What's Slowly Cooking in the Pressure Cooker?
Safety Culture Contradictions in Atlantic Canada's Offshore Oil Sector

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Business owners and senior management recognize that poor safety practices have a direct impact on profitability. Safety is critical in the offshore oil sector, and oil rigs operating in the North Atlantic face perilous conditions. We use a case study of an oil rig disaster to examine the role that safety culture played in this event. This paper examines the findings of a government inquiry into this disaster and explores workers' perceptions of the sector's commitment to fostering a safe work environment in the years subsequent to the disaster. Significant tragic accidents continue to occur in the offshore oil sector.

INTRODUCTION

Today's business environment places an unprecedented level of attention on safety. Business owners and senior management recognize that poor safety practices have a direct impact on profitability. The financial cost of workplace accidents can be significant, including workers' compensation payments, training and salary for replacement workers, lost productivity and loss/damage to equipment. Clearly, companies benefit by promoting a safety culture.

Safety is critical in the offshore oil sector, and oil rigs operating in the North Atlantic face perilous conditions. In this paper, we use a case study of an oil rig disaster to examine the role that safety culture played in this event. The paper examines the findings of a government inquiry into this disaster and explores workers' perceptions of the sector's commitment to fostering a safe work environment in the years subsequent to the disaster.

It is important to conduct this research since significant tragic accidents occur in the offshore oil sector. For example, in 2009, a helicopter transporting workers to the oil rig off the coast of Newfoundland, Canada, crashed with all people on board losing their lives; in 2010 a British Petroleum oil rig off the coast of Texas caught fire and many workers died. This study adds to the literature on the role of national culture, industry culture, and organizational culture on the offshore work environment safety culture.

Context for the Study

On Valentine's Day, 1982, a storm raged off the shores of Newfoundland, Canada. One hundred and seventy nautical miles east of St. John's, Newfoundland's capital city, waves higher than 20 feet beat against the "unsinkable" Ocean Ranger (OR) oil rig. As the storm unfolded the rig began to tip. It later

capsized, causing the entire 84-man crew to lose their lives. When the Ocean Ranger sank to the bottom of the Canadian North Atlantic on February 15, 1982, it was the largest self-propelled semi-submersible offshore drilling unit in the world (Furey and Rixon, 2018).

The province of Newfoundland and Labrador is a northern jurisdiction in the North Atlantic, and the most easterly of the 13 provinces in Canada. The province has a significant offshore oil and gas industry; indeed, oil revenue accounts for about one third of the provincial government's total revenues of nearly 6.9 billion dollars (Barnes, 2014; Province of Newfoundland & Labrador, 2015). The Hibernia oil field, where the Ocean Ranger was located, is about 200 miles east of St. John's, the operations center for the Ocean Ranger. The oil rig itself was American owned by Ocean Drilling and Exploration Company (ODESCO); therefore, some of the OR decision-making power was with the head office of that corporation in New Orleans.

As illustrated in Figure 1, there were several players involved in the operation of the Ocean Ranger on the Hibernia Oil field. It was regulated by the Canada-Newfoundland and Labrador Offshore Petroleum Board (CNLOPB), in charge of managing the regulatory aspects of petroleum resources in NL on behalf of the federal and provincial governments. Mobil Oil was the company involved with exploration, drilling and production. The Ocean Ranger oil rig was manufactured and owned by the Ocean Drilling & Exploration Company (ODECO) and it was leased to Mobil Oil at the time when the oil rig capsized.

FIGURE 1
HIBERIA/OCEAN RANGER ORGANIZATIONAL CHART
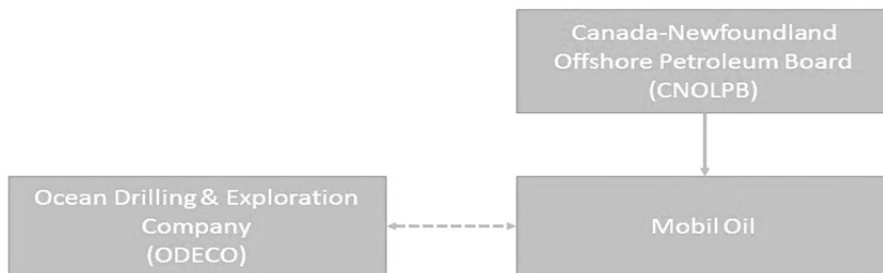
LITERATURE REVIEW

Safety culture can be defined as: "the safety culture of an organization is determined by the product of individual and group values, attitudes, perceptions, competencies and patterns of behaviour that determine the commitment to, and the style and proficiency of and organisations health and safety management" (Health and Safety Commission, 1993, page 23). In comparison, Zohar (2003) defines safety climate as employee perceptions regarding the enactment of organizational policies and procedures relating to safety.

While the terms safety culture and safety climate are often used interchangeably, it can be argued that they are fundamentally different since safety climate deals with how employees perceive and behave towards safety in risks, whereas, safety culture is comprised of underlying norms, values and expectations (Tanga et al, 2018; Mearns and Flins, 1999). Tanga et al (2018) and Cox and Cheyne (2000) contend that safety culture is much more complex concept than safety climate since safety culture is associated with social values while safety climate is often displayed through safety management practices and can be engineered by leadership (Glendon and Stanton, 2000).

