EXPLORING RISK-AWARENESS AS A CULTURAL APPROACH TO SAFETY: EXPOSING THE GAP BETWEEN WORK AS IMAGINED AND WORK AS ACTUALLY PERFORMED

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ABSTRACT

Safety culture has risen to prominence over the past two decades as a means by which organisations may enhance their safety performance. One way to conceptualise safety culture is as an interpretive device that mediates between organisational rhetoric and safety programs on the one hand, and how local workplace cultures make sense of and choose to interpret the rhetoric and programs on the other. More recently, risk-awareness programs have emerged as an approach to changing safety culture. Front line workers are encouraged to become risk-aware through programs designed to prompt them to undertake mental or informal risk assessments before commencing work. The problem is that risk-awareness programs have not been the subject of systematic research. Therefore, the purpose of this ethnographic study of two sites within a large contract maintenance organisation in Australia was to explore the impact of a risk-awareness program upon workers' awareness of risks, their risk control practices, managers' practices in relation to the program and the impact of the program on safety culture more generally. This study found that managers focused upon collecting the paperwork associated with the program whereas workers preferred to rely upon their common sense to keep them safe. For workers, the completion of the paperwork became a ritual that served to appease the organisational rhetoric about safety but had minimal influence upon their awareness of risk and their risk control practices. Consequently, the paperwork created an illusion of safety for managers as much as common sense did for workers. Therefore, this study found a gap between work as it was imagined by the managers and work as it was actually performed by the workers. The results of this study have implications for the design of risk-awareness programs and the role of risk-awareness programs in creating a culture of safety.

1. INTRODUCTION

Recently, risk-awareness programs have emerged as an approach to changing safety culture (Hopkins, 2005a). These programs encourage workers to stop and think about risk before commencing work. However, the notion and importance of safety culture has been debated since the term rose to prominence following the investigations into the 1986 Chernobyl nuclear reactor disaster in the Ukraine which was attributed to a failure of safety culture (Gherardi et al., 1998; Glendon & Stanton, 2000; Pidgeon, 1997; Weick & Sutcliffe, 2001). Safety culture, or the lack of a safety culture, has gone on to be implicated in a range of disasters world-wide including both the Challenger (Presidential Commission on the Space Shuttle Challenger Accident, 1986) and Columbia (NASA, 2003) space shuttle disasters in the United States and more recently, the BP Texas City fire and explosion which killed 15 and injured 180 (CSB, 2007), also in the United States. With a poor safety culture being implicated in so many disasters it is not unreasonable to infer that a good safety culture may enhance safety performance. For example, in Australia, the inquiry into the Waterfall rail disaster in New South Wales identified

the importance of a good safety culture (McInerney, 2005) as did Hopkins' (2005a) analysis of the Glenbrook rail disaster, also in New South Wales – Australia. However, the notion of a "good" safety culture may be a misnomer and may be better thought of as a culture of safety, or more particularly, organisational cultures that emphasise safety (Hopkins, 2005a).

But the dual notions of organisational culture and a culture of safety are difficult to grasp and enact due to the range of theoretical debates that abound. For example, organisational culture may be thought of as a metaphor (Alvesson, 2002), or as being either integrated, differentiated or fragmented (Martin, 2002), or as operating at a number of levels (Schein, 2004). The sources of culture vary from leadership (Schein, 2004) to communities of practice (Gherardi & Nicolini, 2000, 2002). The focus for culture change could be, at least in the first instance, organisational practices rather than individual values (Hofstede & Hofstede, 2005). Most of these theories have been applied in one form or another to the study of safety culture (Guldenmund, 2000; Hopkins, 2005a; Reason, 1997; Richter & Koch, 2004; Weick & Sutcliffe, 2007).

Within the field of safety culture, a range of approaches for thinking about safety culture have emerged. For example, Hopfl (1994) describes safety culture as an interpretive device that mediates between the espoused values of the corporate culture and the taken for granted assumptions of the workplace culture. Similarly, other researchers suggest that safety culture is an emergent property of social groups (Gherardi & Nicolini, 2000; Pidgeon & O'Leary, 2000). Alternatively, Reason (1997) argues that it is possible to engineer an informed culture and that an informed culture is a safety culture. Hudson (2003) argues that an informed culture evolves whilst Weick and Sutcliffe (2007) view the content of an informed culture as being consistent with the principles of collective mindfulness.

