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# Site managers and safety leadership in the offshore oil and gas industry

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**Abstract**

Management commitment to safety is recognised as a fundamental component of an organisation's safety culture (Reason, 1997. Managing the Risks of Organisational Accidents. Ashgate, Aldershot, UK). However, the role and experiences of site managers in relation to safety have rarely been examined. A survey questionnaire was conducted of 200 Offshore Installation Managers (OIMs) from 157 offshore oil and gas installations belonging to 36 organisations operating on the United Kingdom Continental Shelf. The questionnaire gathered data relating to OIMs' level of experience and style of leadership as well as their knowledge and experience of safety and leadership within the industry. The aims of the study are twofold. The first aim is to investigate the relationship between managers' level of experience and style of leadership with their safety attitudes and behaviour. The second aim is to investigate managers' perceptions of best practice in safety leadership and their beliefs about the key outstanding safety issues. Findings suggest that experience is not the dominant factor in determining leadership style or attitudes to safety, however, the less experienced OIMs and those with more directive styles of leadership were found to overestimate their ability to influence and motivate the workforce. It seems that although managers are aware of best practice in safety leadership, they do not always act in ways consistent with this. They report having considerable difficulty in motivating and controlling some safety crucial aspects of workforce behaviour such as getting workers to accept ownership of safety and getting workers to report near misses. In terms of outstanding safety issues, it appears that improvements still need to be made in a number of areas such as the standardisation of safety culture; the harmonisation of safety practices and procedures across the industry; improved workforce competency and increased workforce involvement in safety activities and decision making.


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## 1. Introduction

The identification of 'safety culture' as a major contributor to industrial accidents is beginning to have a profound effect on the way risk and safety are managed within organisations. It suggests that the occurrence of accidents can be predicted on the basis of certain factors that are indicative of the organisation's 'state of safety'. This has led to a plethora of studies which have sought to identify the contribution of organisational culture to accidents (Reason, 1997; Turner and Pidgeon, 1997, *Work & Stress* [special issue, 12,3, 1998]; *Safety Science* [special issue, in press]). The challenge facing researchers has been to identify measurable dimensions of safety culture, now usually called the safety climate (Cox and Flin, 1998), which influence the likelihood of accidents occurring. The UK Health and Safety Executive (HSE, 1999), have recently advised companies to assess organisational culture by measuring safety climate.

### *1.1. Management influence on safety climate*

Zohar (1980) who first introduced the notion of 'safety climate', suggests that the climate of safety which exists within an organisation will promote amongst the workforce, a unified set of cognitions regarding safety and its relationship to production processes. These cognitions are highly related to workforce perceptions of the safety attitudes and behaviours of management. Similar findings have been highlighted in other investigations across a range of industries, (Eyssen et al., 1980; Dedobbeleer and Beland, 1991, 1998; Ostrom et al., 1993; Donald and Canter, 1994; Niskanen, 1994). What these studies emphasise is the importance of management, or factors which are under the direct control of management, in promoting a positive safety climate and good safety performance. These factors have tended to be subsumed under the nebulous term "management commitment to safety", however, the term has been used rather abstractly to describe a broad range of managerial activities and roles. In recent years a number of review studies have been conducted which attempt to synthesise the expanding body of research (Shannon et al., 1997; Hale and Hovden, 1998; Flin et al., 2000; Guldenmund, 2000). These studies highlight a range of managerial behaviours, which are consistently related to good safety performance, and appear to be a key to good safety leadership, these behaviours can be subsumed under the term 'participative management'.

Participative management incorporates a number of interrelated activities, the most critical being management involvement in work and safety activities, as well as frequent, informal communications between workers and management, (Davis and Stahl, 1964; APU, 1976; Cohen, 1977; Andriessen, 1978). These interactions serve a number of useful functions, they demonstrate the managers' concern for safety, they serve as a frame of reference for the workforce to guide the appropriate task behaviours, and they foster closer ties between managers, supervisors and workers. More recent evidence suggests that it is not just management participation and involvement in safety activities which is important, but the extent to which management encourage the involvement of the workforce. Moreover, management must be

willing to devolve some decision-making power to the workforce by allowing them to become actively involved in developing safety interventions and safety policy, rather than simply playing the more passive role of recipient (Niskanen, 1994; Williamson et al., 1997). In this way workers are more likely to take ownership and responsibility for safety. Sanders et al. (1976) in a study involving safety in the coal mining industry found that participative decision making and decentralisation of authority were influential on safety because they foster consensual behaviour amongst the workforce and greater motivation to work safely. Likewise, Simard and Marchand (1995, 1997) found that a decentralised approach to safety management was the most effective way in which management can promote workforce safety motivation. Similar findings have been reported by Braithwait (1985) Gaertener et al. (1985) and Thompson et al. (1998). Indeed, participative management is not only the best predictor of worker safety motivation, it is also the most important factor in relation to two other predictors namely workgroup cohesion and co-operation (Dwyer and Raftery, 1991; Simard and Marchand, 1995).