In distinguishing organizational culture from safety culture, Rentsch (1990) and Tanga et al (2018) note that organizational culture reflects how individuals perceive safety. Just as safety culture influences safety climate, organizational culture influences organizational climate. Safety culture can be considered to be a subset of organizational culture (Guldenmund, 2000; Hopkins,1999 and Pidgeon,1997). Similarly,

safety climate can be perceived to be a component of organizational climate (Mearns and Flin, 1999). However, Choudry et al (2007) argue that while organizational culture can embed safety culture, it cannot be assumed that safety culture is automatically driven by organizational culture because not all organizations view safety as a vital aspect of their business. Others argue that culture is the driving force behind climate since culture encompasses the values, norms and expectations of society (Flin et al, 2000 and Mearns et al, 2003).

When examining safety culture and organizational culture, it is important to consider the impact of national culture on safety. According to Mearns and Yule (2009) national culture may have an impact on safety in the oil and gas sector. They noted that in some areas of the world, particularly in less developed areas, there may not be a strong focus on health and safety issues because employees are more concerned with securing employment than with safety. This is a reflection of Maslow's (1943) hierarchy of needs where the physiological needs have to be fulfilled before employees become concerned with safety and security.

Another aspect of culture that impacts safety culture relates to the attitudes of workers in the traditionally male dominated oil and gas industry sector. The oil and gas industry in the western world is largely male dominated and exhibits a macho culture. In fact, many of the early workers in the offshore oil and gas sector were typically rough and tough guys who enjoyed taking risks and accepted it as part of the job. Indeed, this was one of the reasons in the 1970s and 1980s they were paid high wages to compensate for the high level of risk associated with the job. This was referred to as danger money (Mearns and Yule, 2009).

The level of senior management commitment to safety has a powerful impact on the safety culture of an organization. For organizational culture to be a source of institutional resilience instead of vulnerability, Pidgeon contended it should include "senior management commitment to safety; shared care and concern for hazards and solicitude over their impacts upon people; realistic and flexible norms and rules about hazards; continual reflection upon practice through monitoring, analysis and feedback systems" (p. 7). Preventing disaster does not involve seeking change to individuals or improving the climate of safety (Pidgeon, 1997), but instead involves improving the way safety is managed and remedying organizational defects (Hopkins, 1999).

In the safety climate literature, several scholars have identified management commitment and workforce involvement as key components of a safety climate (Dedobbeleer and Beland, 1998; Flin et al., 2000; Guldenmund, 2000). Mearns and Yule (2009) contend that both climate and culture researchers believe management is essential to a safe work environment. Mearns and Yule argue that management commitment to safety is paramount in establishing a safe work environment. They argue that employees are informed about safe practices through the statements and actions of management. Indeed, management safety attitudes versus other organizational goals such as productivity, efficiency, etc. are important in demonstrating to employees the level of importance attached to safety.

Several researchers have examined crisis in various industrial sectors to determine the role played by safety culture. For example, Hopkins (1999) theorized two sets of cultural factors prevented an appropriate response to signs of an upcoming crisis during its incubation period at the 1994 Moura Mines incident in Australia when 11 miners lost their lives in an explosion. First, there was a hierarchy of knowledge that "placed greatest value on personal experience and systematically discounted the reports of others," and second, there was a culture of denial, characterized by "an elaborate set of beliefs that "it couldn't happen here'" (Hopkins, 1999, p. 141). Psychology studies have shown that "where the evidence conflicts with belief, the individual is in a state of 'cognitive dissonance,' an unpleasant state that must be resolved by adjusting either the belief or the evidence" (Hopkins, 1999, p. 144). At Moura Mine, the belief that spontaneous combustion was extremely unlikely had the psychological effect of stifling the relevance of evidence to the contrary. This dissonance prevented the miners from adjusting either the belief or the evidence; they could not see the potential danger of an explosion ripping through the mine, entombing them.

Similarly, denial of dangerous circumstances prevented recognition of crisis warning signs at Westray Mine, Nova Scotia, in 1992, in which 26 miners lost their lives in an explosion (Hynes and Prasad, 1997).

One analysis found an institutionalized 'mock bureaucracy' developed at Westray (Hynes and Prasad, 1997). Mock bureaucracy is a term coined by Gouldner (1954) to describe an environment in which rules and regulations are promoted by organizational bureaucracy in posters, memos, and so on, but are ignored in practice. Managers and workers at Westray considered official safety rules and regulations to have little legitimacy. Ignoring safety regulations had become a systematic pattern by the time of the May 1992 explosion (Hynes and Prasad, 1997).

Westray managers may have neglected safety regulations to maximize profit (Hynes and Prasad, 1992). However, the workers were also equally noncompliant. The authors attributed this to several factors: (a) they were not unionized, (b) were relatively new and less familiar with common coal mine precautions, (c) had very little training in safety regulations, (d) were socialized at the mine in ways that dulled the sense of danger underground, and (e) were affected by cultural ideas of masculinity as well as the pragmatic need to keep comparatively well-paying jobs in an area of high unemployment (Hynes and Prasad). Similarly, Beck et al. (2004) provided support for the profit-maximizing theory in an analysis of a cost-benefit ratio of safety measures. The caliber of health and safety or risk to human life can be affected by an environment of cost-cutting methods to the degree that accidents may be caused by it.