In more recent times Hopkin's (2005a) has coined the term risk-awareness as a cultural approach to safety, arguing that a culture of risk-awareness is interchangeable with the notions of an informed culture and collective mindfulness. According to Hopkins, risk-awareness is enacted through collective or organisational practices rather than through trying to change the mindsets of individual workers. Risk-awareness is encouraged among the workforce, through programs such as "Take time take charge", a program that requires workers to stop and think about risk before commencing work. The problem is that these types of risk-awareness programs have not been the subject of systematic research, neither in relation to the impact these programs have on individual risk-awareness or in relation to the extent to which these programs create cultures of risk-awareness. This research used Hopfl's (1994) idea that safety culture is an interpretive device to explore how successful one organisations leader initiated risk-awareness program was in creating cultures of risk-awareness and workers who are more risk-aware.

2. CHARACTERISTICS OF A CULTURE OF RISK-AWARENESS

In practical terms, risk-awareness is developed in organisations through programs that encourage workers to undertake a risk assessment in their minds before commencing work (Hopkins, 2005a). Risk-awareness programs, as a cultural approach to safety, rely not only on individual risk-awareness but on organisational systems that encourage risk-awareness (Hopkins, 2005a, 2007). For example, supervisors may ask workers at toolbox or other meetings to provide examples of what hazards they became aware of and what action they took to control risk. In turn, managers may ask supervisors to report the results of these meetings back to them and so on up the organisation's safety reporting system.

Hopkins (2002; 2005a; 2005b) identifies at least three reasons for promoting risk-awareness. The first reason is that it is impossible to write a safety rule to cover every situation (Hopkins, 2005a). Workers who are risk-aware will appreciate the limitations of safety rules and will focus more on risk rather than mindlessly following the rules. The second reason is that workers who are risk-aware will report more safety issues and make more suggestions for improving safety (Hopkins, 2005a). The third reason is that individual workers who are more risk-aware will be able to identify ways in which things might go wrong and take action to prevent things from going wrong (Hopkins, 2005a). Hopkins describes risk-awareness programs as a "mini risk assessment" (Hopkins, 2006).

2.1 Risk-awareness programs as an approach to risk assessment

Risk-awareness is a cultural approach to safety but it is also a form of risk assessment and has been variously referred to as 'informal risk assessments on day-to-day tasks' (Joy & Griffiths, 2005), 'informal/mental risk assessment' (Australian Coal Association Research Program, 2007), 'last minute risk assessments' (Gillette et al., 2004) and 'mini risk assessments' (Hopkins, 2005b). What makes risk-awareness programs a form of risk

assessment is that risk-awareness programs encourage workers to stop and think before starting work so that they may identify hazards and take action to control the associated risks.

Hopkins cites several examples of risk-awareness programs operating in industry including Esso Norway's 'Step-back five by five' (Hopkins, 2002; Hopkins, 2005a) and Xstrata Coal's 'Stop, Look, Assess, Manage' (Hopkins, 2005b). Another example of these types of programs is the popular "Take 5" program which has its origins in the oil and gas industry. The common feature in each of these programs is that they encourage individual workers to stop before starting a job, to think about the hazards on the job and to ensure that adequate risk controls are in place before starting work.

2.2 Risk-awareness programs as a form of situation awareness

Risk-awareness, at the level of the individual worker, is essentially giving workers what Westrum (1992, p. 404) calls a "licence to think". In a similar way, Hopkins (2005a, p. 17) suggests that workers "need to act with a heightened awareness of the risks involved" but does not specify the individual cognitive processes that enable or restrict workers' abilities to act with "heightened awareness". The concept of situation awareness provides a model that may fill this gap.

Situation awareness (SA) is an approach to understanding the cognitive processes involved in decision making in complex and dynamic environments (Endsley, 1995a). Although situation awareness has its origins in aviation (Endsley, 1995b, 2000; Stanton et al., 2001) it is said to be applicable to a range of working environments and according to Endsley (1995b, p. 33) "many other everyday activities call for a dynamic update of the situation to function effectively. Walking, driving in heavy traffic, or operating heavy machinery surely call for SA".

Endsley (1995b, p. 36) proposes that situation awareness is about "knowing what is going on" and defines situation awareness as "the perception of the elements in the environment within a volume of time and space, the comprehension of their meaning, and the projection of their status in the near future".

Endsley (1995b) has proposed a model of situation awareness in dynamic decision making that includes a three-level hierarchy, or three steps toward achieving situation awareness from which follows decision making and action. The first level, perception of elements in the environment, is influenced by the ability of the individual to pay attention to the relevant elements. This ability is influenced by experience, training and the availability of cues in the environment. The second level, comprehension of the current situation, goes beyond perception to how people interpret and integrate information relative to their goals. According to Endsley, experience plays a role as do existing mental models against which the picture of the situation will be compared. The third level, projection of future status, is influenced by how effectively meaning is comprehended so that future status can be predicted for decision making and action.

