The role of managerial leadership in determining workplace safety outcomes

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The role of managerial leadership in determining workplace safety outcomes

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The aim of this report is to review the theoretical and empirical literature that examines the role of managerial leadership in determining organisational safety outcomes. Three different levels of management, with special responsibilities for safety are identified, senior (or corporate) level managers, middle level managers (including site managers), and supervisors (also known as front line managers or team leaders). Distinctions between the levels are clarified, the unique contribution of each level to organisational safety outcomes is explored and paths of influence between them are examined. An attempt will be made to construct a holistic model of how the leadership factors at each level interact to influence health and safety outcomes. The review is conducted in eight sections

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Executive summary

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In section one the field of research is introduced. The importance of leadership factors in tackling organisational safety is explicated. In section two corporate governance of safety is introduced. The UK regulator's role in regulating, enforcing and motivating organisations to enhance their governance of safety is explored. A number of studies are reviewed which directly assess and evaluate the current state of directors' thinking about health and safety. In addition, the role of the trust relationship between senior managers and employees and its relevance to safety outcomes is explored. In section three the empirical research evidence relating to the role of middle level managers (including site managers), in relation to safety is examined. In particular, attention is paid to the influence of managerial leadership on workplace safety climate, on supervisors and on employees. In section four the role of supervisors in determining safety outcomes is investigated. This section culminates in a distinction between the roles of managers and supervisors and explores the paths of influence between them. In section five the role of workers in safety is examined. Particular emphasis is placed on the role of employee motivation for safety. The determinants and antecedents of safety motivation are identified. In section six the summary findings are presented in a table. In addition, a model is developed showing the important factors at each level and the paths of influence between the levels. The model is discussed. In section seven the implications of the findings for safety management are highlighted, recommendations for leadership training are also made. In section eight conclusions are drawn and recommendations for future research are made.

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1 Introduction

1.1 Overview

This literature review has been prepared as part of a Joint HSE and Step Change in Safety funded project. The project was commissioned by the Health and Safety Executive to investigate the literature relating to the role of senior, middle and supervisory level leadership in determining workplace safety outcomes.

1.2 Aim

The aim of this paper is to review the theoretical and empirical literature that examines the role of managerial leadership in determining organisational safety outcomes. This will be achieved by extracting the key relationships involving leadership factors in safety research.

1.3 Background to leadership and safety

Until recently, there has been little theoretical development or empirical research directly assessing the relationship between leadership and safety. Most of the leadership research has focused on outcomes such as productivity, profit, turnover and worker satisfaction as their criteria, whilst few studies have looked at *safety* as a criterion for measuring leadership effectiveness. This is surprising, given that creating a safe workplace and promoting effective leadership are key goals of most modern organisations. Yet it cannot be assumed that similar leader behaviours will be associated with effectiveness in safety as with other outcomes because safety, unlike other organisational outcomes is intangible. Good safety performance culminates in non-events which are not self reinforcing. Thus, in order to develop and sustain employee motivation for safety it is likely that managers will require certain communication and motivational skills, which may differ from those required to fulfil task orientated goals.

In recent years there has been an upsurge in interest in the contribution of leadership to organisational safety. This has been spurred on by the inquiry outcomes into a number of major disasters such as Three Mile Island (Kemeny, 1979), Chernobyl (IAEA, 1986), the Clapham Junction rail crash (Hidden, 1989), the sinking of the Herald of Free Enterprise

(Sheen, 1987), Piper Alpha (Cullen, 1990), the Kings Cross fire (Fennell, 1988) and the Esso Longford gas plant explosion, (Hopkins, 2000); which found that that failures at managerial levels were at least as important as technical failure and human error, in causing the accidents.

For example, in the report of the Public Inquiry into the Piper Alpha disaster, Lord Cullen stated: *"I am convinced from the evidence…that 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, pg. 301) Similarly, Mr Justice Sheen (1987, pg. 14) investigating the sinking of the Herald of Free Enterprise concluded, *"..a full investigation into the circumstances of the disaster leads inexorably to the conclusion that the underlying or cardinal faults lay higher up in the company…From top to bottom the body corporate was infected with the disease of sloppiness"*

These findings are supported by the evidence emerging from safety climate research which clearly implicates the leadership process in the formation and maintenance of safety climate and the reduction of accidents (Brown & Holmes, 1986; Dedobbeleer & Beland, 1991; O'Dea, 2002; Simard & Marchand 1994, 1995, 1997). Most of the research has been conducted in high hazard industries such as the underground mining industry, the nuclear power industry, the aviation industry, the offshore oil and gas industry and the rail industry. This review affords the opportunity to test the robustness of the link between these two constructs.

Although many of the studies purport to investigate 'leadership and safety', in fact most of the studies are focused at the supervisory level, very few have examined the role of more senior level managers on occupational safety outcomes. With a few notable exceptions (Carroll & Hatakenaka, 2001; Hopkins, 1995; 1999; Smallman & John, 2001) there is very little research regarding the process by which senior managers can achieve a strong safety culture in their organisations.

It is likely that the behaviours associated with effectiveness at corporate management level, will be different to those that will be important at the level of the site manager which will in turn be different from those at the level of the first-line supervisor. Higher-

level managers are usually more concerned with strategy i.e. making long-range plans, formulating policy, modifying the organisation's structure, and initiating new ways of doing things. Decisions at this level usually have a long-time perspective. Middle level managers such as site managers, are primarily concerned with tactics i.e. interpreting and implementing policies and programs, they usually have a moderately long time perspective 1-3 years. Low-level managers such as supervisors and team leaders are primarily concerned with operational matters i.e. structuring, co-ordinating and facilitating work activities. Objectives are more specific, issues are less complex and more focused, and managers typically have a shorter time perspective (Management Charter Initiative 1997). The safety literature is also beginning to recognise that different grades of managers play different roles in the overall management of safety (Andreissen, 1978).

Within this review, three hierarchical levels of management are distinguished: corporate (or senior level) managers, middle (or site level) managers and supervisors (also known as first line managers or team leaders). The review culminates in a model showing the important factors at each management level and the paths of influence between the levels.

2 Corporate governance of safety

Corporate governance (or accountability) for safety is a cherished concept, yet one which is not well understood. Sinclair (1995) explains the concept as the way in which organisations take responsibility for their actions. This implies that corporations (or those that run them) have the capacity to use moral reasons in decision-making, and that those decisions have the capacity to control corporate acts as well as corporate policies and rules (Monks & Minow, 1995). Demb and Neubauer (1982) explain corporate governance as the process by which corporations are made responsive to the rights and wishes of stakeholders within the organisation, which may include, workers, the public, and shareholders. This suggests that corporate actions are influenced by the agenda of the different parties to the organisation, each having a different degree and direction of influence on the organisation.

This interpretation is supported by the new corporate manslaughter legislation which stipulates that directors and senior managers can be held individually accountable for accidents, where it can be shown that the risks were not managed effectively (Slapper, 1999; Wells, 2001). In order to apply the legislation, the present law states that there must be a "controlling mind" in the organisation who can be held accountable. However, while this may be relatively easy in a small organisation, the same is not true of large multi-national corporations or a state-owned organisations (like the national health service), that employs a million people. In such cases finding the "controlling mind" has proved difficult. In fact to date, according to the Home Office, there have been only three successful prosecutions under the new legislation (Department of Health (DoH), 2002). However, new Home Office proposals promise to close legal loopholes that make it so difficult to identify the "controlling mind". Moreover, many of the regulatory requirements are extremely vague. A good example of this is the requirement to reduce risks "*as far as is reasonably practicable"*. Such laws are open to interpretation and can allow firms to exploit legal loopholes in order to avoid necessary safety expenditures (Gun, 1993). Thus, while the idea of corporate responsibility has undoubtedly gained acceptance in recent years, it is still unusual for prosecutions to be pursued.

Nowhere is the need for effective legislation more pertinent than in the health care industry where the number of "medical accidents" or "adverse incidents" is higher than

was previously acknowledged. In the Chief Medical Officer's report last year it was revealed that as many as 850,000 adverse incidents are happening in NHS hospitals each year. These mistakes are estimated to cost the health service in excess of £2bn annually (DoH, 2002). Moreover, there are an estimated 34,000 preventable deaths in the NHS annually (Henderson, 2002).

Doctors protest that while none of these "Medical accidents" or "Adverse incidents" is acceptable, nonetheless doctors, like any other human, will make mistakes. Yet there are those who say that the profession is simply not doing as much as it can to allow for the possibility of human error, or to protect patients from them (Tomas, 2002).