In another analysis of the Westray disaster, Wicks (2001) argued that an "institutionalized mindset of invulnerability" had formed in the mine. Although Wicks specifically decried Hynes and Prasad's mock bureaucracy analysis in favor of a micro-institutional method of analysis, Wicks' conclusions substantially overlap with those of Hynes and Prasad. Wicks (2001) asserted that regulative aspects of mining, backed by strong sanctions, normative rules governing social obligations, and cognitive elements of individual miners, which affirmed their social identities as coal miners and as men, formed their 'institutionalized mindset of invulnerability.'

Another way in which safety culture is articulated by individual experience is through organizational learning. Carroll (1998) studied self-analysis of operating problems among employees at nuclear power plants and chemical process plants. Such employees are expected to learn from precursors and near-misses, rather than exclusively by trial-and-error; however, employees learn better when they can focus on "resilience and learning as well as anticipation and fixing, on abstract as well as concrete issues, and on organizational power as well as politics" (p. 30). The system or structure of the organization influences the success rate of learning from near misses. That is, "in organizations with fragmentary, myopic and disparate understandings of how the work is accomplished, there are likely to be more failures to learn from operating experience, recurrent problems, and cyclical crises" (p. 1).

According to Turner 1993, (p. 219), accidents cannot be prevented by improving "sloppy" management, which serves to avoid most disasters, and can only be averted by "large-scale system re-design". Turner found sloppy management includes the following aspects of safety culture: [at] the first level of disaster prevention [are] the kinds of failures promoted by sloppy management: inadequate assumptions; blinkered outlooks and groupthink; communications failures of many varieties; the operation of outdated regulations; the neglect of warning signs; and the complacent attitude which assumes that 'accidents can't happen here', and ignores the alarm signals when things do start to go wrong (p. 218).

Although the majority of researchers support cultures originating from the organization social network theory, Loosemore and Hughes (2001) disputed the theme of Turner's 1997 theory. At any organization, social contact among employees influences workplace culture. 'Social Network Theory' deviates from Pidgeon, and Turner (1997) by placing minor emphasis on the organizational level and positing that efficient crisis management depends on the skills of the crisis manager in designing and controlling the formal and informal social fabric that keeps the organization together. The task is complicated because, during a crisis, competing coalitions and interest groups attempt to exercise both legitimate and illegitimate power in the pursuit of relational control. Also important are the personal qualities and motives of the people embedded within the organization and the quality of information exchanged between them (Loosemore & Hughes, 2001).

A major theme of safety culture research is that workplace cultures originate from the organization and the system, not from individuals (Hopkins 1999; Pidgeon, 1997; Turner, 1978). Negative safety

cultures are often characterized by deep-rooted and dangerous assumptions mutually reinforced among employees and supervisors, which give rise to workplace cultures of denial, hierarchies of knowledge, an institutionalized mindset of invulnerability, and mock bureaucracies (Hynes & Prasad, 1997). In contrast, healthy safety cultures require frank and clear communication, a sincere emphasis on safety, and a realistic view of the dangers of the given system (Turner, 1994). This healthy culture allows organizational members to recognize warning signs of a crisis incubation period.

According to Hopkins (2006), safe behaviour programs are becoming an increasingly popular tool used by large organisations to improve safety. Hopkins contended that unsafe behaviour is the last link in a causal chain and is not necessarily the most effective link to focus on in order to reduce accidents. Hopkins maintains that it is the behaviour of management that is most critical in fostering a culture of safety in an organization. Hopkins also notes that it is important to understand that safe behaviour programs are not effective if workers mistrust management and believe that these programmes are just another way to hold workers responsible for accidents.

METHODOLOGY

The methodology for this research is a case study comprised of semi-structured interviews and a documentary review of the four volumes of the transcripts of the Royal Commission on the Ocean Ranger Disaster (RCORD). The RCORD inquiry was conducted in 1983-84 and the interviews were conducted in 2008 to ascertain the sector's current safety culture. In-person interviews were held with 37 oil rig employees ranging from managers to workers on the rig and the marine vessels servicing the rig. Participants were comprised of union, non-union, management, and non-management personnel from both offshore and land locations. Only two referrals contacted did not agree to be interviewed. The high level of participation (two refusals) may be attributed to the fact that workers could remain anonymous by checking the appropriate item on the consent form prior to the interview.

The interview transcripts were reviewed and coded by key topic by the co-author who did not conduct the interviews. In addition, the transcripts were analyzed by a research assistant to further verify the coding to various topics related to safety culture. It should be noted that the interviews covered a wide array of topics related to the offshore oil sector. It did not focus exclusively on safety culture. A research assistant identified sections of the RCORD report that related to safety and the authors followed up with further coding by key topic.

A qualitative approach is intended to equip researchers with data through descriptions, analysis, and the observation of social behaviors (Patton, 2002). The semi-structured interview data collection process provided the researcher with the lived experiences of participants from the oil and gas industry (Abusabha & Woelfel, 2003; Billingsley, 2004; Creswell, 2009; Moustakas 1994). Abusabha and Woelfel argued that the perceptions of individuals who are being interviewed allows the researcher to gather, analyze, and report accurate information free of bias. Abusabha and Woelfel asserted that "qualitative researchers argue that, in the absence of close connection with the object of study, results will be distorted" (p. 1); thus, the present study was conducted with an approach incorporating face-to-face interviews to establish a close connection. Creswell (2009) asserted that qualitative data provides a source of descriptive information that permits researchers to present results based on fact.