Situation awareness has parallels with the purpose of risk-awareness programs because it elaborates the cognitive processes associated with achieving 'awareness'. The three levels of situation awareness can be applied successfully to better understand how individuals can act with heightened awareness of risk. For example, relevant elements in the working environment that could impact upon risk must be perceived. These elements could include the hazards associated with a particular task, the adequacy of existing safety rules, time pressures, changes in the physical environment, availability of equipment, and the availability of other people to assist with the task. To control risk, the perceived elements must be integrated and comprehended such that a picture emerges of how things could go wrong.

2.3 The role of common sense in safety culture and risk-awareness

Although situation awareness may explain the cognitive processes involved in becoming more risk-aware, 'common sense' may also play a role in shaping safety culture and what it means to be risk-aware. For example, workers may use their common sense knowledge of what it means to work safely as a proxy for risk-awareness.

The literature on common sense has its roots in philosophy (Lonergan, 1957, 1980), anthropology (Geertz, 2000) and the study of health behaviours (Diefenbach & Leventhal, 1996; Leventhal et al., 1980). Common sense knowledge, as opposed to theoretical knowledge, is a concept derived from philosophy and anthropology and is characterised by knowing for the sake of doing (Gerber, 2000, 2001; Stewart, 1996). This type of knowledge is practical, concrete, immediate and localized (Stewart, 1996). Common sense knowledge may develop into a shared network or system of beliefs (Forguson, 1989; Linde, 1993) about the world and be thought of as a cultural system (Geertz, 2000).

Lonergan (1980, p. 111) defines common sense as "a basic nucleus of insights that enables a person to deal successfully with personal and material situations of the sort that arise in his ordinary living, according to the

standards of the culture and the class to which he belongs". Insights are understandings people hold to perform certain actions (Gerber, 2000; Lonergan, 1957, 1980; Stewart, 1996). Common sense knowledge does not aim to produce knowledge that is "universally valid"; rather validity is tested by the ability of common sense to deliver "practical results" (Stewart, 1996, p. 16). This means that common sense knowledge is a form of situated knowledge that is specific to a particular culture or community (Geertz, 2000; Gerber, 2000, 2001; Stewart, 1996). Consequently, workers' common sense knowledge has the potential to play as equally an important role in influencing their awareness of risk and shaping safety culture as formal risk-awareness programs.

Within the field of occupational health and safety, common sense has emerged as a factor in a number of studies. For example, Somerville and Abrahamsson (2003) explored how Australian mine workers learn safe work practices and found that workers preferred to use 'common sense' rather than safety rules to keep them safe. Similarly, in a study of safety rules at an Australian mine site, Laurence (2005) also found support for the view that safety rules should reflect common sense. Gerber (2001, p. 72), in a phenomenographic study of workers "experience of and practice in using common sense in their work" found that common sense was associated with acting and working safely because "they have anticipated the problems in performing a work task and they avoid any risky behaviours". This view of common sense may have something in common with risk-awareness, in fact Gerber argues that common sense may be an example of acting mindfully (Gerber, 2000).

The findings of these studies reflect Turner's (1996) view that beliefs about what constitutes safe work practices may be embedded in 'common sense' and culturally accepted views of work. Although Turner's work is in the area of disaster research, it may be that even for mundane and every-day risks, common sense views may prevail until a serious injury occurs. The serious injury may challenge existing beliefs about safe work practices and render them incommensurate with previously held common sense. As a result, cultural re-adjustment (Turner & Pidgeon, 1996) may occur that also includes some re-adjustment of what constitutes common sense in relation to safe work practices.

Conversely, an Australian report, commissioned by the Australian Safety and Compensation Council to identify the drivers and barriers to improved occupational health and safety performance within the agriculture sector (O'BrienRich Research Group, 2006), found that the belief among farmers that safety is common sense was a significant barrier to improved occupational health and safety performance. Further, a New Zealand study commissioned by the Department of Labour to evaluate the impact of legislative changes upon safety management (Centre for Research on Work Education and Business Limited, 1999, 2000) found that whilst workers and supervisors believed safety was common sense, this assumption was rejected by managers. This study concluded that 'common sense' was associated with the least developed or laissez faire stage of safety management.

Therefore, although common sense knowledge in relation to safety may be valued by workers as part of their culture, it is not necessarily accepted by managers and regulators as a means for controlling risk.

3. OVERVIEW OF THE ORGANISATION

This research took place at two very different sites of an Australian multi-national organisation that provides a range of contract maintenance services. Site A is in the water industry sector and is located in a rural city. For many years the company has held the contract to maintain water and waste water treatment plants and their associated infrastructure on behalf of the local water authority. Workers operate out of a 'depot' but are required to provide maintenance services over a large geographical area which means that workers spend a good proportion of their time driving their trucks between the depot and jobs in the field. At times workers may work alone in remote and isolated areas whilst at other times they may be required to work in groups. Work ranges from entry into confined spaces to cleaning sewer wells. These wells are sometimes located in the middle of busy roads. Site B is in the facilities management industry sector and is located in a town on the fringe of a major metropolitan city. The company has held the contract to maintain public parks and open spaces for many years on behalf of the local shire council. Again, workers operate out of a 'depot' but are required to provide maintenance services over a large geographical area, once again requiring workers to spend a good proportion of their time driving their trucks between the depot and jobs in the field. Unlike Site A, workers at Site B work in teams most of the time. Work ranges from removing large trees on the side of busy roads to grass cutting and weed spraying.