The problem has its roots in structural and organisational features of the health care industry. Key issues are the inability to make patient safety the dominant organisational goal relative to cost and production and the inability to optimise individual and organisational learning. Professor Liam Donaldson (2002) (Chief Medical Officer for England) said " at the moment there is no way of knowing whether the lessons learnt from an incident in one part of the NHS are properly shared with the whole health service".

It is now widely acknowledged that strategies to improve medical performance have to be developed. However, a prerequisite of such an approach is the detection of errors and the acceptance of fallibility. In a move towards such an end, the government recently announced the introduction of an "early warning system" to detect medical errors. The system will require hospitals to report all medical errors or near misses in a central register. The register will be used to allow errors to be analysed and enable steps to be take to ensure the mistakes do not happen again. While such programmes are beneficial, it is now acknowledged that major improvements in patient safety will only be achieved with a fundamental change in culture within the health care industry.

It is not just the high hazard industries that are required to manage occupational risk more effectively. Since December 1999 companies incorporated in the UK and listed on the London Stock Exchange (LSE) have been subjected to the LSE's corporate governance requirements. This requires boards of directors to identify, evaluate and manage their significant risks and to assess the effectiveness of their internal control systems.

The Combined Code on Corporate Governance (known as the Turnbull Report) pulls together the range of corporate governance pronouncements over the years and provides guidance to organisations on the implementation of the legislation. The Code does not advocate 'zero risk', but rather a health level of 'controlled risk', through awareness of changing environmental threats and opportunities. The four key requirements outlined by the code are:

- The protection of shareholders' investment and company assets through sound systems of control.
- The initiation of regular reviews of effectiveness of controls and specifically on finance, operations, compliance and risk management.
- The need for companies to regularly review the need for an internal audit function, where one is not present (Davies, 2001).

Thus, the guidance is about the adoption of a risk-based approach to establishing a system of internal control and reviewing its effectiveness. For directors the task is to implement control over the wider aspects of business risk, not just financial risk. By setting responsibility at board level, the definition of risk has been considerably widened, relating not just to external threats and internal unauthorised employee acts, but also included fundamental issues that affect board strategy and policy. The guidance indicates the company's internal control system should have three main characteristics (i) it should be embedded within its operations and not be treated as a separate exercise (ii) it should be able to respond to changing risks within and outside the company; and (iii) it should enable each company to apply it in an appropriate manner related to its key risks (The Institute of Chartered Accountants, 2002).

Thus, corporate governance relates to the degree of ownership and control which the organisation holds in relation to safety. Recent advances in legislation means that all organisations not just high reliability organisations now have to actively manage all of the risks they face not just financial risks.

2.2 The Health and Safety Executive's role in promoting corporate governance of safety

The UK's industrial safety regulator, the Health and Safety Executive (HSE) plays a major role in promoting corporate governance of safety. Their approach to tackling the issue through regulation, enforcement and deterrence has been remarkably successful and has been largely responsible for the considerable fall in injury and illness at work in Britain over the past 25 years (HSC, 2000).

However, governments often lack the resources to monitor compliance with occupational safety regulations (Kolstad, Ulen & Johnson, 1990). In fact, a recent study in the UK by the Eagle Star insurance group revealed that only 30% of firms fully comply with employee health and safety regulations (Corporate Cover, 1994). In fact the HSE's own research concludes that between 70-85% of workplace deaths were preventable, yet, fewer than 20% result in a prosecution for a health and safety offence (Wells, 2001).

In recognition of this, the HSE has taken a more motivational approach to their role as regulators by promoting better working environments, positively engaging firms in health and safety, and motivating them to develop a culture of self-regulation (HSC, 2000). The new approach recognises that while appropriate enforcement and deterrence are crucial, this should not be at the expense of promoting voluntary compliance.

- The 'safety pays' argument

The main vehicle used by the HSE for cultivating this culture of self-regulation rests upon proving the commercial advantage of improving health and safety performance. The central argument being that accidents generate costs that could be avoided by expenditure on precautions, which would be lower than the cost of the accident. The underlying principle is based on the total loss control theory espoused by Heinrich (1959), which uses the pyramid concept to show that controlling the numerous non-injury accidents at the base of the pyramid, will reduce the chance of injuries and fatalities further up the line, and so provide proactive control of health and safety. Similarly, the HSE's approach is based on eliminating the underlying causes of accidents such that the occurrence of accidence is minimised. This should reduce the costs of ill health, injury and death and should make for more efficient and profitable organisations. Furthermore it will ensure

that health and safety objectives and legal obligations are met.

In order to substantiate the claim that 'safety pays' the HSE (1997) conducted a study, investigating the costs incurred as a result of workplace accidents in five organisations: a creamery, a construction site, a North Sea oil platform, a transport company and a National Health Service hospital. In all cases it was found that the costs of accidents were considerable. On an annualised basis, they were estimate to have cost 8.5% of the tender price of the construction organisation, 1.4% of the creamery's operating costs, 37% of the transport company's profits, and 14.2% of the potential output of the oil platform and 5% of the annual running costs for the hospital. The salience of such costs provides a powerful incentive to accident prevention.

(Ashby & Diacon, 1996) identifies other financial arguments for expenditure on health and safety. Firstly, firms may find that the productivity of their workforce will rise in response to increases in risk management expenditure, since firms failing to ensure adequate protection against physical injury or redundancy are likely to lose their most productive workers and de-motivate those that remain. Secondly, workers in unsafe or unpleasant jobs demand a compensating wage differential, the requirement to pay sizeable wage premiums to workers exposed to occupational risk, should be an incentive to invest in safety in order to increase their profits.

- Criticism of the 'safety pays' argument

Despite this, the relevance of the economic argument at the organisational level is questioned by a number of theorists. For example, Cutler and James (1996) criticise the HSE for painting an overly simplistic picture of the 'safety pays' argument, and points out two flaws with it. Firstly, it encourages the notion that employers should prioritise the avoidance of accidents by reference to potential financial returns. Secondly, it is estimated that the average costs of non-injury accidents are nearly three times those of injury accidents. The pursuit of financial returns may encourage organisations to target non-injury accidents more aggressively. Besides, at some point further investment in the safety programme will not give a net return, thus based on a purely financial argument, safety expenditure should be increased up to the point where the marginal cost of safety equals its marginal benefit, and no further (Ashby & Diacon, 1996).

In fact Hopkins (1999) believes that managers' thinking about expenditure on health and safety may in fact be essentially flawed. Two different types of faulty thinking patterns are identified. 'Institutionalised irrationality' relates to managers' tendency to focus on the costs of complying with health and safety legislation, over too short a period of time (usually one year). Not surprisingly, the costs of compliance are identified as a financial burden. If expenditure was deducted against longer periods, the expenditure might seem more cost effective. 'Bounded rationality' on the other hand relates to the lack of access to all relevant information. Here, employers look at whether the cost of prevention outweighs the potential cost borne by the employer, regardless of what proportion of the total cost this may be (Hopkins, 1999). Such failures to fully weigh up the economic arguments is thought to lead to faulty decision making by managers.

Smallman and John (2001) also criticise the 'safety pays' argument. They argue that research has not yet firmly established a link between health and safety performance and broader corporate performance. Thus while the moral case of investment in health and safety is indisputable, the argument that safety pays is spurious.

The evidence from a number of high profile accidents supports this position. Knight and Pretty (1988) investigated the impact of catastrophe on shareholder value in fifteen major corporations. As would be expected, in all cases the catastrophe had a significant negative *initial* impact on shareholder value. However, in some cases, the net impact on shareholder value (after 50 trading days) was actually positive. The ability to recover value differs considerably between firms. It seems that management's ability to deal with the aftermath of the catastrophe demonstrates their talent in dealing with difficult circumstances. This appears to be a more significant factor in determining shareholder confidence, than the economic loss associated with the incident. Such evidence illustrates that organisations often do not suffer financially, even from serious incidents.

Furthermore, the 'safety pays' argument is not specific enough with respect to the beneficiaries of any improvement in safety (Smallman & John, 2001). For example, there is no evidence to support the proposition that the health and safety performance has any impact upon top managers' remuneration. In fact Hopkins argues that top managers are often shielded from any untoward financial consequences of accidents or catastrophe. Yet, "*any attempt to argue that safety pays must specify for whom. Unless we can*

identify a relevant decision maker for whom safety pays, the argument has no capacity to motivate action to reduce injury and illness" (Hopkins, 1999 pg. 144).