Creswell (2009) argued the three-dimensional narrative inquiry comprises the personal and social, the past, present, future, and the place of a phenomenon; consequently, this study was designed to utilize data collected from "persons who have experienced the phenomenon, and to develop a composite description of the essence of the experience for all of the individuals" (p. 58). A qualitative case study method was deemed appropriate for the present study because "phenomenology is focused less on the interpretations of the researcher and more on a description of the experiences of participants (Moustakas, 1994). Researchers utilizing a case study method are provided with the opportunity to understand and present the lived experiences of the participants (Mack, Woodsong, MacQueen, Guest, & Name, 2005). The semi-structured interview process with open-ended questions was appropriate for the study because a lived

experience of an interviewee provides a deep understanding of the phenomenon being studied (Silverman, 2005).

Potential interview participants were identified using the snowball selection method, an informal way of reaching appropriate oil and gas workers. A primary concern of snowball sampling research is the quality of the data, in particular, a selection bias that might limit the validity of the sample (Kaplan et al., 1987; Van Meter, 1990) restricting researchers from generalizing from the particular sample (Griffiths et al., 1993). Snowball samples may over-emphasize cohesiveness in social networks (Griffiths) and will miss those not connected to any network that the researcher has accessed (Van Meter, 1990). The technique was implemented in this study as an economically feasible, efficient, and effective means of reaching onshore and offshore oil and gas workers from different levels of the organizational hierarchy of more than one company in the oil and gas industry. Interviewees were asked to nominate people they knew well or knew by name, but only those who might have important information about the effect of distributed decision-making in a virtual environment. Increased control over referrals also increased the chance of finding interviewees with diverse opinions.

The lack of rigorous controls typically associated with case studies, as well as the possible reflexivity of the researcher and the potential influence of active listening, (McCracken, 1988) were partially mitigated through taping the interviews. By taping the interview, responses were captured accurately. While not all disadvantages can be mitigated, interviews were the most appropriate approach for the complex nature of the main research question and the need to solicit feedback from a number of oil and gas workers who worked onshore, on land rigs, or on ships.

FINDINGS: ROYAL COMMISSION ON THE OCEAN RANGER DISASTER (RCORD)

Subsequent to the OR disaster, the federal and provincial governments appointed a royal commission to investigate what happened and what improvements could be made to avoid future offshore disasters. The RCORD report focused on four aspects of safety: design of the oil rig, training, audit and regulation. However, very little of the report focused on the impact of safety culture in the oil rig work environment in particular and the offshore oil sector in general. The following section present aspects of the RCORD findings that had an impact on the safety culture of the Ocean Ranger.

Regulatory Environment

The RCORD acknowledged the confusing nature of managing safety in the offshore sector. The report indicated that there were multiple government agencies and companies who were responsible for overseeing safety on the offshore oil rig. RCORD noted confusing and often overlapping regulatory bodies, resulting in several gaps in responsibility for safety. For example, the various regulations and guidelines did not specify the minimum training required for the ballast control operator; there were conflicting responsibilities for safety between the rig owner and the rig operator; the tool pusher was responsible for the rig when it was in drilling mode and the captain was actually his subordinate. Even though the tool pusher had no marine experience, he was responsible for evacuation and was in charge of life boats. He had no knowledge of balancing systems for the principle of stability, yet the report found that authority and responsibility for the safety of the crew rested in his hands.

Organizational Commitment to Safety

The RCORD report concluded that regulations alone cannot guarantee safety. It showed that enforcement of accountability is more effective than just trying to enforce regulations. The report stated that a high level of safety requires the commitment of senior management of the rig owners and operators. The report stated that the rig owner is responsible for the integrity of the rig and accountable for its safe operation. The operator is legally accountable for all aspects of the operation under their permit. The report indicated that the operator has the power, through contractual arrangements, to influence safety consciousness and performance of the contractors that are hired.

The RCORD report stated that safety management is a matter of attitude and requires commitment at all levels of the organisation. The report noted that leadership of the organisation, in conjunction with sustained and consistent application and involvement by employees, was required. The report stated that principles of safety management are implemented by setting objectives, creating physical conditions that are safe, implementing operating procedures and practices that reduce risk, and by auditing and monitoring performance. In general, these are all the characteristics that would be reflective of an organization's true safety culture. The RCORD report stated that it is paramount that the organisation indicates its strong commitment to safety by its CEO and senior management and that this attitude should cascade down through all parts of the organisation (p.75).

Worker Intimidation

The RCORD noted that it is evident that workers do not always feel they are able to communicate freely to management with respect to unsafe working practices and conditions. The inquiry found that workers feared that if they were overly critical about safety related matters, it might result in eventual dismissal. It was stated that these attitudes and fears only serve to weaken the entire safety management process. It was also noted that the critical factors for safety are the calibre of the crew, quality of their training, and the level of the team and how they are promoted throughout the organisations. All of these factors depend on the rig owners' responsibility to ensure they have an experienced person in charge of the rig and that person is capable of understanding both the human and technological side of safety in the offshore oil sector (p.76).