3.1 A description of the risk-awareness program

The organisation has a highly structured and systematic approach to managing occupational health and safety built on a model of continuous improvement.

The risk-awareness program was introduced by the corporate safety office approximately one year prior to this research. Workers were introduced to the program at toolbox meetings through a PowerPoint presentation along with the handing-out of supporting materials.

The risk-awareness program has two components. The first is a pocket card which is designed to act as a prompt for workers to stop and think about risk before commencing work. The second is a formal process that requires workers to complete a form to demonstrate that they have assessed risk before starting work. The implementation of the risk-awareness program is controlled via a policy and a procedure. The procedure is supported by a form for documenting the risk-awareness process. This form is used by managers as evidence that workers have thought about risk before commencing work. The use of the pocket card, however, is not mentioned in the policy and procedure. The policy states that the intent of the risk-awareness program is to document that workers have thought about and controlled task specific hazards before commencing work. The procedure requires that the risk-awareness program be used for every task that a worker or workgroup performs. The procedure states that the form used to record the risk-awareness program can be adapted to suit local circumstances. The policy and procedure does not mandate when workers should use the pocket card rather than the formal risk-awareness process.

The pocket card is a two-sided laminated card. An acronym on the front of the card prompts workers to stop, think and assess risk before commencing work. The "assess" step in the process prompts workers to think about the hazards (what can go wrong?), the pathway (how can it occur?) and the impact (what is the most likely result?). The back of the card contains a range of hazard specific questions to further prompt the worker. For example, workers are asked to think about manual handling issues including their ability to lift objects safely. More general questions require workers to think through what impact the work might have on others. The card also prompts workers to consider if their assessment has revealed any uncontrolled hazards.

The formal risk-awareness process requires workers to complete a one-sided form. The form captures information in relation to the work location and the type of work being performed. The form also asks workers if they have reviewed their pocket card and the prompts from the pocket card are repeated, in part, on the form. The form picks up the prompt from the pocket card in relation to uncontrolled hazards. If an uncontrolled hazard is identified, then there is space provided on the form for workers to describe the issues or hazard and the action to be taken (control measure/s). Having reviewed the task, workers are then required to sign the form before starting work.

In accord with the risk-awareness policy and procedure, individual sites have adapted the form to suit local circumstances, particularly in relation to what should be assessed. Consequently, a number of different versions of the form are in use by different work groups within the same site. The adapted forms are designed to make it easier and quicker for workers to complete, usually by way of a checklist of items for workers to consider and tick-off. Workers or work groups are required to submit their completed risk-awareness forms to their supervisor or manager at the end of each shift for filing.

3.2 Organisational practices that support the risk-awareness program

Toolbox meetings are used by supervisors and managers to encourage workers to use the risk-awareness program. In particular, workers are encouraged to hand-in completed risk-awareness forms to their supervisor at the end of each day for filing.

Although the organisation has a safety performance measurement system that escalates a range of performance measures up the organisational hierarchy, the outcomes of the risk-awareness program are not included and the performance of the risk-awareness program remains a site level matter.

4. METHODOLOGY

This study adopted the perspective that safety culture is an interpretive device (Hopfl, 1994) that mediates between the leader initiated risk-awareness program on the one hand and the acceptance of the program by the workplace cultures on the other. That is, the outcome of this interpretation and mediation process will determine whether the program is successful in creating cultures of risk-awareness. Furthermore, this perspective refutes the view that meaning and therefore meaningful reality exists apart from consciousness (Crotty, 1998), or that the

objective truth about risk is waiting to be discovered in a risk-awareness program. Rather, this study takes the view that meaning about risk and therefore meaningful reality about risk-awareness is socially constructed (Berger & Luckman, 1966) through engagement with the real world that human beings are interpreting (Crotty, 1998).

The assumption that knowledge is socially constructed through interactions in a given context creates a strong justification for using ethnography as a methodology for exploring the nature of those interactions. Ethnography, as an approach which requires the researcher to study people in their naturally occurring settings (Brewer, 2000), is an established approach to the study of safety culture. For example, ethnography has been used to: study how novices learn the trade on an Italian construction site (Gherardi & Nicolini, 2002); how mine workers in Australia learn safe work practices (Somerville & Abrahamsson, 2003); to explore perceptions of safety culture in a Danish manufacturing organisation (Richter & Koch, 2004); to explore safety management in the Australian fishing industry (Brooks, 2005); to analyse the space shuttle *Challenger* disaster (Vaughan, 1997) and to study high reliability organisations in the United States (La Porte & Consolini, 1991).