In support of his argument, Hopkins (1999) cites the case of the Bhopal incident in which Union Carbide Corporation and its managers ultimately benefited from the incident. While lower level managers may have suffered financially and lost their jobs, for senior managers, whose decisions are crucial to safety, their inattention to safety paid off handsomely. The case of the Moura Mine disaster in Australia is similar. Because this particular mine was only a tiny part of the BHP empire, the catastrophe did not have any serious financial impact on the most senior executives of the company. Again the parent company did not suffer financially, and again, senior managers were shielded from any untoward financial consequences. In fact, the most serious and immediate consequences for middle level managers at the mine was mine closure due to production shortfalls. It made sense for these managers to focus all efforts on maximising production, the possibility of catastrophe was seen as a lesser threat. Hopkins (1999) is careful to point out that they are not suggesting that senior managers are inherently unconcerned about safety, but simply that financial considerations play an insignificant role in generating this concern. The above evidence suggests that the 'safety pays' argument is unlikely to be effective in motivating managers to action to reduce injury or illness.

- The strategic benefits of occupational health and safety

It is now being proposed that the message which government agencies should be seeking to convey to managers is not that safety pays financially, but that it pays in terms of other non-tangible benefits such as brand value, customer satisfaction, corporate reputation, worker morale and worker motivation. Such intangibles are also likely to have links to the bottom line through insurance premiums, quality, sales and profits (Hopkins, 1999). However, there are two opposing views on the relationship between good health and safety performance and corporate reputation. In one view reputation is regarded as a critical competitive component of global firms. But, because of a preoccupation with managing tangible assets and unfamiliarity with how to exploit the value of a good reputation, many top firms failed to capitalise on reputation as an intangible resource (Petrick, Scherer, Brodzinski, Quinn & Ainima, 1999). On the other hand, Smallman (2001) argues that occupational health and safety (OHS) can impact on corporate

reputation but only in a negative sense. It seems that while poor OHS performance can lead to competitive disadvantage, good OHS performance is likely to go unnoticed. He suggests that real benefits can only be accrued by organisations when they subscribe to a model of business excellence in which OHS plays a vital part.

This point is strongly supported by Burke and Logsdon (1996) who argue that rather than focusing on a direct correlation between what he terms Corporate Social Responsibility (CSR) and profits, corporations should be endeavouring to maximise the strategic benefits which CSR programmes can create for the organisation. They propose a basis for identifying the relationship between CSR and a firm's strategic interests. Five strategy dimensions are identified which help to assess the value created for the firm by CRS programmes, these are:

i) Centrality: the closeness of fit between a CSR policy and the firm's mission and objectives.
ii) Specificity: the ability of the programme to capture private benefits for the firm.
iii) Productivity: the degree to which the program is planned in anticipation of emerging social trends and in the absence of crisis.
iv) Voluntarism: the scope for discretionary decision-making and the lack of externally imposed compliance requirements.
v) Visibility: the observable, recognisable credit by internal and or external stakeholders for the firm.

Occupational health and safety programmes with these characteristics should yield substantial business-related benefits to the firm, by supporting core business activities and contribute to the firm's effectiveness in accomplishing its goals (Burke & Logsdon, 1996).

The Turnbull report on corporate governance presents a similar case. It argues that it makes sound business sense to manage risk effectively and to embed internal control in the business processes by which a company pursues its objectives. Thus, risk management and internal control are firmly linked with the ability of a company to fulfil its business objectives. Such benefits are achievable through a reduction in time spent fire fighting, identifying a better basis for strategy setting and the resultant achievement of

competitive advantage (The Institute of Chartered Accountants, 2002).

Indeed, Warrack and Sinah (1999) found that among the most sophisticated firms in their sample, this is in fact the case. OHS is not viewed as a separate function but as an integral part of productivity competitiveness and profitability. The basic elements of building a safer and healthier workplace environment are congruent with the criteria important to achieving excellence in quality and productivity. Such arguments suggest that safety and profit are not incompatible goals but complementary, and that safety and quality share similar drivers. Integration is the key. Indeed Petrick et al (1999) found that excellent global leaders are capable of balancing four competing criteria of performance: i) profitability and productivity, ii) continuity and efficiency, iii) commitment and morale and iv) adaptability and innovation. This leadership style has been termed behavioural complexity and is directly linked with sustainable competitive advantage.

The ability of such programmes to accrue positive benefits for the entire organisation is illustrated in the case of the failing Millstone Nuclear Power plant in Connecticut, USA (Carroll & Hatakenaka, 2001). In 1997 the company was facing bankruptcy, its stock had plummeted in value and the power-producing units were shut down due to safety concerns. Yet by August 2000, Millstone was again producing electricity and the stock had gone up in value. This was achieved by a process of organisational learning and development. In particular, leadership development and training programmes were instigated in which leaders' interpersonal skills, openness and learning were developed. Moreover, an atmosphere of mutual trust between leaders and workers was encouraged, open systems of communication were developed where employees were encouraged to voice their concerns, and structures of participation were developed. It is suggested that such principles could be put in place by any industry in order to improve managers' effectiveness and the company's competitiveness.

- Are safety and profitability compatible?

Yet despite this rhetoric, much of the evidence on accident causation suggests that managers have to balance the *competing* requirements of safety with their other responsibilities (Fuller, 1999), and that it must be *traded off* against other management matters (Dawson, Willman, Clinton & Bramford, 1988). It seems that even where leaders

give high priority to safety, this is liable to be undermined by competing organisational and individual objectives (Smallman, 2001). Numerous studies have found that pressure to achieve high production targets is implicated in accident causation (Cutler & James, 1996; Flin, 2001; Nichols and Armstrong, 1973). A regular finding of these studies is that dangerous practices are tacitly encouraged by management even though they contradict formal safety policies. When injuries occur such actions can be labelled human error since they are contrary to company safety policy (Cutler & James, 1996).

The evidence from accidents such as the Esso Gas Plant explosion at the Longford plant outside of Melbourne, highlights some of the conflicts which organisations face. Management at the plant were conflicted between the need to recognise and control major hazard and the need to reduce the costs of lost time injuries. It seems they focused much of their attention on the latter, to the exclusion of major hazards (Hopkins, 2000). Other failures at senior management levels were also recognised as being fundamental to the accident. In particular, inadequate evaluation of operator competence, an emphasis on cost cutting leading to failures of maintenance, poorly executed audits, and running the plant outside of its design envelope.

Thus, there are two opposing views on the relationship between good health and safety practice and financial performance of organisations. In one, good health and safety performance is seen to contribute to sound financial performance, this view is proposed by the HSE. In the other, an inherent contradiction is seen to exist between expenditure on health and safety requirements against the desire to maximise profits (Cutler & James, 1996).

In order to tackle such attitudes and improve the standard of corporate responsibility for safety, it will be necessary to raise the level of safety consciousness among those in the business world who are in positions to influence the importance of safety on the corporate agenda. In their recent study (HSC, 2000), there was a widespread perception by health and safety practitioners of a low profile for their profession in the corporate agenda, and little support from senior management. Indeed many health and safety practitioners considered that greater prominence for health and safety issues at board level was needed in order to raise safety standards. To date, very little is actually known about which factors influence senior managers' decision making processes regarding health and safety, or the priority given to safety versus productivity. Yet Sinclair (1995) argues that before

accountability can be increased or encouraged, we need to understand how it is constructed by those who are held accountable. Those studies that have investigated the role of senior managers in organisational safety or senior managers' attitudes to safety, are reviewed in the following section.

2.3 The role of senior managers in safety.

The HSE have long recognised senior managers as a key influence on organisational safety. In their recent publication, they cited *"poor management and ignorance of good practices"* as the primary reasons for health and safety failures within UK organisations. (HSC, 2000, pg. 19). They emphasise the importance of pro-activity on the party of senior managers in establishing the safety culture with organisations. "*Senior management commitment is crucial to a positive health and safety culture. It is best indicated by the proportion of resources (time, money, people) and support allocated to health and safety management and by the status given to health and safety."* (HSE, 1999, pg. 46). The nuclear power industry (IAEA, 1997, pg.10) also emphasise that managers should frequently emphasise the importance of safety. *"On a personal basis, managers at the most senior level demonstrate their commitment by their attention to regular review of the processes that bear on nuclear safety, by taking direct interest in the more significant questions of nuclear safety or product quality as they arise, and by frequent citation of the importance of safety and quality in communications to staff"*. Yet while the regulator and other agencies exhort about the value of senior management, there is limited evidence to support such exhortations.