Findings: Semi-structured Interviews

As noted in the methodology section, the interviews were wide ranging and did not include a list of specific questions. Instead, a story telling approach was used to invite respondents to discuss safety (and other topics) in the Atlantic Canadian offshore oil sector. The responses have been coded and various passages have been grouped by topic. Unless otherwise indicated, the responses are attributed to workers who are in non-management positions. Throughout the findings section, we use the term 'company' to refer to the employer of the individual respondent. It should be noted there were several companies represented in the responses as outlined in the context section.

Perceptions of Safety

Under this topic, the interviews revealed varied perceptions regarding safety in the offshore oil sector. As illustrated in the responses outlined in the following sections, opinions among the respondents were divided as some believed safety had vastly improved since the Ocean Ranger Disaster, while others expressed concern about the sector's commitment to a healthy safety culture.

Money Versus Safety. Eight of the 37 respondents indicated they believed the company put production and profitability ahead of safety. While they acknowledged there was an increased emphasis on safety, they indicated that the company gave precedence to profits as illustrated in the following comments:

> "....they do a lot more now to make something safe, and safety does play a bigger role; but at the end of the day if it comes down to it and it's safety and saving a dollar, the dollar is going to win"; "Production is the driver. This is where accidents happen"; "...safety is a concern as long as it doesn't affect the production".

Conversely, three respondents indicated that safety was regarded by the company as more important than money. According to one respondent, drilling was second to safety, while another stated that he was responsible for making the rig safe.

Telecommunications. Perceptions of safety were influenced by improved technology and telecommunications. For example, one respondent pointed out that they now have portable, satellite phones while another stated there is now triple redundancy in the devices that failed on Hibernia. Indeed,

five workers and one management respondent believed improved telecommunications enhanced safety. It should be noted that at the time of the OR sinking, there were no cellphones or skype technology.

Safety Commitment. The research found the workers held conflicting views regarding the sector's commitment to and focus on safety. Some respondents believed there was an excessive emphasis on safety. One respondent claimed: "workers can't use their common sense any more". Another explained that the focus on numbers actually resulted in a decrease in safety because "safety is pushed so much that people start to blank out…safety is important but they're shoving it down our throats". Furthermore, a respondent, who was a manager, claimed "if there's 800 people that work on Hibernia, I'd be very surprised if you could find five to ten people that would say Hibernia is not a safe place to work."

However, one respondent claimed that there is still a culture that adherence to safety is a sign of weaknesses: "you're a wuss if you wear a safety belt". It is interesting to note how a management respondent ranked safety: "people are first, then environment and then the facility". This management respondent went on to state that: "you always err on the side of safety…. that is never questioned no matter what it costs". As a result of the oil company's continued focus on safety, another non-management respondent stated: "with time, people are gaining confidence in the equipment and safety systems.

Employee Morale. The issue of poor employee morale was identified by respondents as having a negative impact on safety: "if your mind isn't on the job, mistakes are going to happen" (R7). Meanwhile, another respondent pointed out it was important to "let employees know when they are doing a good job….it keeps morale up". The impact of low morale on safety was pointed out by one respondent:

> Like we always say, keep your mind on your work… and keep the morale up and everyone is happy and everyone is safe; but, if you're being ragged on and your mind is on that all day and the next thing you know you're doing a job and the next thing you know you've pinched a finger.

Regulation and Oversight. Despite the fact that the offshore oil sector was regulated by the Canada-Newfoundland Offshore Petroleum Board as well as by Occupational Health and Safety legislation, some workers believed there was an opportunity for enhanced training:

> Training is paramount in this industry. You don't get second chances in this industry. You've got to get the training… it's not always happening the way it should be, but I don't blame the companies a lot for this. I blame the regulators.

Learning From Ocean Ranger

Opinions were divided on the impact of the Ocean Ranger disaster on subsequent safety practices, as illustrated in the following remarks:

> All these recommendations that came out after the Ocean Ranger went down, they're all history – all put away somewhere and forgot about. I remember if we got a bad storm after that and it was forecast at a sustained wind over 80 knots, they had to come out and take everybody off the rigs. That's never done anymore. They got no intentions of doing it. All that's forgotten now. Now it's not quite as bad because of the safety thing, which is not really safety. It's just mitigating their liabilities, right, and that's what it boils down to.

In contrast, other respondents credited the Ocean Ranger disaster for the vast improvements in current day safety practices: "we evolved and we got the safest…platform. We got the top-of-the-line equipment."

When I first joined the boats [vessels servicing the oil rigs], I started out as a trainee mate, and there was no paperwork on those boats and there were no records kept of anything. There was no safety policy. There were no personal floatation devices or anything like that or safety equipment used when you work on deck. It was just the same as if you were working on one of the fishing boats around here. There were no courses for anything regarding the offshore. All that came after the Ocean Ranger sank.

Safety Training, Awareness, Drills and Procedures

Several respondents commented on the extensive emphasis on safety. For example, a respondent described the weekly drill:

We have our weekly exercise anyway, so everybody is expecting that and then it's just, oh, let's get this over with, you know, and muster and go back to bed or whatever; but when it's not planned and everybody is definitely wondering why the alarm went off, for sure... and there's that nervousness, I guess, at a small level until the manager gets on and makes the first announcement, and then he informs everybody of the situation and says the fire team has been dispatched and it's under control.