4.1 Methods

Three methods consistent with an ethnographic approach were used for collecting data: a review of organisational documents related to the risk-awareness program, participant observation and semi-structured interviews.

Data related to the risk-awareness program were collected to provide the background and context for data subsequently collected through participant observation and semi-structured interviews. Data collected included the organisation's policy and procedure related to the risk-awareness program, the programs forms and pocket-cards, examples of completed risk-awareness forms and annual reports that mentioned the intent of the risk-awareness program.

The researcher spent eight months interacting with the organisation including visits to National and State offices to converse with members of the corporate safety team and arrange entry into the field. Two months were spent at the sites undertaking participant observation and sensitising concepts were used as "suggested directions along which to look" (Shibutani, 1970 p. 8). Site entry was negotiated through the contract manager.

Semi-structured interviews (Minichiello et al., 1995) were conducted with 19 workers and 7 managers. The interviews were normally conducted after periods of participant observation to add context colour and focus to the interviews.

5. THE IMPACT OF THE RISK-AWARENESS PROGRAM ON SAFETY CULTURE

The findings of this study suggest that in the case of risk-awareness programs that a culture of safety does not emerge solely from leadership or from the organisational structures and processes that they enact. Rather, it seems that a culture of safety also emerges locally from within communities of practice who have the power to interpret and modify the program and its associated rhetoric, in light of their own underlying assumptions about safety. Workers did not value the program, in particular the paperwork, viewing the paperwork as a means for managers to protect themselves from any threat of prosecution. A typical worker response was: *I can't see anybody who's doing it other than to do the paperwork* or more bluntly: *it's all arse-covering at the end of the day*. Ironically, the collection of the paperwork by managers gave them a sense of security that workers were working safely; a sense that is well summed up by the following comment: *I feel comfortable that they have a process that enables them to have a safe worksite.*

This has implications for how organisations, and, in particular how leaders, approach safety culture. In the first instance, this requires leaders to acknowledge that there may be a gap between "work as imagined" by the leaders and the "work as actually performed" by the workers (Dekker, 2006). Consequently, there may be different sets of collective practices operating in different parts and at different levels of the organisation. Therefore, leaders may not be able to change workers' collective practices until they have: invested time and effort into understanding what the collective practices are; the underlying assumptions those practices represent and why they have meaning to the workers and their communities of practice in the first place. Therefore, any change processes must be seen by the workers as adding value to their world of work and to their safety before they will be absorbed. In the second instance, this requires leaders to carefully consider the type of organisational structures and processes and the associated practices that they themselves pay attention to when encouraging risk-awareness among workers. Therefore, leaders' practices should be more focused on eliciting a shared understanding of how workers go about dealing with risk on the job rather than compliance with paperwork. If

leaders have a better understanding of work as it is actually performed, then they will be in a more informed position to design organisational practices that support risk-awareness that have meaning for workers.

6. THE IMPACT OF THE RISK-AWARENESS PROGRAM ON WORKERS' AWARENESS OF RISK

The findings of this study suggest that there may be gaps between the risk-awareness program and the workers' risk-awareness practices and their awareness of risks. Each of the four gaps listed below has implications for the effectiveness of risk-awareness programs. The four gaps are between:

1. The risk-awareness paperwork and the workers' risk-awareness practices;
2. The risk-awareness paperwork and the workers' awareness of risk;
3. The workers' common sense and the workers' awareness of risk;
4. The workers' awareness of risk and the workers' risk control practices.

The first gap represents a 'values' gap and refers to the organisational requirement that, for certain jobs, workers must document, on the prescribed form, that they have stopped to think about risk before commencing work. In practice, workers' compliance with this requirement varies between workers and can also vary from day-to-day and from job-to-job for an individual worker or work crew. One explanation for this is that whilst managers appear to value the paperwork associated with the risk-awareness program because it provides them with proof that workers have thought about risk, workers do not value the paperwork. Instead, workers prefer to rely on their common sense to keep them safe. Therefore, the organisation's espoused values in relation to the risk-awareness program, exemplified by managers constantly reminding workers to complete the paperwork, are inconsistent with the workers' basic underlying assumptions that safety is common sense. Therefore this 'values' gap has implications for the effectiveness of the risk-awareness program and relates back to the first implication that leaders must take time to understand the real collective practices in which workers engage.