However, the occupational category 'management' has been used ambiguously within many of these studies, describing various levels of management from CEO to first-line supervisor. Consequently, it is often unclear which level of management is being assessed, but it is important that these distinctions are clarified, given that the various grades of managers play very different roles in the management of safety (Andriessen, 1978). The influence of site managers on safety performance has received very little attention within the literature, which is surprising given the acknowledged impact of the site manager on the safety climate which exists at the workplace (CBI, 1990; ACSNI, 1993). The role of the site manager in establishing a positive safety climate would appear to be particularly critical in the high reliability industries (Weick et al., 1999) such as chemical plants, nuclear power plants, and aviation maintenance.

### *1.2. Site management in the offshore industry*

In this paper the focus is on one such environment, namely the offshore oil and gas installation, where, in 1988, one of Britain's worst industrial disasters took place, the loss of the Piper Alpha platform and the resultant loss of 167 lives (Cullen, 1990). In the UK, the site manager on these production platforms and drilling rigs is called the Offshore Installation Manager (OIM). He[2] is responsible for the emergency command of the installation as well as the day-to-day management of safety and is recognised as holding a key position within the organisational structure (Flin et al., 1996). The OIM represents a key link between the onshore and offshore facets of the organisation, and as such, he plays an important role in communicating the safety message from senior levels within the onshore organisation to the workforce at the sharp end. Therefore, OIMs appear to have a critical role to play in developing and maintaining the safety climate in the offshore environment. It is recognised within the industry that these individuals posses a

[2] All OIMs working on the UKCS at the time of the survey were male.

wealth of knowledge and personal experience of safety and leadership which could be accessed, combined and used for the identification and development of best practice in safety leadership offshore. Apart from an earlier survey of OIMs in 1991, (Flin and Slaven, 1993) and a subsequent study, (Flin and Slaven, 1994), which concentrated on the emergency command function of OIMs, this group has been largely ignored by researchers.

However, there have been a number of investigations of the safety climate on offshore petroleum installations, which have identified the importance of management, albeit in rather general terms. Alexander et al. (1995) reported that for UK offshore workers, 'management commitment to safety' was the dominant factor in their safety climate questionnaire. Rundmo (1994) in a study examining the association between organisational factors and safety in the Norwegian offshore environment, found that employee perceptions of greater management commitment to safety and a priority of safety over production goals, were an important predictor of employee satisfaction with safety and contingency measures. A finding replicated in a subsequent survey in the UK sector using a similar set of measures (Flin et al., 1996). In none of these surveys was the actual role of the site manager (OIM) in maintaining the safety climate of the installation explored.

This study aims to investigate the relationship between offshore managers' experience and preferred style of leadership, with their safety attitudes and behaviours. It also seeks to gather managers' knowledge and experience of safety leadership to identify best practice in safety leadership, and to identify the key outstanding safety issues. Five hypotheses are being tested.

### *1.2.1. Hypothesis 1*

Simard and Marchand (1995) found that managers' level of experience affected their willingness to engage participatively with subordinates. They concluded that the more experienced managers were more open to subordinates' participation in occupational safety due to their higher position power within the organisation. Thus, hypothesis 1 states that the more experienced managers will be have a more participative style (i.e. those who prefer a 'consulting' and 'joining' relationship with subordinates) whereas managers with less experience will have a more directive style (i.e. they will prefer a 'telling' and 'selling' relationship with subordinates).

### *1.2.2. Hypothesis 2*

The more experienced managers and those with a participative style are also likely to have more positive perceptions of the workforces' attitudes to safety than those with a directive style because they will have spent more time communicating with the workforce about safety (Sanders et al., 1976; Simard and Marchand, 1995, 1997). These managers are more likely to recognise the influence of environmental and task related factors in accident causation and less likely to apportion blame to the individual. Thus, hypothesis 2 states that the more experienced managers and those with a participative style are more likely to attribute the cause of accidents to job related factors and less to person related factors, the opposite will be true of the directive managers.

*1.2.3. Hypothesis 3*

For the same reasons, the more experienced and participative managers are also likely to have more positive attitudes regarding their own ability to motivate, influence and control worker behaviour and thus the safety climate at the worksite. Hypothesis 3 states that the more experienced managers and those with a participative style will be more positive about their ability to develop and maintain a positive safety climate at the worksite.