Another respondent indicated there was a regimented protocol for dealing with emergencies. He also noted: "If anything goes wrong, that thing will shut down. It'll shut itself down automatically, and you can't start it up until you've resolved the issue".

A management respondent attributed his feeling of safety to the procedures and protocols:

I feel pretty safe, pretty... you know, a lot of procedures that are there – the controlled work permit, the risk based work selections, the... all the near miss reporting, the stop programs, the hazard ID programs that are all in place now. You know, it's very hard to miss some of the hazards that would potentially be fatal to you.

Meanwhile, another worker explained that safety was improved through the company's formal risk assessment processes. Conversely, another worker stated that the high turnover rate of managers combined with the view that some had little regard for safety, contributed to unsafe work conditions.

Reporting Accidents and Near Misses

In describing the oil sector's approach to reporting near misses, one respondent noted: "I've raised concerns, but nothing was done. We also fill in near misses on the safety card, but I don't know what happens to them". Although the company ostensibly encouraged the reporting of accidents and potential safety hazards, there was some trepidation on the part of workers to file reports:

I don't know if I'd go to the managers out on the rig. If it was a big enough issue or problem, I'd probably bring it to a safety representative anonymously, or I'd pick up the phone and call the safety person with the Newfoundland Offshore Petroleum Board. Now if you get caught calling the Newfoundland Offshore Petroleum Board for an issue, oh, you can kiss your job good-bye. If you don't go through the proper steps, of going to your supervisor, then going to your manager or whatever about a safety concern or whatever. If you go straight to the CNOPB and they found out you called the CNOPB... they don't like seeing the CNOPB. They don't like to see any governing body out on the rig – no one.

Another respondent described the reluctance of employees to report accidents or mistakes and provided an example of an incident with a co-worker:

He took off his glove anyway for a second to scratch his face and as he was walking by, he hit something with his finger, and he gashed his finger here, and he went up to the medic. The medic cleaned it up and put a stitch or two in it. And the safety person came up and said – well, what happened. He said – well, while I was walking by I hit my finger off a piece of sheet metal. He said – were you wearing your safety equipment. He said – yeah, yeah, yeah… he said – I had that… I just took my glove off for a second while I was walking through the door. So you never had your safety equipment on. Suspended him for four weeks.

Injury Management

Some workers were of the opinion that the focus on safety has resulted in more unreported injuries. Using the example of the worker in the preceding section, the respondent described the impact of this incident:

Everybody else on the rig then was frightened to death – frightened to death because he could've lost his job for a little cut. So, what happened then – and I've seen this – that the next guy that walks by with his glove and he smacks his hand off a piece of the sheet metal and he has a gash on his finger – he's not going to medic. He puts his glove back on. He goes down into the bathroom and wraps toilet paper around it or… and you can't get a band-aid out there anywhere. They took band-aids out of the first aid kits.

This respondent went on to explain that the company wants employees to report injuries, but they do not want it to be a lost-time injury. He stated:

A lost-time injury is like the worst thing that can happen offshore for the company, because that's just like a big, huge red 'X' through their safety performance. They hate it. As soon as someone gets hurt out there, the stress level of the managers goes up because they have to answer for it.

Experience

When discussing the factors contributing to the Ocean Ranger disaster, respondents drew attention to the lack of experienced workers. In particular, they noted that on the Ocean Ranger: "There was no marine crew. There was no captain. There were no mates. There was no one, basically, that knew anything about the marine environment."

While many respondents believed there was an improvement in training and experience, one respondent indicated that even in today's environment, there remains a lack of experienced workers:

We got a lot of inexperienced people doing jobs that they're really not fully qualified to do, and don't have enough time put in, you know, at that job before they're pushed into it, but got to save the dollar.

Another respondent echoed the following concern regarding lack of experience:

The biggest problem is bringing inexperienced guys that don't understand the plant and being put in supervisory role in charge. They put people into the safety roles out there that haven't got a clue what they're doing. They're yes men and so that's the big thing with the decision-making.

Management Support

Despite acknowledging the many improvements to safety practices, respondents expressed concern that employees were not listened to, no action was taken to address their concerns and there was relatively little empathy. A respondent explained that although the safety committee brings up issues, they are not

often addressed. When incidents are reported, another respondent stated that it is documented and a report printed, but that is usually as far as it goes. Another respondent attributed lack of action taken to address employee concerns to the managers: "these pseudo... or middle managers. They're not even managers in my mind's eye, who have absolutely no regard for the people who they're supposed to be supervising".

Three respondents expressed concern about workers feeling intimidated with respect to reporting accidents and safety issues:

> I know every manager out there, but I'd have trouble right now pushing back, and I'm a pretty senior guy out there now. I'm thinking – what about my two boys home; what about my wife; what about my house; what about my van; what about my car; what about the little bit of security that I got. If I push back, am I going to lose all that because probably if... if I got fired or lost my job tomorrow, chances are I'm not going to working on a rig the day after, and I got a pretty decent reputation. You're sort of pressed into doing stuff that you didn't really want to do; but if you didn't want to do it, there's the helicopter; all the best. You know, there's 200 people behind you looking for the job.