An 'illusion of safety' is reflected in gap two and refers to those circumstances when managers are successful in encouraging the workers to complete the paperwork. It was found that there is no guarantee that the paperwork enables the workers to foresee all the risks on a job. For example, on a job of building an estuary boardwalk where the workers had diligently completed the risk-awareness paperwork on the back of the truck prior to commencing the days work, the researcher asked the workers to imagine what could kill them on this job. One worker looked down and said: *if you walked on the joists you could slip and hit your head*, whereas another worker looked up and said: *look at the dead tree there, that dead tree could fall on you*. Not only did the two workers see different risks, what the workers saw had not been identified when they had completed the risk-awareness program paperwork earlier that morning, suggesting that different workers may hold different tacit knowledge based on their own prior experience and training.

Furthermore, when workers were asked to talk through a practical example of how they think about risk, and their responses were classified according to Endsley's (1995b) model of situation awareness, it was found that their responses were incomplete at all levels (perception, comprehension and projection) but most notably at the third level of the hierarchy, that is their ability to project the future status of what they had perceived and comprehended. One explanation for this gap is that workers become fixated on completing the paperwork to please their supervisor or their manager, as opposed to actively thinking about and becoming aware of risks. Furthermore, simplifying the paperwork to make it easier to complete has resulted in a potentially more mindless 'tick and flick' exercise that may not prompt workers to think about risk. A further explanation could be that because there is a requirement to complete the paperwork at the start of the job, then workers are only thinking about risk at one point in time. Consequently, this may dull the workers' awareness of changing circumstances and risk and lull them into a false sense of security that, because the paperwork has been completed, the job must be safe. Therefore, the paperwork may be creating an 'illusion of safety' in the minds of both workers and managers. Once again, these findings have implications for the effectiveness of the risk-awareness program and suggest that an over-emphasis on the paperwork may be detracting from the intent and effectiveness of the program.

A further 'illusion of safety' is reflected in gap three but for different reasons to gap two. This third gap reflects an underlying assumption among some workers that safety is common sense. In fact in the minds of the workers, common sense took precedence over the risk-awareness program. This view is summed up by one worker who said: *I just go about it the way I've always gone about it before they* (the risk-awareness program) *came in. As I said, it's just common sense that you go through the process*. However, common sense, like the paperwork associated with the risk-awareness program, does not guarantee that workers will be able to foresee all

risks. For example, common sense was insufficient for workers to identify the fire risk associated with a hot truck exhaust that was in contact with tinder dry grass, or as one worker said: *A fire hazard! I never thought about that actually! ... but it's actually strange because you think about it when you're driving ... I do a lot of four-wheel driving, and that's one thing I think about.* One explanation for this gap is that common sense knowledge for an individual worker may be limited by their prior training and experience. As a result, common sense knowledge may be highly context specific. Therefore, the belief that safety is common sense may be creating an 'illusion of safety' in the minds of the workers. This finding has implications for the effectiveness of the risk-awareness program and suggests that an over-reliance on common sense may be detrimental to workers' safety and has implications for how workers learn about risk.

The fourth and final gap is between the workers' awareness of risks on the one hand and their decisions and actions in relation to risk control on the other. This 'rule-breaking' gap assumes that even though workers may be aware of the risks on the job, their risk control practices deviate from the formal safety rules. For example, a work group was inspecting a sewer well in a suburban street. The task required that the sewer pump to be manually removed from the well for inspection. Even though the risk-awareness program paperwork had been completed and the worker was aware of the risk of handling a contaminated pump he said: *I used to work in an abattoir and my hands are tough, I don't feel that I need to wear gloves.* Another worker, who was required to wear a motor bike helmet when riding a quad bike whilst spraying weeds in public parklands refused to wear the helmet because: *you can't hear and see as well with the helmet on ... when you are spraying you are all over the place, you really need to be able to hear.* One explanation for this 'rule-breaking' gap is that workers prefer to rely upon their common sense to keep them safe in preference to following the rules. Furthermore, some workers believed that the safety rules did not match the practicalities of their day-to-day work, a situation which further reinforced their need to rely upon common sense. This gap may also be perpetuated by the organisation because the organisation may be unaware that the workers are breaking the rules or of the workers reasons for breaking the rules. In effect, this finding deepens the illusion of safety because, not only is it possible that the risk-awareness program may not be making the workers more risk aware, but workers are also making their own decisions in relation to risk control practices unbeknown to the organisation. This gap has implications for the effectiveness of the risk-awareness program and for the rule-management program. With respect to the former, it has implications for how organisations balance achieving risk-awareness with decision-making and action. The latter has implications for the quality of rule management systems as well as for leaders and their appreciation of the gap between the formal safety rules and how the workers apply those rules in practice.