- Senior managers attitudes to safety

Two recent studies (Ashby & Diacon, 1996; Smallman & John, 2001), have been very useful in illuminating the current state of directors' thinking about health and safety. Smallman and John (2001) describe a research study conducted at the behest of the British Safety Council by MORI, in which 102 senior directors of large British companies were surveyed in a broad questionnaire which included questions about directors' attitudes to Occupational health and safety (OHS), and its relationship with corporate reputation. In depth interviews were held with a further eight business leaders, from a sample of 30 FTSE 500 organisations. The interviews covered directors' attitudes to and

priorities in health and safety; and companies' practices in health and safety at a senior level. It was observed that firms seem to evolve through a number of stages of maturity in health and safety practice, moving from 'compliance', stemming from a desire to limit the costs of liability, though to 'enlightened paternalism' which emerges from a sense of duty to employees and other stakeholders, and on to 'external competitiveness' which is related to a sense of pride in the organisation. Overall, the survey revealed that directors view OHS as a significant performance determinant. The study has no way of identifying whether the attitudes expressed by directors are translated into practice when safety or production critical decisions are being made. Nonetheless this is more likely to be the case when, (as appears to be the case) safety is seen as integral to competitiveness and profitability.

On a similar vein, (Ashby & Diacon, 1996) conducted a study to explain why large UK corporations undertake measures to reduce the risks of occupational injury, to their employees. A postal questionnaire survey was conducted of 127 corporate risk and finance managers from a population of 350 of the largest UK companies. The survey shows that respondents place most emphasis on ensuring statutory compliance with government health and safety regulations and on the avoidance of legal liabilities. Financial performance seemed to influence motives for reducing the risk of physical injury in only three cases: in order to increase labour productivity, to reduce legal liability costs and to conform to safety regulations. Thus it seems that motivation to manage OHS stems primarily from a desire to comply with government regulation.

A very recent study by Rundmo and Hale (in press) investigated the attitudes towards safety and accident prevention among 210 senior managers in an industrial company in Norway. The aim was to analyse the association between safety attitudes, behavioural intentions and safety behaviours of the managers using a questionnaire study. The study shows that senior managers' safety attitudes are an important causal factor for managers' behavioural intentions and behaviour. High management commitment, low fatalism, high safety priority, and high risk-awareness seem to be particularly important attitudes for managers. They appear to be strongly predictive of behavioural intentions also their safety behaviour.

- Senior managers' leadership style

Another potentially fruitful research avenue is to study the influence of senior managers' leadership styles in relation to safety on the attitudes and behaviours of those further down the hierarchy, and in turn the workforce. Yule, Flin & Murdy (under review) investigated the association between senior managers' perceived leadership style (using the MLQ, Bass & Avolio, 1995) and safety performance of their units. Two elements of transformational leadership style (intellectual stimulation, idealised consideration) and one element of transactional leadership (contingent reward) were found to be significantly associated with lower accident rates. This was a preliminary study and would require replication, nevertheless it does suggest that leadership styles may have an impact on safety outcomes. In another recent study (Bryden & Flin, in prep) found that the charismatic component of transformational leadership was associated with stronger perceptions by subordinates of the senior manager's commitment to safety.

- Trust

Interpersonal trust between leaders and subordinates has long been thought to be important to organisational success (Argyris, 1964). Research has shown that trust has significant relationships with many organisational variables, such as the quality of communication, performance, citizenship behaviour, problem solving, and co-operation. In addition, trust reduces the need for formal contracts, it limits opportunistic behaviours and reduces the need for hierarchical controls (Whitener, 1998).

Like safety, managerial behaviour is thought to be an important determinant of the development of trust in the employee-manager relationship. Mayer, Davis and Schoorman (1995) found that three leadership factors – ability, benevolence and integrity appear to explain a major portion of workers' perceptions of trustworthiness. Similar categories of behaviours have been identified by Whitener (1998), although in this case five categories of behaviour were identified which influence employees' perceptions of managerial trustworthiness: 1. behavioural consistency, 2. behavioural integrity, 3. sharing and delegation of control, 4. communication (e.g., accuracy, explanations, and openness), and 5. demonstration of concern.

However, few studies have specifically looked at the role of trust in determining safety

outcomes. One exception is Kivimaki, Kalimo and Salimen, (1995) who conducted a study involving (n=428) nuclear power plant workers in Finland. A significant path of influence was found between trust in top management (i.e. trust in the extent to which management give priority to safety goals over production goals) and workers' acceptance of organisational goals; and between acceptance of organisational goals and perceived nuclear risks. There was also a significant *direct* path between trust in top management and perceived nuclear risks. It was concluded that a lack of acceptance of organisational goals on the part of workers probably reflects workers' subjective estimation of an inadequate balance between safety and efficiency on the part of top management.

According to Hardin (1996), organisational attributes, such as structure, policies, and culture, may dictate the degree of control managers exert over the actions of their employees. It is proposed that organisations that are highly centralised, formalised, hierarchical, and focused on efficiency will be less likely to generate managerial trustworthy behaviour - in particular, communication and delegation of control - than will organisations that are decentralised, less formal, less hierarchical, and focused on effectiveness. Hardin argues that organisations can be designed to enhance trustworthiness by creating structures that make trusting more successful. Other factors such as performance appraisal and reward systems (e.g., regular and timely feedback and mechanisms for employee input into performance appraisal), the more likely it will be that managerial trustworthy behaviour, especially communication and behavioural consistency, will occur. Also, culture may indirectly encourage (or discourage) managerial trustworthy behaviour through the structuring of general patterns of communication, co-ordination, and decision making. That is, certain cultural values and norms, are likely to engender managerial trustworthy behaviour. Organisations with cultures characterised by inclusiveness, open communication, and valuing people will show greater trustworthy behaviour, particularly delegating control, communicating openly, and showing concern, than will organisations with cultures that do not share these values or norms.

2.4 Overview of corporate governance of safety

These results have important implications for government safety policy. They reject the notion that current regulatory mechanisms are ineffective in motivating corporate

governance of safety, and confirm the notion that the motivation to achieve good health and safety standards are linked primarily with regulatory requirements and that government regulations are necessary in order to protect employees against excessive levels of workplace risk.

The new corporate manslaughter legislation is likely to be an effective strategy to this end. It should act as a powerful deterrent to help prevent needless injuries and deaths while at the same time punishing the grossly negligent. However the evidence does call into question the utility of relying on the 'safety pays' argument to motivate managerial action. Rather it suggests that government agencies should be seeking to convey the message that safety also pays in terms of other non-tangible benefits, such as corporate reputation, quality, satisfaction and morale, which are also likely to have impact on bottom line factors. There is a need to raise the profile of health and safety at boardroom level and to shift perceptions of health and safety from 'regulatory need' to 'strategic issue'.

Reason (1997) suggested that the higher the individual is in organisation, the greater their potential to influence organisational outcomes. The evidence from the above studies supports this view. They suggest that the decisions made at senior levels will affect the priorities attitudes and behaviours of managers and employees lower down the organisational hierarchy, and be a critical driver on the emphasis that front line managers place on the competing values of safety and productivity. However, as was mentioned earlier in this review, there has been little empirical research or theoretical development on the way these levels interact with each other to determine safety outcomes. This gap in knowledge needs to be addressed in future research.

3 Middle managers

While none of the managerial positions (except perhaps for supervisors) have been studied extensively in relation to safety, the evidence regarding the role of middle level managers has been expanding in recent years. A number of variables have emerged through the literature with such consistency that their relevance to organisational safety outcomes seems indisputable. This consensus has been achieved despite differing methodologies, different industrial sectors and different national boundaries of the studies. This suggests that the findings are fairly robust. However, the field has been hampered by a number of conceptual and methodological difficulties. These are outlined below.

1. The occupational category 'management' is used ambiguously in many of the studies, describing various levels of management from CEO to first line supervisor. Consequently, it is often unclear which level of management is actually being assessed: It is important that these distinctions are clarified, given that the various grades of mangers appear to play very different roles in the management of safety (Andriessen, 1978).
2. The breadth of the subject matter has resulted in researchers examining fragmented aspects of the safety-leadership phenomenon. Such diversity makes it difficult to develop a coherent model of the safety leadership phenomenon.
3. Leadership has been conceptualised at various different levels of analysis, (i.e. individual, dyadic, group and organisational level). It is likely that different leadership styles and behaviours will be effective at the various levels.
4. All of the studies are based on the quantitative research methodology, it requires that subordinates retrospectively rate how often a leader exhibited some behaviour; whether these behaviours are used skilfully or at appropriate times is not considered.
5. There is a lack of standardised measurement instruments. The field of research is characterised by a proliferation of customised survey instruments, many of which are developed on the basis of interviews and focus groups conducted within a particular organisation or industry, as well as reviews of the literature.
6. There have been very few independent replications of studies. Those that there have been, have not revealed consistent findings.
7. There is a lack of objective safety performance criteria. A variety of different criteria

are used upon which to base evaluations of organisational effectiveness in preventing accidents, these include: (1) company accident statistics, (2) self reported accident involvement (3) comparison of high and low accident rate plants and evaluation of plants with outstanding safety records (4) expert, manager, supervisor, workforce evaluation of importance of various variables (5) self reported safety behaviours and safety attitudes, each with its own limitations.