*1.2.4. Hypothesis 4*

Over the past 10 years, a plethora of technological, engineering and design improvements have undoubtedly helped to reduce the accident rates offshore to their current plateau. Moreover, new safety legislation, policies and procedures have been introduced which attempt to regulate and control almost every aspect of the work. It is now widely recognised that it is the 'behavioural issues' such as motivating subordinates to work safely and encouraging them to take ownership and responsibility for safety, which are the main stumbling block in the effort to push incident and accident rates below their current plateau. A high level of participative involvement between employees and management will be required if these issues are to be resolved. Thus, the fourth hypothesis states that managers will identify behaviours consistent with 'participative management' as best practice in safety leadership.

*1.2.5. Hypothesis 5*

For the same reasons, hypothesis 5 states that managers' perceptions of the outstanding safety issues are likely to relate to human behaviour and motivation rather than technical and procedural issues.

The issues under investigation here are abstracted from a larger survey which was conducted as part of the UK upstream oil and gas industry's Step Change for Safety Initiative, which aims to achieve a 50% improvement in safety performance across the industry by the year 2000. For a copy of the questionnaire see the Step Change website at http://www.oil-gassafety.org.uk/task/task.htm. The purpose of the survey was to used the knowledge and experience of OIMs across the industry to benchmark the state of safety on the United Kingdom Continental Shelf (UKCS) and to investigate some issues specific to the step change program (see O'Dea and Flin, 1998). This offered the opportunity to use this distinct sample of site managers to investigate issues relating to site managers and safety leadership. Items relating specifically to systems and practices offshore are omitted from the discussion, which will concentrate on management issues relevant to the influence of site managers on safety.

## 2. Method

### *2.1. Sample*

It was estimated that within the UKCS at the time of the study, there were 314 OIMs in charge of 157 manned installations operated by 36 different organisations. Of this

population, 200 OIMs completed the questionnaire, yielding a total response rate of 64%. The total population was made up of 69% production platforms (including production vessels), and 31% drilling rigs. In this survey, the sample comprises 70% (140) from production platforms and 30% (60) from drilling rigs. Thus, there is no significant difference between the total population and the sample population.

### 2.2. Questionnaire design

A questionnaire was chosen as the most convenient and efficient method of data collection given that respondents were located on offshore installations throughout the UKCS. In addition, discussions with onshore safety personnel established that offshore personnel are highly familiar with questionnaire surveys. A first draft of the questionnaire was developed on the basis of a review of the literature regarding site management and safety issues current to safety management in the offshore industry, and a previous survey of OIMs (Flin and Slaven, 1993). The content of the draft questionnaire was discussed with two senior safety executives from two companies involved in the study. Each item of the questionnaire was considered, relevant changes were discussed and omissions identified. The amended questionnaire was then sent to 10 OIMs who were asked to fill in the questionnaire and give their feedback. Face-to-face discussions were held with seven of these OIMs, discussions lasted from 45 min to 1.5 h. Feedback was obtained via electronic mail from the three other OIMs. Changes were made to the questionnaire on the basis of their comments and responses. The final draft version was sent for approval to the two senior safety executives mentioned earlier.

The final version of the questionnaire contained a total of 26 questions, it was eight pages long with a cover page of instructions and contained both open and closed format questions, (Kerlinger, 1986). Closed questions required the OIMs to rate (usually on the basis of 5 point Likert type scale) their opinions on issues relating to safety management, safety culture and corporate culture within the industry. Open questions drew on the OIMs' knowledge and experience of safety leadership to highlight their perceptions of best practice in safety leadership and to identify the key outstanding safety issues that now need to be resolved. The items that relate specifically to systems and practices within the offshore industry are omitted from the discussion, which will concentrate on management issues relevant to the influence of site managers on safety. Respondents were not asked for their names or the names of their employer, they were informed that only summary statistics would be contained in the report and that no individuals would be identifiable. They were asked to give a frank and honest account of their opinions.

### 2.3. Questionnaire content

#### 2.3.1. Experience

Respondents were asked to give information on the length of time spent in their current location, length of time as an OIM, and installation type (production platform, FPSO, drilling rig, flotel, other).

*2.3.2. Leadership style*

The Tannenbaum and Schmidt (1958) leadership style questionnaire was used to identify the preferred leadership style of respondents on the basis of four style categories: 'Tells', 'Sells', 'Consults', 'Joins'. The categories are not independent of each other, respondents will show a score on all four of the categories, however, the category with the highest score signifies the kind of interaction the leader *prefers* to have in his dealings with subordinates. This scale was chosen over other potential measurement instruments because it proports to measure aspects of leader behaviour which were identified as important in the literature, i.e. participation and control. Furthermore, this scale is relatively short and less time consuming to complete which was an important consideration given the scope of the study. Other, longer scales such as the Multifactor Leadership Questionnaire, (Bass and Avolio, 1989) or the Leader Behaviour Description Questionnaire, (Stogdill, 1963) measure constructs such as transformational/transactional leadership and person centred/task centred leadership respectively, which were not thought to be as relevant to the hypotheses being tested.