Another worker described a situation he encountered in relation to using an exclamation point in a report:

> I'm not a person who's intimidated – never was. We had a safety meeting one time; and in the safety meeting, we discussed something and I wasn't happy with it and I put an exclamation mark at the end of my sentence. Well, a company man, tool pusher and my supervisor – all of them came back to me and they say... and really gave it to me because I made an exclamation. That's like yelling. You're making a big point there, and I said, well, I meant to make a point, but I was asked not to do this again and I didn't.

Conversely, as illustrated in the following comments, several respondents expressed confidence in the support received from senior management if they had to make a decision to shut down the rig:

> I've made a decision that we're going to shut down and it... I must say, we get the support that anytime we feel things are not safe or, you know, they... that's what we're told – if you think you should shut her down, no one will ever question you on your decision if you think there's a danger there. It's a gray area, right, and... but, normally, like the last couple of times we didn't think it was safe but then we would stop and find a new way of doing the job.

Not surprisingly, a management respondent expressed a high degree of confidence in receiving support from senior management as illustrated in the following comment:

> If there's an issue with a day-to-day work activity, people know that they can stop the work themselves without reprisal and discuss it with the supervisors to see if it makes sense or not; and, like I said, I'd be really surprised if anybody would say that they... number one, were afraid to go to their supervisor because they thought something was unsafe to do.

DISCUSSION AND ANALYSIS

The objective of his research was to examine the role of safety culture in the sinking of the OR and the implications on today's safety environment. The research found that a poor safety culture did indeed have a significant impact on the OR disaster and continues to influence today's safety environment in the offshore oil sector in Atlantic Canada. An important finding of our research was that safety culture cannot be considered in isolation. Instead, as illustrated in Figure 2, it should be considered in the context of

national culture, industrial sector culture and organizational culture, since our research found that all three influence safety culture.

FIGURE 2
CULTURAL INFLUENCES ON SAFETY
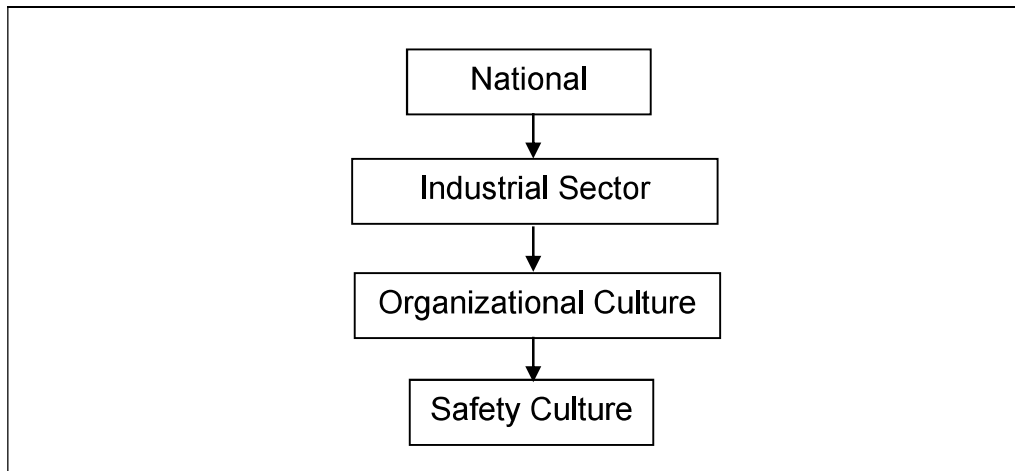
National Culture

The national culture associated with maintaining high paying jobs in an area of high unemployment is a factor that persists today, some 35 years after the OR disaster. Although we use the term 'national', it can be interpreted as provincial in the Canadian context since the Atlantic Canadian provinces tend to exhibit high unemployment. Hynes and Prasad (1997) attributed the Westray Mine disaster to several factors. One in particular – the pragmatic need to keep high-paying jobs in an area of high unemployment – is certainly applicable to the current safety culture in the offshore oil sector in Atlantic Canada. Indeed, several workers stressed their reluctance to raise safety issues or report accidents due to fear of losing their jobs. The impact of the fear of job loss on workplace safety in the offshore oil sector cannot be underestimated and was reflected throughout the interviews when respondents noted that there were 200 people lined up to take their jobs and one employee received a four-week suspension for a cut on his finger.

Industrial Sector Culture

The interviews revealed that some people still equated adherence to safety as a sign of weakness; this also contributes to employees' attitudes towards safe work practices. According to Hynes and Prasad (1997), cultural ideas of masculinity were also contributing factors in the Westray Mine disaster. The oil and gas sector in the 1980's has been characterized as a rough and tumble environment (Mearns and Yule, 2009).

Another concerning aspect of the Canadian offshore oil and gas sector relates to the regulatory environment. The RCORD found that the regulatory environment had overlapping and confusing rules. The fact that the multiple government agencies and companies involved did not seek to clarify responsibility and accountability for safety speaks to the safety culture within the oil and gas sector. While many improvements have been made in the decades subsequent to the OR disaster, the interviews revealed there are still areas of overlapping and confusing responsibilities.

Organizational Culture

The RCORD report found that regulation will go only so far in guaranteeing a safe work environment. Our interviews revealed organizational practices and beliefs that are not conducive to a safe workplace continue to exist. This is surprising in the aftermath of the OR disaster and the RCORD report.