7. CONCLUSIONS

This research found that the paperwork associated with the organisation's risk-awareness program created an illusion of safety for managers as much as common sense did for the workers. These findings suggest that leader initiated risk-awareness programs may not be successful in creating cultures of risk-awareness, particularly if there is an overemphasis on paperwork and common sense, and an under emphasis on the gap between work as imagined by the managers and work as it is actually performed by the workers. To make risk-awareness programs more successful, and to close the gap between paperwork and practice, organisations should focus less on the paperwork and more on implementing structures of accountability that hold managers responsible for learning from the outcomes of these programs. Furthermore, if the source of culture is as much communities of practice as it is organisational leaders, then leaders need to understand the safety practices that develop informally in these communities. To do so, leaders and managers must spend time in these communities of practice and build trust among the members. With trust comes the opportunity to make tacit knowledge explicit. This knowledge can then be shared among members of the community and with managers. Therefore, communities of practice become the site for learning and provide a mechanism through which organisations can grow a worker's base-line of common sense. Finally, understanding work as it is actually performed will allow managers to develop safety rules that are grounded in reality, and to create a culture of safety that encourages workers to be mindfully rule guided rather than mindlessly rule bound.

REFERENCES

Alvesson, M. (2002). *Understanding organizational culture*. London: Sage.

Australian Coal Association Research Program. (2007). *Communication strategies and mechanisms that maximise the effectiveness of informal/mental risk assessment programs* (No. C13078): Australian Coal Association Research Program.

Berger, P. L., & Luckman, T. (1966). *The social construction of reality*. Baltimore, U.S.A.: Penguin.

Brewer, J. D. (2000). *Ethnography*. Philadelphia, USA: Open University Press.

Brooks, B. (2005). Not drowning waving! Safety management and occupational culture in an Australian commercial fishing port. *Safety Science, 43*, 795-814.

Centre for Research on Work Education and Business Limited. (1999). *Evaluation of the ACC reforms: Case study research* (No. 1). Christchurch NZ: Department of Labour.

Centre for Research on Work Education and Business Limited. (2000). *Evaluation of the ACC reforms: Case study research* (No. 2). Christchurch NZ: Department of Labour.

Crotty, M. (1998). *The foundations of social research: Meaning and perspectives in the research process*. St. Leonards: Allen & Unwin.

CSB. (2007). *Investigation report: Refinery explosion and fire* (No. 2005-04-I-TX): CSB.

Dekker, S. (2006). Resilience engineering: Chronicling the emergence of confused consensus. In E. Hollnagel, D. D. Woods & N. Leveson (Eds.), *Resilience engineering: Concepts and precepts*. Hampshire: Ashgate.

Diefenbach, M. A., & Leventhal, H. (1996). The common-sense model of illness representation: Theoretical and practical considerations. *Journal of Social Distress and the Homeless, 5*(1), 11-38.

Endsley, M. R. (1995a). Measurement of situation awareness in dynamic systems. *Human Factors, 37*(1), 65-84.

Endsley, M. R. (1995b). Toward a theory of situation awareness in dynamic systems. *Human Factors, 37*(1), 32-54

Endsley, M. R. (2000). Theoretical underpinnings of situation awareness: A critical review. In M. R. Endsley & D. J. Garland (Eds.), *Situation awareness analysis and measurement*. Mahwah, NJ: Lawrence Erlbaum Associates.

Forguson, L. (1989). *Common sense*. London: Routledge.

Geertz, C. (2000). *Local knowledge: Further essays in interpretive anthropology* (2nd ed.). New York: Basic Books.

Gerber, R. (2000). Experience, common sense and expertise in workplace learning. In R. Gerber & C. Lankshear (Eds.), *Training for a smart workforce*. London: Routledge.

Gerber, R. (2001). The concept of common sense in workplace learning and experience. *Education & Training, 43*(2), 72-81.

Gherardi, S., & Nicolini, D. (2000). The organizational learning of safety in communities of practice. *Journal of Management Inquiry, 9*(1), 7-19.

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

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

Gillette, K., Haaland, D. K., Steinsvik, D., & Edgar Jensen, K. (2004). *The green and red roadmap to a safety culture where "nobody gets hurt"*. Paper presented at the The Seventh SPE International Conference on Health , Safety, and Environment in Oil and Gas Exploration and Production, Calgary, Alberta, Canada 29-31 March 2004.

Glendon, A. I., & Stanton, N. A. (2000). Perspectives on safety culture. *Safety Science, 34*, 193-214.

Guldenmund, F. W. (2000). The nature of safety culture: A review of theory and research. *Safety Science, 34*, 214-257.

Hofstede, G., & Hofstede, J. (2005). *Cultures and organizations: Software of the mind*. New York: McGraw-Hill.

Hopfl, H. (1994). Safety culture, corporate culture: Organizational transformation and the commitment to safety. *Disaster Prevention and Management, 3*(3), 49-58.