*2.3.3. Accident causation*

OIMs were asked to rate what they consider to be the top six causes of accidents (1 = the most common cause ... 6 = least common cause), from a pre-selected list containing 10 person related factors and 10 job related factors (see Table 1). The list was based on findings of Mearns et al. (1997).

*2.3.4. Safety climate*

This seven item scale assesses how easy or difficult (1 = very difficult, 5 = very easy) the OIMs rate their own ability to develop and maintain a positive safety climate at the worksite. Items in the scale were drawn from a review of the literature and on the basis of pilot work with OIMs.

*2.3.5. Safety leadership*

Three open questions are used in order to access the OIMs' extensive knowledge and experience of managing safety, managing people and promoting a strong safety climate. 'What is the most effective thing you have done to improve the safety climate on your installation?' 'What is the best way an OIM can demonstrate his commitment to safety?' and 'What is the one piece of advice you would give to a new OIM on how to impact on safety on an installation?'

*2.3.6. Outstanding safety issues*

A final open question asks the OIM to identify the five main outstanding safety issues, which still need to be tackled.

*2.4. Procedure*

It is usual for each installation to have two OIMs, therefore packs containing two questionnaires were posted to each installation, (via the head office of each company)

on 25th and 26th February 1998. Return addressed envelopes were supplied. A letter from the Chairman of the Step Change Initiative accompanied the questionnaires, it highlighted the aims of the survey, that it was supported by senior managers and encouraged OIMs to participate. Two weeks later, follow-up telephone calls were made to the safety department of each organisation, asking them to remind their OIMs to complete and return their questionnaires if they had not already done so.

### 2.5. Data analysis

Data from 200 managers were used in the analysis. Where two-way relationships between the variables are hypothesised, (i.e. installation type and attitudes to safety), the interactions were investigated using the Kruskal–Wallis test of variance. There were no significant effects of installation type on any of the scales in the questionnaire; therefore this variable is omitted from the remainder of the analysis. Where three-way interactions are hypothesised, (i.e. experience, style of leadership and attitudes to safety) loglinear analysis (using the backward hierarchical elimination) is used to develop loglinear models of the interactions between the variables. Loglinear models are useful for uncovering the potentially complex relationships among variables in a multiway crosstabulation. Both the Kruskal–Wallis test and Loglinear analysis are suitable for analysis of categorical data where the observations are not from populations that are normally distributed with constant variance. All two-way contingency tables provided expected frequencies in excess of five; there were no outliers.

Analysis of open questions is based in Grounded theory (Glaser et al., 1967). The constant comparative method, which is used here, combines analysis and coding in five stages: defining categories, comparing items applicable to each category, integrating categories and their properties, redefining the categories, and writing the theory. Characteristic examples from the data set are used to illustrate the concepts. The numbers of instances in each category are then summed.

#### 2.5.1. Reliability of coding

The reliability of coding was measured using inter-rater reliability on a random sample of 20% of the data, based on the five stages mentioned earlier. The second rater was not informed of the experimental hypotheses. First, each rater (separately) identified a set of thematic categories. Second, the categories identified by each rater were compared and the appropriate level of abstraction was discussed and agreed upon, this involved the integration and redefinition of various categories. Third, each rater (separately) re-coded the individual items into the redefined categories. Cohen's Kappa was used to measure the inter-rater reliability of the ratings. Inter-rater reliabilities were 97, 94 and 93% respectively for each of the three safety leadership questions, and 97% for outstanding safety issues.

## 3. Results

The level of experience of OIMs in this study is very similar to those reported in the Flin and Slaven (1993) sample. In total 14% have worked as an OIM for more

than 10 years, 59% have been OIMs for 5 years or less and 70% of OIMs have worked in their present location for 5 years or less. In terms of their style of leadership, results suggest that 31% of OIMs appear to favour a 'telling' (authoritarian) style of management, 26% of OIMs favour a 'selling' (persuading) style of management, 21% favour a 'consulting' (conferring) style and 22% favour a 'joining' (participative) style.

The first hypotheses stated that the more experienced OIMs will have a more participative leadership style than the less experienced OIMs (low experience = $>5$ years, high experience = $\geqslant 5$ years). Analysis of variance revealed no significant interaction between length of experience and OIM leadership style.