All of the above makes the identification of a common set of factors difficult and the development of a common factor structure almost impossible. Nonetheless, a pattern of findings is beginning to emerge which provides important new insights into the relationship between leadership and safety. In the next sections the empirical evidence relating leadership to safety will be reviewed. For ease of analysis, the studies are grouped under headings which relate to the main theme of the study.

- Organisational climate and leadership

Surprisingly little is known about the mechanisms by which leadership interacts with safety climate to determine employee safety behaviour. However, in recent years researchers have become more interested in this relationship. For example, Neal, Griffin and Heart (2000) in a study involving 525 hospital workers from Australia, found evidence to support a model in which employee's attitudes to general organisational climate (represented by a number of management variables including praise and recognition, goal congruency, role clarity, supportive leadership, participative decision making, professional growth and professional interaction) exerted a significant impact on safety climate. Safety climate in turn was related to employees' self-reported compliance with safety regulations and participation in safety-related activities. The study demonstrated that evaluations of the safety climate appear to be made within the context of the general organisational climate. Thus interventions designed to improve general organisational climate (i.e. workers perceptions of management) may have a positive impact on safety climate.

Hofmann and Stetzer (1996) in a study conducted at a US chemical processing plant, found that, employees' perceptions of safety climate were predicted by their perceptions of the actions of management. It seems that management engage in certain actions to

which workers attach meaning, which guides their behaviour. Similar findings were reported by Diaz and Cabrera (1997) in a study of employees from three Spanish airport ground handling companies. They identified three key dimensions of the safety climate: company policy towards safety, management commitment to safety, and perceptions about the organisation's philosophy regarding safety versus production priorities. In fact, these dimensions were able to discriminate between organisations with different levels of safety.

The studies highlight that organisational climate is a multidimensional construct that encompasses a wide range of individual evaluations of the work environment. These are strongly related to attitudes to management and factors which are under the direct control of management such as communication, participation, safety policies and procedures, work pressure and safety activities. General organisational climate and safety climate, are shown to exert a strong impact on an individual's motivation to achieve work outcomes, and provide a context in which specific evaluations of the importance of safety are made.

- Management commitment

Management commitment to safety emerges from the research as a key construct. The relationship to employee safety outcomes is strong. Through their questionnaire and site interview data, from 42 matched pairs of companies in the USA, Cohen, Smith and Cohen (1975) and Smith, Cohen, Cohen and Cleveland (1978), found that management commitment to safety was greater in the low-accident-rate plants than the high accident-rate plants. In the former plants, commitment was expressed through the allocation of resources to plant safety and health and more active involvement and participation by management in safety program matters. The findings are supported by the findings of Cohen and Cleveland (1983) in their study of the five top business performing companies in the United States. Plant management in these plants frequently expressed the view that worker safety took precedence over all other matters, including production. In addition, all of the plants had a written corporate safety policy which was not only stated but also implemented throughout all levels of the organisation.

Interestingly, Gaertner, Newman, Perry, Fisher and Whitehead (1987) found that there was very little in the interviews with plant management, from sixty-two underground coal

mines in the USA, that allowed direct discrimination between companies where management was committed to safety and where it was not. Nowhere did they find top management indifferent to safety nor did they find an attitude of fatalistic acceptance of high or even moderate injury rates. However, there was a difference in the way in which management expressed its commitment, the most obvious being the company's safety policy. In the companies with the best safety records, safety policy was characterised by clarity, consistency, and emphasis (production over safety). The second way in which the top performing companies differed from the others was in the company's choice of mechanisms for stressing safety. There did not appear to be one best vehicle for promoting safety, but all had several things in common: the means selected represented a complete sequence of activities in which the workforce could participate, and which could be implemented, monitored, and fed back to management and workforce.

More recent work has found associations between management commitment and a wide range of outcomes including: employees' evaluations of safety and contingency measures (Rundmo, 1994); incident reporting (Clarke, 1999); personal actions for safety (Cox, Tomas, Cheyne & Oliver, 1998); risk perception (Kivmiaki et al., 1995) and of course incident and accident rates (Alexander, Cox & Cheyne, 1995; Donald & Canter, 1994; Mearns, Flin, Gordon & Fleming, 1998).

- Management involvement in safety

Cohen et al. (1975) and Smith et al. (1978) found that management involvement in a number of safety activities was associated with good safety performance. Such activities included personal inspections of work areas, open and informal communications between workers and management, and frequent contacts between workers, management and supervisors. They concluded that the active involvement of management acts as a motivational force for both management and for employees. In their follow up analysis of the top five performing companies, Cohen and Cleveland (1983) found that in four of the top five plants, managers were highly involved in the development and execution of plant safety programmes. Similar findings are reported by Simonds and Shafai-Sharai (1977).

Conversely, DeMichiei, Langton, Bullock, and Wiles (1982) found that in five high-accident-rate mines, the safety department personnel identified a *lack* of upper

management involvement in safety matters as a serious impediment to improving safety and health conditions at the mine. In these mines, responsibility for safety was often delegated to safety personnel, who lacked the authority to require operating personnel to follow standard work procedures. Similar findings are reported by Zohar (1980) who found that managers in less effective plants, tended to assign all responsibility to specified safety personnel without delegating to them any executive power.

Brown and Holmes (1986), in a study designed to test Zohar's eight factor model of safety climate, identified three overarching factors: employees' perceptions of how concerned management was with their wellbeing, employees' perceptions of how active management was in responding to this, and employees' physical risk perceptions. In a follow up study of safety on construction sites, Dedobbeleer and Beland (1991) reduced this three factor model to two factors with paths of influence going between management commitment to safety and worker involvement in safety. Management commitment to safety involves management's safety attitudes and safety practices as a single dimension. Workers' involvement in safety includes workers' perceptions of control and workers' physical risk perception as a single dimension. This suggests that workers' perceived control and risk may be highly related to workers' involvement or responsibility for safety. Moreover, workers appear to perceive safety as a joint responsibility between workers and management.

- Management attitudes to safety

In fact, very few studies actively measure managers' attitudes to safety. One exception is Eyssen-McKeown, Hofmann and Spengler (1980) who examined managers' attitudes to accidents in a telephone company in Canada. They found that managers' self reported attitudes to safety were correlated with lower accident rates. Constructive attitudes included: greater perceived risk, a greater priority afforded to safety, the belief that accidents are preventable, a belief in the effectiveness of one's own actions, a focus on the incentives to reduce accidents rather than on the undesirable effects of accidents, the belief that accidents reflect badly on one's self, the belief that accidents interfered with productivity, belief that time spent on safety is appreciated. A focus on the barriers to safe work and the feeling that one's efforts were hindered by more senior management were associated with higher accident rates.

- Production versus safety

In their analysis of the top five performing companies, Cohen and Cleveland (1983) state that all of the top performing companies had certain characteristics in common. In each case safety was a real priority in corporate policy and action. In addition, safety practices and procedures were considered to be intrinsic to ongoing production goals. Similarly, Diaz and Cabrera (1997) found that employees' perceptions of the organisation's philosophy of either production or safety, is the second most important factor (after organisational policies towards safety) in predicting safety performance. Interestingly, Gaertner et al. (1987) found that companies that had better safety records also tended to be more productive. Gaertner interpreted this finding as the capacity of management to convince the workforce of a consistent, clear position supporting safe (but high) production.

In his sociological investigations into the causes of accidents in the UK's offshore oil industry, Wright (1986) found that perceptions of performance pressure can lead workers to believe that engaging short cut behaviour is an expected, or required part of the job. Workers who perceive a high degree of performance pressure will focus their attention on completing the work and focus less on the safety of their work procedures.

- Safety policies and procedures

A wide range of organisational level safety policies and procedures have been associated with better safety outcomes, these include: work planning and organisation, (Cohen et al., 1975; DeMichiei et al., 1982); accident investigation and record keeping (Gaertner et al., 1987; Simonds & Shafai-Sharai, 1977; Pfeifer, Stefanski, & Grerther, 1976); selection, promotion and training, (Cohen et al., 1975; DeMichiei et al., 1982; Smith et al., 1978); housekeeping, environment and plant design (Lee, 1998; Mearns & Flin, 1995; Simonds & Shafai-Sharai 1977); reduced turnover and absenteeism (Cohen et al., 1975, DeMichiei et al., 1982; National Academy of Science (NAS), 1982; Smith et al., 1978); use of praise, rewards and avoidance of blame (Alexander et al., 1995; Eyssen-McKeown et al., 1980), safety program development (Cohen & Cleveland, 1983; Simard & Marchand, 1994); safety rules and procedures (Lee, 1998; Mearns et al., 1998; Simonds & Shafai-Sharai, 1977). All of these work by convincing the workforce that management is clearly and consistently supportive of safety.