Hopkins, A. (2002). *Safety, culture, mindfulness and safe behaviour: Converging ideas*.Unpublished manuscript, Canberra.

Hopkins, A. (2005a). *Safety, culture and risk*. Sydney: CCH Australia.

Hopkins, A. (2005b). *What are we to make of safe behaviour programs?* Paper presented at the Behavioural Approaches to Managing OH&S, Melbourne.

Hopkins, A. (2006). What are we to make of safe behaviour programs? *Safety Science, 44*(7), 583-597.

Hopkins, A. (2007). *Lessons from Gretley: Mindful leadership and the law*. Sydney: CCH Australia.

Hudson, P. (2003). *Understanding safety management in the context of organisational culture.* Paper presented at the NATO/Russia ARW Forecasting and Preventing Catastrophes 2-6 June, University of Aberdeen.

Joy, J., & Griffiths, D. (2005). *National minerals industry safety and health risk assessment guideline*. Brisbane, Australia: MISHC, University of Queensland.

La Porte, T. R., & Consolini, P. M. (1991). Working in practice but in theory: Theoretical challenges of "high reliability organizations". *Journal of Public Administration Research and Theory, 1*, 19-47.

Laurence, D. (2005). Safety rules and regulations on mine sites: The problem and a solution. *Journal of Safety Research, 36*, 39-50.

Leventhal, H., Meyer, D., & Nerenz, D. (1980). The common sense representation of illness and danger. In S. Rachman (Ed.), *Contributions to medical psychology*. New York: Pergamon Press.

Linde, C. (1993). *Life stories: The creation of coherence*. New York: Oxford University Press.

Lonergan, B. (1957). *Insight: A study of human understanding*. New York: Philosophical Library.

Lonergan, B. (1980). *Understanding and being: An introduction and companion to insight*. New York: Edwin Mellen Press.

Martin, J. (2002). *Organizational culture: Mapping the terrain*. Thousand Oaks CA: Sage.

McInerney, P. A. (2005). *Special commission of inquiry into the Waterfall rail accident*. Sydney.

Minichiello, V., Aroni, R., Timewell, E., & Alexander, L. (1995). *In-depth interviewing* (2nd ed.). Melbourne: Longman.

NASA. (2003). *Columbia accident investigation board report volume 1*. Washington, D.C.: NASA.

O'BrienRich Research Group. (2006). *Beyond common sense: A report on the barriers to adoption of safety in the agriculture industry*. Barton ACT: Australian Safety and Compensation Council.

Pidgeon, N. (1997). The limits to safety? culture, politics, learning and man–made disasters. *Journal of Contingencies & Crisis Management, 5*(1), 1-14.

Pidgeon, N., & O'Leary, M. (2000). Man-made disasters: Why technology and organizations (sometimes) fail. *Safety Science, 34*, 15-30.

Presidential Commission on the Space Shuttle Challenger Accident. (1986). *Report to the President by the Presidential Commission on the Space Shuttle Challenger Accident. 5 vols.* Washington, D.C.

Reason, J. (1997). *Managing the risks of organizational accidents*. Aldershot: Ashgate.

Richter, A., & Koch, C. (2004). Integration, differentiation and ambiguity in safety cultures. *Safety Science, 42*, 703-722.

Schein, E. H. (2004). *Organizational culture and leadership* (3rd ed.). San Francisco: Jossey-Bass.

Shibutani, T. (Ed.). (1970). *Human nature and collective behavior: Papers in honor of Herbert Blumer*. New Jersey: Prentice-Hall.

Somerville, M., & Abrahamsson, L. (2003). Trainers and learners constructing a community of practice: Masculine work cultures and learning safety in the mining industry. *Studies in the Education of Adults, 35*(1), 19-35.

Stanton, N. A., Chambers, P. R. G., & Piggott, J. (2001). Situational awareness and safety. *Safety Science, 39*, 189-204.

Stewart, W. A. (1996). *Introduction to Lonergan's insight*. Lewiston NY: The Edwin Mellen Press.

Turner, B., & Pidgeon, N. (1996). *Man-made disasters* (2nd ed.). Oxford: Butterworth-Heinemann.

Vaughan, D. (1997). The trickle-down effect: Policy decisions, risky work, and the *Challenger* tragedy. *California Management Review, 39*(2), 80-102.

Weick, K. E., & Sutcliffe, K. M. (2001). *Managing the unexpected*. San Francisco: Jossey-Bass.

Weick, K. E., & Sutcliffe, K. M. (2007). *Managing the unexpected* (2nd ed.). San Francisco CA: John Wiley & Sons.

Westrum, R. (1992). Cultures with requisite imagination. In J. A. Wise, V. D. Hopkin & P. Stager (Eds.), *Verification and validation of complex systems: Human factors issues*. New York: Springer-Verlag.