The second hypothesis stated that the more experienced managers and those with a preference for participation with subordinates (i.e. the consulting and joining OIMs) will have more positive attitudes to workforce safety and will therefore tend to attribute the causes of accidents to external or task-related factors as opposed to person-related factors. Loglinear analysis using backward hierarchical elimination revealed no significant three- or two-way interactions between the variables; thus hypothesis 2 was not supported. However, a main effect of attributed causes was found. The likelihood ratio ($\chi^2 = 16.03$, df = 1, $P = 0.311$) indicates a good fit between observed and expected frequencies. OIMs more often attributed accidents to person as opposed to job related factors. In particular 'not thinking the job through', 'carelessness' and 'failure to follow the rules' were ranked as the top three behaviours which are most likely to be the cause of an accident, this is true of both production and drilling OIMs. Job factors such as 'inadequate risk assessment' and 'inadequate planning' are rated as most common job related factors, but they were given a much lower emphasis (see Table 1). Responses were weighted in reverse (i.e. 1st cause = six points, 2nd cause = five points ... 6th cause = one point.

The third hypothesis stated that there would be significant differences between managers (based on length of experience and preferred style of leadership),

Table 1
OIMs' perceptions of the main causes of accidents

| Person factors | Rank | Score | Job factors | Rank | Score |
|---|---|---|---|---|---|
| Not thinking the job through | 1st | 704 | Inadequate planning | 5th | 323 |
| Carelessness | 2nd | 702 | Inadequate risk assessment | 6th | 301 |
| Failure to follow the rules | 3rd | 518 | Inadequate supervision | 8th | 197 |
| Lack of communication | 4th | 335 | Inadequate training | 12th | 73 |
| Lack of experience | 7th | 208 | Lack of job instruction | 13th | 66 |
| Inappropriate use of plant and equipment | 9th | 190 | Inadequate procedures | 13th | 66 |
| Lack of motivation | 10th | 123 | Work overload | 15th | 63 |
| Poor decision making | 11th | 121 | Too few Staff | 17th | 29 |
| Stress | 16th | 32 | Inappropriate allocation of responsibility | 18th | 26 |
| Fatigue | 19th | 20 | Lack of resources | 20th | 18 |
| Other (Lack of intelligence lack of competency) | 21st | 11 | | | |

regarding their perceptions of how easy or difficult it is to develop and maintain a positive safety climate at the worksite. More experienced OIMs and those with participative styles, (i.e. those with a preference for 'consulting' and 'joining' relationships with subordinates) are hypothesised to be more positive regarding their ability to motivate and control worker behaviour. Respondents were allocated to 'low/difficult' or 'high/easy' categories based on their mean score on the safety climate scale (difficult = $\leqslant 3.00$, easy = $> 3.00$) Loglinear analysis using backward hierarchical elimination revealed no interactions or main effects between the variables. However, because the issues in this scale are central to this exploratory investigation, the analysis was repeated using each individual item on the scale.

No three-way interactions were found between experience, style of leadership and self reported ease or difficulty on each item of the scale. However, three two-way interactions were revealed and five main effects. 'Getting workers to accept ownership of safety' is associated with both OIM leadership style and OIM level of experience. The model had a likelihood ratio of $\chi^2 = 8.44$, df = 6, $P = 0.208$. Analysis of the contingency table shows that more experienced OIMs and those with a 'consulting' style tend to rate this task as difficult. The third two-way interaction is between 'Establishing effective disincentives against carelessness and violations' and leadership style, the model has a likelihood ratio $\chi^2 = 9.38$, df = 8, $P = 0.311$. Analysis of the contingency table suggests that 'consulting' and 'joining' OIMs tend to rate this task difficult more often than the 'telling' and 'selling' OIMs. In both cases the goodness-of-fit chi-square test indicates a good fit between the model and observed frequencies.

The main effects identified include: (1) 'Promoting an open atmosphere for reporting accidents' (likelihood ratio $\chi^2 = 10.59$, df = 14, $P = 0.718$), 71% of respondents rate this task as easy. (2) 'Translating policy into specific actions' (likelihood ratio $\chi^2 = 20.98$, df = 14, $P = 0.102$), 63% of respondents rate this task as difficult. (3) 'Communicating the safety message' (likelihood ratio $\chi^2 = 16.43$, df = 14, $P = 0.288$), 58% of respondents find this task easy. (4) 'Motivating subordinates to work safety' (likelihood ratio $\chi^2 = 15.81$, df = 14, $P = 0.325$), 60% of