- Decentrialisation of power

Dwyer and Raftery (1991) in a study of workers attitudes at seven manufacturing plants in New Zealand, found that management use of power was implicated in industrial accident causation. Specifically, high levels of management command power, management control over work organisation, and task structure, served to reduce worker autonomy and worker integration, which are associated with higher accident rates. While none of the variables alone could explain the majority of accidents, a combination of these factors was capable of explaining differences in accident rates. For example, they found that accident rates were low when autonomy was high and the weight of rewards and command levels in management was low. Accident rates were high when auto-control was low and the weight of rewards and organisation was high. Such findings are supported by a number of other studies. DeMichiei et al (1982) for example, found that at high-accident rate mines, senior management were more reluctant to devolve decision-making power to supervisors or to employees. Similarly, Goodman (1987) in a study of coal mines in the USA, found that the reorganisation of a work section into an autonomous work group resulted in an increase in employees' knowledge of practices and safety procedures, as well as beneficial changes in communication, interaction and level of responsibility taken by individuals. Likewise Braithwait (1985) in his study of five coal mining companies with outstanding safety records suggests that decentralisation of decisions regarding safety is a characteristic that is common among the large mining companies with better safety records. These companies, combined a centralised focus on safety through policy setting, with decentralised safety practices through line management responsibility for implementation and performance. Similar findings are reported by Sanders Patterson and Peay (1976) who found that decentralised decision-making and flexible management has a relationship with decreased injury rates.

The evidence of Simard and Marchand (1994, 1995, 1997) form ninety-seven manufacturing plants in Canada, also strongly supports the utility of a decentralised approach by management as an effective strategy for accident prevention. It is argued that a decentralised approach from the top, promotes the supervisor's capacity and willingness to behave participatively with employees which results in more internal cohesion within the workgroup and greater co-operation with the supervisor, both are associated with lower accident rates.

- Decisiveness

DeMichiei et al. (1982) found through their questionnaire results that, in high accident mines, there was a greater tendency for management indecision. Not only did managers in such plants delay making important production and planning decisions, they also more often failed to enforce established company policies relating to absenteeism, job assignments and standard operating procedures. Miners in these mines stated that their morale was negatively affected by this.

- Organisational support

Eisenberger, Fasolo and Davis-LaMastro (1986) proposed that when employees' perceive their organisation values and is committed to them, an obligation develops for future reciprocity aimed at benefiting the organisation. These beneficial actions have been shown to include engaging in organisational citizenship behaviours, making suggestions to improve the organisation and performing better. Rundmo (1994) in a study conducted in the Norwegian offshore industry, found that employee evaluation of the social support given to them by managers and supervisors was the second most important factor in their satisfaction with safety and contingency measures in the workplace. The most important factor was managers' and supervisors' commitment and involvement in safety work. Similarly Hofmann and Morgeson (1999) in a study conducted at a manufacturing facility in the USA, using 49 supervisor-group leader dyads, found that supervisors' perceptions of organisational support was significantly related to their willingness to engage in safety communication with superiors.

- Labour management relations

A significant body of research evidence is accumulating to suggest that there is a significant positive association between favourable labour-management relations and organisational safety. It is likely that good labour relations result in a more motivated and safety compliant workforce, however the opposite causal relationship could also be the case i.e. a deterioration in safety could also result in a deterioration in labour management relations (Peters, 1989). Either way the association between these two variables suggests that they have important implications for safety in industry.

Braithwait et al (1985) in a mining study, found that a positive climate and high quality

labour relations are associated with better safety records. Organisations with good quality labour management relations were characterised by: an open door policy by management, a fair percentage of time spent underground by management, informal contact with upper level management, feelings of pride in the company, multiple communication vehicles including informal meetings. Another important predictor of the quality of labour-relations climate, was the safety committee. Where the relationship between workers and management was strained the committee was commonly more adversarial than in those companies where relations were supportive. Similarly, Kozlowski and Doherty (1989) found that organisations with high-quality supervisor-subordinate relations tended to have more positive climate perceptions, greater consensus among subordinates on climate and greater consensus with supervisors. Likewise, DeMichiei et al. (1982) found that in the majority of high-accident rate mines, the lack of communication was identified as a primary cause for poor management-labour relations.

Gaertner et al. (1987) found that mining companies with a negative labour relations climate had injury rates that were almost double those that had a positive climate. In addition, negative labour relations climates were also associated with significantly higher reported violation rates.

- Humanistic management practices

Cohen et al. (1975) and Smith et al. (1978) found that the low-accident rate plants tended to use a "humanistic" approach in dealing with employees. These plants valued good labour relations and engaged in more frequent and more positive contact with employees. The management in these plants seemed to have a higher regard for their employees and treated them with more respect regarding their work and showed a greater concern for them personally. The employees in these companies felt that they were appreciated as individuals and that their contribution was valuable to the organisation. Smith et al. (1978) state that it was on these issues that the greatest contrast was found between the low and high accident rate plants. Similar findings are reported by DeMichiei et al's (1982) in the mining industry.

Simonds and Shafai-Sharai (1977) found that companies that provided recreational programs for their employees tended to have significantly lower injury rates than their

counterparts without such programs. Two possible explanations are put forward: such programs may be seen by employees as evidence of management's concern for their welfare; alternatively, recreational programs may help to bring employees together and lead to more friendly and cohesive relationships among workers. Mearns, Flin, Gordon, O'Connor and Whitaker (2000) also found that oil installations with better health promotion and surveillance policies and practices tended to have lower accident and incident rates. They propose that investment by the company in these areas fosters perceptions of company commitment and builds worker loyalty in areas such as safety behaviour.

- Worker/management communication and co. operation

High levels of communication, and interaction between workers and management has been associated with positive outcomes in many studies. For example, the National Academy of Sciences (NAS) (1982) study found that in mines with low injury rates there appeared to be a co-operative attitude between management and labour, conversely, in three of the five mines with high injury rates, an adversarial attitude between management and labour was observed. Similarly, Kivimaki et al. (1995) found that feedback, communication, participative management and time spent by management at the worksite, were associated with good safety performance. Likewise, Smith et al. (1978) found that management of low-accident rate plants seemed to have a greater level of one to one interaction with their employees, while in high-accident rate plants management more often relied on committees to interact with employees. Similar findings are reported by Cohen and Cleveland (1983), who found that the top performing companies provided direct and immediate channels of communication and positive employee/ management interaction. All used some form of immediate feedback to motivate their employees.

- Flexibility

Zeffane (1994) investigated the relationship between perceived management styles and organisation commitment amongst 1418 public and private sector employees in Australia. Management style was hypothesised to incorporate four sub-dimensions (1) flexibility and adaptation, (2) rules and regulations; (3) hierarchy and role specialisation; and (4) degree of work-group discontinuity and change. Multiple regression revealed that organisational commitment was affected positively by flexibility and adaptation and by

role hierarchy and specialisation. The results of the study strongly suggest that aspects of management style as perceived by members, account for a significant amount of the variance in commitment. Perceived emphasis on flexibility and adaptation seems to be the most predominant predictor of commitment. Employees' perceiving a bias toward such a style, then develop greater commitment to the goals and values of the organisation.

- Leadership Style

One area of current interest is whether conventional theories of leadership such as the Bass (1985) transformational model measured by the MLQ (Multifactor Leadership Questionnaire, Bass & Avolio, 1995) can offer an insight into key leadership skills for influencing safety initiative and rule compliance at the worksite. Proponents of transformational leadership suggest that the dimension covers a wide range of leadership behaviours. Indeed, it appears to incorporate some of the factors identified as important by the earlier theories. For example, the need to empower subordinates and develop a sense of ownership for what goes on in the organisation reflects the principles of person centred, participative, supportive and trusting relationships which were advocated by theorists such as Likert (1967), Blake and Mouton (1964), McGregor (1966) and Fielder, (1967). It also appears to incorporate dimensions which are likely to be influential on safety. For example there is an emphasis on values and emotions which explain how a leader can influence followers to make self-sacrifices, commit to ideological objectives, and achieve much more than they initially believed was possible. Nonetheless, Bass's (1985) theory is a general one and was not designed to measure leadership behaviours which are identified through empirical research to be specifically related to safety. In fact Yukl (1999) criticises the label "full range leadership theory" which Bass (1996) uses to describe the theory. Although he recognises that no single theory can be expected to include all aspects of leadership, the MLQ lacks scales on several aspects of leadership i.e. task behaviours such as planning, clarifying; relations behaviours such as team building networking; change oriented behaviours, participative leadership behaviours and group and organisational processes, some of which appear to be critically related to safety.