For example, mock bureaucracy, as described by Gouldnor (1954), is also evident in the extensive safety protocols described by workers and managers. According to interview respondents, there are weekly safety drills, completion of forms when workers observe someone doing something unsafe, documentation of incidents and unsafe conditions, and numerous safety meetings. However, many of these practices appear to be form over substance. There is a perception among many workers that the company is focused on safety, but not at the expense of production and profitability. This is somewhat surprising since accidents can be costly and thereby have a negative impact on profitability.

Hopkins' findings regarding a culture of denial and 'it couldn't happen again' is also evident in the responses of many workers who indicated how much better safety is now on offshore oil rigs compared to when the Ocean Ranger was in operation. Respondents compared today's operating environment to years earlier when there was relatively little documentation or records, no safety policy and minimal safety equipment. Indeed, the significant emphasis on safety might also be contributing to the workers' false sense of security.

Our research found that there was limited organizational learning from the OR disaster. As pointed out by Carroll (1998), employees often learn from precursors and near misses. In contrast, our research found that workers in the current environment were discouraged in some instances from reporting incidents or were sometimes encouraged to downgrade the seriousness of the incidents. For example, employees described the level of stress experienced by managers when a lost-time injury occurred. The RCORD study also found that were instances of worker intimidation in terms of reporting safety risks.

Safety Culture

Overall, it appears that while the offshore oil and gas sector is paying more attention to safety, the level of commitment and sincerity of top management is questionable. Several respondents indicated that the company gives priority to production and profitability over safety. This conflicts with Pidgeon's view and that of the RCORD that a good safety culture is dependent on senior management commitment to safety.

Several researchers (Hopkins, 1999; Pidgeon, 1997; Turner, 1997) contend that workplace cultures are influenced by the organization rather than by individuals. This theory is also evident from the interview responses. In the wake of the Ocean Ranger disaster, safety achieved heightened importance. Despite the many safety measures and protocols in place, there is an underlying perception that the company's commitment to safety is not their top priority. The sector seems to be sending mixed messages with the constant focus on safety while at the same time signaling they really do not want to have safety issues and injuries reported. That being said, some respondents nevertheless indicated they believed that safety was extremely important to the oil companies.

According to Turner (1994), an effective safety culture requires a sincere emphasis on safety. Respondents' accounts of reluctance to raise safety issues out of fear of losing their job contradicts the company's focus on safety, making it appear superficial rather than sincere. Furthermore, there were examples provided by respondents concerning the perception that when employees bring up safety concerns, they are not addressed. Some workers did not feel they were supported by managers, while others believed they would be supported by management if they made the decision to shut down the rig.

CONCLUSIONS

The purpose of this research was to examine the role of safety culture that currently prevails in the offshore oil sector in light of the Ocean Ranger disaster. The research found that there is a paradox at play. Opinions are divided regarding the current safety culture in Atlantic Canada's offshore oil sector. While many respondents indicated that safety has improved, others raised an array of issues that indicate there is substantial room for improvement. Most respondents acknowledged there is a heightened focus on safety, illustrated through the controlled work permit system, risk assessments, reporting unsafe conditions, safety drills and frequent meetings of the occupational health and safety committee. On the surface, it appears that there is considerably more attention to safety since the sinking of the Ocean

Ranger. However, many workers also believed there was a lack of sincere commitment to safety; they felt that oil sector management were saying all the right things, but there was relatively little underlying concern about safety. In fact, the responses illustrated that workers perceived the oil sector's focus on safety as superficial.

The interviews paint a picture of an ineffective safety culture marked by a mock bureaucracy, superficial commitment to safety, underlying focus on financial results coupled with a confusing regulatory environment, a high rate of employee turnover and insufficient levels of employee experience. Furthermore, the fact that some respondents stated they were reluctant to report safety concerns out of fear of losing their job indicates the sector still has much more work to do in order to create a true safety culture. Clearly, to have an environment that fosters a safety culture, all workers should have a comfort level that they will be supported by management when they raise safety concerns or report injuries.

One of the key findings is that safety culture cannot be considered in insolation. In fact, it must be considered in the context of the national culture, industrial sector culture and organizational culture. To foster and bring about a positive safety culture requires a wide range of commitments to safety, starting firstly with the national attitudes towards which may be partially addressed by regulations, Secondly, improvements to the industrial sector level perception of safety must be made. Finally, the organizational culture requires a deep level of senior management commitment to safety as well as mechanisms to hold management to account.

This paper contributes to the body of literature on safety culture since it develops a profile of the offshore oil sector culture through the rich information obtained through interviews with a wide array of workers who were in non-management, management, offshore and onshore. The research shows that the companies and regulators operating on Canada's east coast offshore oil sector need to do much more to encourage workers to report safety issues without fear of reprisals.

There are several areas that are fruitful for future research. One avenue would be to compare the findings from this study to practice in other jurisdictions in order to determine if a similar safety paradox exists in offshore projects such as those in the North Sea or off the coast of Texas. In addition, it would be beneficial to examine the role of the regulators in establishing and monitoring safety practices. As Rixon and Furey (2011) found, there are situations where governments need to play a greater role in ensuring the regulators are establishing sufficiently stringent standards and are holding companies and senior management to a higher degree of accountability.

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