Table 2
Developing the safety climate

| key: 'not easy' = (1 = very difficult, 2 = difficult, 3 = neither difficult nor easy); 'easy' = (4 = easy, 5 = very easy) | % Not easy | % Easy | Mean total |
|---|---|---|---|
| Promoting an open atmosphere for reporting accidents | 29 | 71 | 3.73 |
| Translating policy into specific actions | 63 | 37 | 3.14 |
| Communicating the safety message | 42 | 58 | 3.57 |
| Getting workers to accept ownership of safety | 78 | 22 | 2.82 |
| Motivating subordinates to work safely | 60 | 40 | 3.26 |
| Getting workers to report near misses | 69 | 31 | 2.97 |
| Establishing effective disincentives against carelessness and violations | 81 | 18 | 2.61 |
| Cronbachs alpha = .75 | | | |

respondents find this task difficult. (5) 'Getting workers to report near misses' (likelihood ratio $\chi^2 = 11.32$, df = 14, $P = 0.661$), 69% of respondents rate this task difficult (Table 2).

### 3.1. Safety leadership

The fourth hypothesis states that managers will identify behaviours consistent with 'participative management' as best practice in safety leadership. A total of 670 statements were identified and coded based on OIMs' responses to three open questions: What is the most effective thing you have done to improve the safety climate on your installation? What is the best way an OIM can demonstrate his commitment to safety? What is the one piece of advice you would give to a new OIM on how to impact on safety on an installation? Four overarching themes emerged. A statement characterising each element is also presented.

#### 3.1.1. Visibility

Visibility at the worksite and leading by example, which includes participation in the work tasks, consistently applying the rules and company safety policy and being a role model for safety.

> "Get to know the work patterns and work tasks, become involved in the work and lead by example."

#### 3.1.2. Relationships

Develop open, honest and trusting relationships with the workforce, by engaging in a high level of communication with the workforce with particular emphasis on listening to the workforce and taking their suggestions on board. Always maintain an 'open door' policy.

> "Always have an open door approach and encourage crew members to come and discuss safety issues openly and without fear of recrimination."

#### 3.1.3. Workforce involvement

Workforce involvement and empowerment in planning and decision-making, thereby increasing workforce ownership and responsibility of safety performance.

> "Involve the workforce by seeking their opinions and then act on them."

#### 3.1.4. Proactive management

Being proactive about safety, which involves taking action in safety related matters, following up on incidents and accidents appropriately, generating the support of workers and supervisors, establishing effective disincentives and reward systems and promoting an open atmosphere for reporting incidents and accidents.

"Be seen to support the correct safety behaviours, challenge poor safety practices, reward those who exhibit the right behaviours."

Thus, the evidence supports hypothesis 4. A high degree of consensus amongst OIMs was found in their responses, and there were no differences in the responses of the OIMs based on leadership style or level of experience.

### *3.2. Outstanding safety issues*

Hypothesis 5 stated that outstanding safety issues would relate to human behaviour and motivation rather than to technical and procedural issues. A total of 735 statements were coded into five overarching themes. There was a high level of consensus amongst OIMs. No differences based on experience or style of leadership were found.

#### *3.2.1. Standardisation*

The increasing use of shared facilities, staff, and services suggests that it is now vital for companies to co-operate with each other in standardising the rules, procedures, systems, work practices and training systems, so that equity and clarity is achieved throughout the industry. This need for standardisation was identified by 74% of OIMs

"Consistency across the industry in the North Sea."

#### *3.2.2. Workforce Involvement*

In total 44% of OIMs cited workforce involvement as an outstanding safety issue, this requires getting the workforce to participate in safety activities, increasing their awareness of safety and getting them to accept ownership and responsibility for safety.

"There is a need for all personnel including contractors to become part of the team."

#### *3.2.3. Competency*

Improving the competency and skill development of the workforce is seen as a high priority by 34% of OIMs. Many believe that the standard of competence has reduced in recent years. The general consensus is that with the ageing workforce and the dearth of skilled new personnel entering the industry, it is now more important than ever to ensure that new starts receive adequate training before going offshore and that adequate skill development training exists for current staff. A structured competency assessment scheme is also required.

"We need to get new well trained people into the industry."

#### *3.2.4. Simplification*

In total 33% of OIMs express a wish to get back to basics on the safety issues. OIMs feel overburdened with new safety initiatives, procedures and legislation that

they have real difficulties in translating into changes in the working practices at the workforce level. There is a need to simplify safety, rather than to complicate it by adding more procedures. It is now time to consolidate the learning of recent years by concentrating on people and working practices rather than on systems and procedures.

> "Getting things simplified so that the OIM can easily translate legislative requirements to the workforce in a manner they will understand."