3.2 Site managers

The influence of site managers on safety performance has received rather less attention in the literature (apart from some studies twenty years ago, e.g. Andriessen, 1978; Cohen & Cleveland, 1983; Simonds & Shafari-Sharai, 1977). Nonetheless, the importance of the site manager on safety climate is acknowledged in regulatory guidance (e.g. ACSNI, 1993).

A recent study by O'Dea & Flin (in Prep) attempted to model the influence of site management factors on supervisor and employee level variables from one company from the UK's offshore oil and gas industry. Employees' attitudes to OIM commitment to safety, supervisors' commitment to safety, worker-management participative involvement, worker self-rated commitment to the organisation, and worker cohesion, were used to predict workers' self-rated compliance and safety initiative behaviour, using structural equation modelling. Employees' perceptions of site managers' commitment to safety was found to be the most important factor in the model, it directly predicted workers' perceptions of supervisors' commitment to safety and workers' participative involvement. It also indirectly predicted rule compliance behaviour. Workers' participative involvement (with management) in safety, was a key mediating variable in the model. It directly predicted workers' rule compliance, and indirectly predicted workers' safety initiative behaviour, this latter path being mediated by workers' commitment to the organisation. This finding is supported by the evidence of earlier empirical research (Chew, 1988, Cohen & Cleveland, 1983, Dwyer & Raftery, 1991; Simard & Marchand, 1994, 1995), which identified a link between managers' participative involvement with employees and improved safety outcomes. The path between workers' participative involvement and workers' commitment to the organisation was shown to be the strongest in the model. This evidence supports the findings of Gartener and Nollen (1998), Kivimaki et al., (1995), Niehoff, Enz and Crover (1990) and Zeffane (1994), who found that flexible management and worker involvement appear to be the strongest predictors of commitment to the organisation. Commitment to the organisation significantly predicted workers' safety initiative, participative involvement predicted workers' rule compliance. The findings suggest that site managers are not only influential on higher level motivations such as safety initiative, they are also influential on task related outcomes such as rule compliance.

3.3 Overview of middle level managers

Management commitment to safety is a dominant factor in almost all of the studies. However this term is rather nebulous and refers to a wide range of managerial behaviours from the development of the safety program to the quality of labour-management relations. Nonetheless the research suggests that managers can demonstrate their commitment to safety in a number of tangible ways. Firstly, management can demonstrate their commitment to safety through their commitment to structural and procedural safety systems and to the development of the safety program. This includes a diverse range of activities such as: good housekeeping and environmental conditions, good training facilities, clear safety policy and goals, formal inspections at regular and frequent intervals, thorough investigations of all accidents and near misses, thorough record keeping, rules and regulations regularly updated and evidence of management and staff compliance with them, a high priority being given to safety at company meetings, an active safety committee and a high ranking safety officer. Secondly, and perhaps more importantly, management can demonstrate their commitment to safety through their attitudes, behaviours and styles of leadership. These tend to be less tangible than the structural and procedural variables but nonetheless they are thought to have as powerful (if not a more powerful) effect on workforce safety motivation. In fact, Hale and Hovden (1998) suggest that structural factors are likely to be critical only at the lower end of the performance scale, they cease to discriminate once the company has achieved mediocre level of advancement in safety management. It is the other less tangible factors concerning management's attitudes and style of leadership as well as the nature and quality of interactions with the workforce, which are better at discriminating the good from the excellent organisations.

The importance of interactions between managers and workers has been clearly established through the research. Specifically, management participation and involvement in work and safety activities, as well as frequent, informal communications between workers and management are recognised as critical behaviours. 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 appropriate task behaviours, they foster closer ties between managers, supervisors and workers, they encourage a free exchange of ideas on job improvement, and they provide the opportunity for the early recognition of

hazards and improper job practices (Cohen, 1977). More importantly though, worker-management interaction provides a clear indication of an overt, active and genuine concern for safety on the part of management.

The evidence strongly supports the utility of management clearly demonstrating that safety takes priority over production goals. Interestingly, such an emphasis has not been associated with reduced production performance rather the opposite seems to be the case. Those organisations that have clear safety goals also tend to be more productive (Peters, 1989).

A decentralised approach to safety management has been shown to be the most effective way in which management can promote workforce safety motivation. This is achieved by encouraging the joint involvement of supervisors with employees in relatively structured safety activities. Indeed, decentralised management at all levels is not only the best predictor of workgroups' propensity to safety initiatives, it is also the most important factor in relation to two other predictors of worker motivation to safety, namely workgroup cohesion and co-operation (Simard & Marchand, 1995). Co-operative relationships are characterised by a positive team spirit and a willingness to co-operate with other team members and other teams, in order to achieve the organisation's goals. Workgroups, which are internally cohesive and co-operative, also tend to be more co-operative with management. Thus any attempt by senior management to increase workers' safety motivation, must begin by attempting to increase supervisors' and workers' capacity to behave participatively with each other, thereby meeting their social and autonomy needs. In more recent years transformational leadership (Bass and Avolio, 1990) has been shown to be related to greater employee safety motivation and reduced accident rates.

The empirical evidence suggests that it is not just management commitment, participation and involvement in safety activities which are important, but the extent to which management encourages the involvement of the workforce, who must be permitted to help shape interventions rather than simply playing the more passive role as recipients. In this way workers are more likely to take ownership and responsibility for safety and to become actively motivated to take personal initiative in safety (Niskanen 1994; Williamson, Feyer, Cairns & Biancotti, 1997). Cohen and Cleveland (1983) make the following observations based on their three phased study: people work more safely when

they are involved in decision-making processes, when they have specific and reasonable responsibilities, authority and goals, and when they have immediate feedback about their work.

4 Supervisors

Forty years ago Heinrich (1959, p.22) advised, *"The supervisor or foreman is the key man in industrial accident prevention. His application of the art of supervision to the control of worker performance is the factor of greatest influence in successful accident prevention."* Since then a proliferation of studies have sought to measure the contribution made by supervisors in determining organisational safety outcomes (Mearns et al 1998; Niskanen, 1994; Simard & Marchand, 1994). In the main, studies have concentrated on the nature and quality of the interpersonal relationship between supervisors and employees, and the impact that this has on employee commitment, motivation and carefulness. Bentley and Haslam (2001) found that supervisors' impact on safety in postal delivery offices arises both from their attitudes and their actions. However, the precise role of the supervisor in safety management may depend on the way the work is organised.

- Supervisor openness and support

The evidence suggests that high quality and supportive supervision is associated with more positive safety outcomes. For example, Hofmann and Morgeson (1999) who examined the employee-supervisor relationship from a dyadic perspective, found that employee perceptions of organisational support, and high quality 'leader member exchange' (meaning open, two way and frequent communication) were significantly related to employees' willingness to engage in safety communication. High quality leader member exchange was also significantly related to employees' safety commitment and reduced accident rates. Similarly, Niskanen (1994) in a study of Finnish road administration and construction workers, found that the most effective supervisors had a more supportive style of leadership, they initiated discussions about safety and provided increased amounts of positive feedback on safety issues. Similar findings are reported by Pfeifer et al. (1976) and DeMichiei et al. (1982) who report that miners in low-accident rate mines, are more likely to report small incidents and unsafe conditions to supervisors, if the supervisors are open and responsive to this behaviour by employees. More recently, Griffin and Neal (2000) in a study of manufacturing and mining workers in Australia, found that supportive supervision made an independent positive contribution to workers' self reported safety motivation and safety compliance. Similarly, Wood, Barling, Lasaosa,

and Parker (2000) in a large-scale study of industrial organisations in the UK, found that high involvement supervision style and a decentralised approach were also predictive of more positive safety outcomes.

- Supervisor participative involvement

Almost all of the studies support the principle of combined involvement of supervisors and workers in safety work. In particular, Davis and Stall (1964) found that the most successful mining companies shared the following characteristics: supervisors' involvement in training and regular meetings between supervisors and employees to discuss safety. Cohen et al (1975) identified significant differences in supervisor behaviours that could be associated with better safety performances: spending a large portion of their time on occupational safety matters, being involved in the development of safety programs, and being involved along with workers in the safety inspections and accident investigations. Chew (1988) also established a significant association between the involvement of first line supervisors in safety work and lower injury rates.