*3.2.5. Behaviour modification*

A total of 31% of OIMs recognise the need for behavioural programmes to tackle unsafe acts, complacency, general inattention at work, and carelessness. Related to this is the need for organisations to clarify their position on the most appropriate way to deal with procedural non-compliance while at the same time to encourage the open reporting of incidents and unsafe behaviour. OIMs recognise the need to be proactive rather than reactive about safety, and now wish to move away from lost time injuries (LTI) as a measure of safety performance and towards more positive measures such as safe behaviours.

> "To change the behavioural work practices such that working safely becomes a habit not a procedure to be followed."

Thus, the hypothesis is partly supported by the evidence. Although some of the issues relate to the standardisation of work procedures and the establishment of policy for the reinforcement of safe behaviour, the underlying themes are behavioural in nature and relate to the problem of involving, motivating and controlling human behaviour.

## 4. Discussion

No differences were found between Production and Drilling OIMs on any of the scales in the survey, this result is surprising given the different structures of ownership and safety incentive schemes that are in operation in each case. However, the consensus may be explained by the fact that the survey solicits OIM's opinions regarding the state of safety within the industry at the time of the survey, as well as their perceptions of best practice in safety leadership. The results highlight that OIMs across the industry, irrespective of the sector, believe that the non-technical issues, such as leadership, communication and employee motivation, are the issues which now need to receive some attention, as opposed to the technical and design issues which have been the principal concern in the past.

More than half of the OIMs in the study (57%) prefer a 'telling'/'selling' approach in their interactions with subordinates. This type of leadership tends to be characterised by an authoritarian style of management, where the leader/manager has all

the control, information and power to make decisions and issue instructions. The role of the subordinate is simply to follow these instructions (Tannenbaum and Schmidt, 1958). This style is based on the assumption that the subordinate has no useful role to play in decision making; possibly because of a lack of knowledge or a lack of motivation. The leader may take the additional step of trying to persuade the subordinate to accept what is proposed, in order to get willing compliance rather than simply imposing the decision. However, when asked for their opinions on the most effective way of improving the organisation's safety performance, the majority of OIMs cited activities such as participation in the work activity, building open and trusting relationships with employees, empowering employees by involving them in decision making, communicating with employees, listening to them and acting on their suggestions. These behaviours are more consistent with a 'consulting'/'joining' style of leadership yet only 43% of OIMs in the survey prefer this type of interaction with their subordinates. Thus, it seems that there is a contrast between what leaders know to be best practice in leadership and how they actually prefer to behave. In reality managers require the flexibility to use all four styles and to diagnose when the situation or the individual merits a particular style (Hersey and Blanchard, 1969). This issue of management/leadership style in relation to the safety climate in the oil industry is the subject of a new research project (O'Dea, in preparation). No differences were found between OIMs with more or less experience in terms of their leadership style. Thus, it would seem that experience is not the dominant factor in determining the preferred style of leadership of the manager.

As a group, the managers are highly consistent in their attribution of causes to accidents. They overwhelmingly identify factors related to the individual such as not 'thinking the job through', 'carelessness' and 'failure to follow the rules', as the most common causes of accidents. However, it is important to recognise that there is a very strong bias towards attributing the cause of events to individual characteristics and under-estimating the role of situational factors in explaining events. Allocating blame to the individual is often the simplest and most convenient solution and one for which there is a known cure. The problem with blame is that it does not address the root causes of the accident, in fact it shields them from further scrutiny. A more in-depth analysis of accident causation might reveal root causes which implicate one's self (i.e. the manager) or the safety system.

With respect to their safety leadership function, the majority of OIMs report finding many of the tasks associated with developing and maintaining a positive safety climate 'difficult' to achieve. Particular difficulty is associated with 'establishing effective disincentives against carelessness and violations', 'getting workers to accept ownership of safety', 'getting workers to report near misses', 'translating policy into specific actions' and 'motivating subordinates to work safety'. Interestingly, the differences that emerged between OIMs were not in the hypothesised direction. The more participative OIMs and those with greater experience tended to rate tasks such as 'establishing effective disincentives against carelessness and violations' and 'getting workers to accept ownership of safety' as more difficult to achieve. One possible explanation for these findings may be that the more experienced OIMs and those with more participative interactions with the workforce have

more realistic expectations of their ability to influence the workforce. The less experienced OIMs and those with a more prescriptive way of interacting with subordinates may be over estimating their ability to influence subordinates by simply by telling them how things ought to be.

In line with the stated hypothesis, the majority of managers identified behaviours consistent with 'participative management' as best practice in safety leadership. Participation, communication, involvement, and empowerment were the most commonly cited behaviours. Interestingly OIMs emphasise the importance of building good interpersonal relationships with subordinates, relationships which are characterised by trust, openness and honesty. Similarly, there was also a high level of consensus regarding the key outstanding safety issues. These tend to relate to the underlying problem of motivating and controlling human behaviour. The issues raised included the standardisation and simplification of rules, policies and procedures across the industry, improved training and competence for all personnel, involving and empowering personnel with respect to safety, behaviour modification programmes to tackle unsafe acts and promote safe behaviours. The identification of these behavioural issues as key to improved safety performance, are strongly supported by the evidence, the results are based on OIM's responses to four open questions, thus, they cannot be accounted for by biases in the questionnaire.

The importance of tackling 'behavioural' issues as part of an organisation's safety strategy has long been recognised by high reliability industries. However such issues are not often reflected in the literature, (Zohar, 1980; Simard and Marchand, 1994). Zohar (1980) suggests that an individual's work behaviour is influenced by his/her knowledge, skills and motivation to do the job. Assuming that the knowledge and skills to do the job correctly are present as a result of selection and training, whether a person works more or less safely will be a matter of motivation. It is increasingly being recognised that managers play an important role in establishing the kind of environment which can encourage workers to be motivated to behave in a safer way. In fact workforce safety motivation and safety initiative are now considered to be better predictors of effectiveness in occupational safety, than factors which were previously considered important such as carefulness and compliance with safety rules, because they are more proactive and as such have much greater potential for influencing positively the safety performance of the organisation as a whole and not just one individual member (Simard and Marchand, 1994). However, two opposing lines of argument have emerged regarding the level of influence which characterises each level of management.

Andriessen (1978) suggests that senior management have the highest influence on workforce safety behaviour, which can override the effects of the supervisor. The relationship is both direct and indirect. Higher management policies, goals and priorities influence that of the supervisor, and therefore (indirectly) the motivation of workers. There is also a direct relationship in that, even if the supervisor is not interested in safety, workers will work more safely when higher management stresses safety in its policy (Andriessen, 1978). Thus supervisors are identified as crucial, but their effectiveness hinges on the adequacy of their senior managers. Similarly Petersen et al. (1961) suggest that while supervisors are key to accident prevention it is management that set the goals and objectives for the supervisors and as such it is

management that decides on the priorities and determines the climate. On the other hand, Simard and Marchand (1994, 1995) suggest that supervisors are the primary determinants of workforce safety behaviour, with higher level management playing a secondary role through their influence on supervisory level factors. Thus, there is a need for some focused research in order to disentangle the differential effects of management and supervisors and their relative effect on safety. In a recent study, Zohar (in press) suggests that climate perceptions are related to two levels of analysis, at the organisational level, through managerial policies, and at the group level through supervisory practices. The results suggest that climate perceptions are more strongly related to supervisory safety practices, rather than to managerial policies and procedures. A distinction is also made between perceptions of climate and leadership. Climate perceptions relate to the relative emphasis on competing goals, whereas leadership perceptions relate to behavioural attributes, which remain invariant across goals or task facets. However, the author goes on to state that "the dimensionality of safety climate perceptions resembles that of transactional leadership perceptions" Zohar (in press, p. 21). However, despite the acknowledged connection between leadership and safety (CBI 1990; IAEA, 1991; ACSNI, 1993), there is as yet very little evidence directly assessing the relationship between site manager's leadership style and safety performance outcomes (O'Dea, in preparation).

> "...the quality of safety management by operators is fundamental to offshore safety. No amount of detailed regulations for safety improvements could make up for deficiencies in the way that safety is managed by operators. (Cullen, 1990, p. 301)

## 5. Conclusion

This is one of the first attempts to gather the opinions and attitudes regarding safety, from a sample of installation site managers. However, more research needs to be done in order to clarify the exact nature of the influence of the site manager on safety climate. This research suggests that managers are keenly aware of their role as leaders in safety and believe that the best way to promote safety is by developing good quality participative and open relationships with subordinates. Yet the evidence presented here suggests that translating these principles into leadership practice is not so simple, with 57% of the same managers appearing to *prefer* 'telling' and 'selling' approaches to leadership. Another interesting finding relates to managers' perceptions of their level of influence with the workforce. Less experienced managers and those with more directive styles appear to over estimate their ability to influence and motivate the workforce. The issues, which remain outstanding, relate to the standardisation, simplification and clarification of safety policy as will as improved workforce competency and increased workforce involvement in safety. Thus, it seems that there is still some way to go in developing the right environment for optimum safety performance.

As a result of this study, a cross industry OIM forum has been established in which OIMs meet regularly to discuss safety issues and share best practice in safety leadership offshore.

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