In a study to examine the role of the supervisor in safety in the offshore industry, Fleming, Flin, Mearns and Gordon (1996), found that the more effective supervisors tended to use a more participative management style, they placed more emphasis on the importance of team work within the group, they appeared to value their work group more, and they seemed to recognise safety as an important part of their role. The less effective supervisors were characterised by avoidance behaviours, they did not appear to value their staff, they did not appear to have participatory styles, they did not trust subordinates, and spent much of their time policing the workforce. On a similar line, Mattila, Hyttinen and Rantanen (1994) conducted a study investigating supervisors and accident rates at 16 sites of a construction company. The study showed that the most effective foremen gave workers feedback more often and spent a greater proportion of their time communicating with workers about non-work related topics. Simard and Marchand (1994) also found that supervisory participative relationships with the workforce are associated with improved safety outcomes. They conclude that participative supervisory behaviours promote more cohesive relationship and more co-operation with the supervisor, both of which are positively associated with rule compliance behaviour and workforce safety initiative behaviour.

- Fairness

Thompson, Hilton and Witt (1998) found that the supervisor's role in promoting workplace safety is achieved by affecting the perceived level of fairness in their organisation's climate which in turn impacts on workforce compliance with safety rules. Similarly, Reason (1997) argues that workers perceptions of a 'just' culture is a crucial element of an organisations safety culture. Engineering a just culture depends on the trust of the workforce and a clear differentiation between acceptable and unacceptable behaviour.

- Supervisor autonomy

The evidence suggests that the devolvement of decision making power to supervisors is an effective strategy in increasing their motivation and involvement. For example, Simard and Marchand (1995 & 1997) found that worker safety compliance is higher when supervisors have some power and influence over decisions that affect the safety of their workgroups and put into practice joint involvement with workers in the conduct of accident prevention activities. The study concludes that top mangers may have more impact on effectiveness if they promote a decentralised approach which encourages the joint involvement of supervisors with employees in relatively structured safety activities, rather than a centralised and bureaucratic approach. Similarly, DeMichiei et al. (1982) found that supervisors at high-accident rate mines did not have as much freedom to make decisions concerning health, safety, and production as did section supervisors at low-accident rate mines.

- Production pressure

Moreover, Pfeifer et al., (1976) questionnaire results indicate that supervisors in low-accident rate mines were significantly less inclined to push hard for production or to cut corners on safety. Likewise, Sanders et al., (1976) found that increased levels of production pressure at twenty-two coal mines in the UAS, were associated with increased lost time injury rates.

- Supervisors' style of leadership

A number of studies have looked at supervisors transformational style in relation to safety

outcomes. Transformational leadership is hypothesised to be influential in safety, because it has the potential to transcend behaviours based strictly on immediate personal gains, and transactional leadership is hypothesised to be important because such a supervisor will be able to actively control subordinate behaviours (Zohar, 2000). However the studies have yielded equivocal findings. For example, Fleming (2000), and Carnegie (1998) did not find transformational styles to be able to successfully differentiate between the effective from less effective supervisors in the offshore industry. However, evidence from other studies have shown that transformational leadership affects a number of safety-critical subordinate attitudes, behaviours and work outcomes.

For example, Williams, Turner, and Parker (2000) investigated the relationship between team leaders' leadership style and employee safety behaviour in a UK chemical processing plant. In the study, 211 process technicians rated their team leaders using the Multifactor Leadership Questionnaire (MLQ) (Bass & Avolio, 1995). They found that the relationship between team leaders' transformational leadership and workers' compliance behaviour was mediated by workers' commitment to safety. Similarly the relationship between team leaders transformational leadership and workers' pro-activity was mediated by workers' self managing orientation. They argue that transformational leadership can supplement organisational interventions (e.g., work redesign) that attempt to promote safety commitment and broaden employee role orientations. Similarly, Zohar (2000), using data from an Israeli manufacturing organisation, illustrates that the link between supervisors' transformational leadership and actual injuries is mediated by group perceptions of safety climate. Zohar argues that building a safety climate through transformational leadership behaviours can reduce workplace injuries. The same pattern of findings is reported by Zacharatos, Barling & Kelloway, (2000) in a study of restaurant workers in Canada. In this study, transformational leadership of supervisors was associated with company loyalty, trust in management and perceived fairness, which in turn predicted behavioural outcomes – safety compliance and pro-activity. However, Barling modified the standardised version of the MLQ to make it relevant to safety, this makes the results of their study difficult to compare to those based on the original scale.

Unfortunately (with the exception of Zohar, 2000), these studies did not include measures of supervisors' transactional leadership. Yet, since supervisors are primarily concerned with structuring, co-ordinating and facilitating work activities, it seems probable that

transactional leadership behaviours are more relevant to this level of management. In the same way it is likely that transformational behaviours may be more related to the visionary role and strategy function of more senior level management. Fleming (2000), and Carnegie (1998) also looked at consideration and initiating structure (Fleishman, 1953) as determinants of effectiveness in safety leadership however no significant relationships were identified.

Overall, the importance of the supervisor in promoting positive safety outcomes is evidenced in the literature, it would appear that high quality 'leader member exchange', supportive supervision, high involvement supervision and a decentralised approach can have independent and positive contributions to safety outcomes. Thus, that both supervisors and managers exert a significant influence on organisational safety outcomes seems unquestionable. Yet, which level exerts the primary influence is still unclear as are the paths of influence between the variables. The following studies explore these issues.

- Overview of supervisors

A number of supervisory level variables have been identified by the studies as being associated with good safety performance. Specifically, participative and supportive supervisory behaviours are identified as critical. These supervisory behaviours are strongly promoted when the supervisors are allowed autonomy within their own jobs.

4.2 Distinguishing the impact of managers and supervisors

In recent years, researchers have begun to differentiate between the roles of managers and supervisors in order to investigate the relative impact of each on safety outcomes. The evidence suggests that managers and supervisors play different but complementary roles in the promotion of good safety practice. Managers were found to have a broad range of influence over organisational outcomes in general, whereas supervisors were found to have a narrower span of influence, but, being closer to the workforce, potentially having a more direct influence on their behaviours. For example, Thompson et al, (1998) found that managers have a more pronounced effect on employees' perceptions of the *conditions* of safety at the workplace, perceptions of organisational *politics* was also more

strongly associated with management. On the other hand, supervisors were found to have a more pronounced effect on employees' *compliance* to safety rules, perceptions of *fairness* were also more strongly associated with supervisors.

In fact Zohar (2000), in a study of employees from a manufacturing industry in Israel, found that employees actually develop separate perceptions of organisational level and group level climates. Organisational level perceptions were more closely related to managerial *policies* and group level perceptions being more closely related to supervisory level *procedures*. He concluded that employees can differentiate between and compare organisation level and group level climate and can distinguish whether supervisors emphasise or de-emphasise safety relative to organisational standards. This allows them to formulate different group level climate perceptions within the framework of organisational level climate perceptions.

Yet, this leaves the question of who exerts the primary influence, unanswered. In an early study investigating the nature and determinants of employee safety motivation, Andriessen (1978) found that senior level management are more influential on employee safety motivation than supervisory level management. Supervisors' behaviours such as their attitudes to safety and style of leadership appear to play a secondary role along with group standards and group cohesion. Moreover, it is concluded that even if the supervisor is not committed to safety, employees still work more safely when they perceive that top management is committed to safety. The finding that site managers are the primary determinant of safety attitudes and behaviour in the offshore environment supports these conclusions (O'Dea & Flin, in Prep).

On the other hand Simard and Marchand highlight the primary role of *supervisors* in determining safety outcomes. In particular, participative supervisory style and co-operative employee-supervisor relationships were identified as critical. Nevertheless, the role of senior managers in setting the priorities and goals of supervisors is acknowledged. In particular, it is suggested that a decentralised approach on the part of senior management will be the most effective by encouraging joint involvement of supervisors and employees in safety activities which in turn influence workers' motivation for safety. In fact it is concluded that workers' behaviour should be interpreted as being part of a larger cultural set of safety practices that includes not only members of the workgroup

itself, but also supervisors and more senior management (Simard & Marchand, 1997). Similar evidence is presented by Kozlowski and Doherty (1989) who found that the nature of interactions between supervisors and subordinates mediates subordinate interpretations of relevant organisational features. The study concludes that one's immediate supervisors are the most salient and tangible representative of higher management actions. The quality of these interactions may be a key filter in the interpretations that provide the basis for climate perceptions.

Overall, the evidence suggests that management's influence on safe behaviour varies according to the level of management and according to the safety outcome under investigation. Supervisors appear to be more influential on employees' work related safety behaviour, such as compliance with safety rules; they also influence employees' perceptions of fairness. Managers on the other hand, are associated with perceptions of the organisation as a whole, such as organisational policies and the conditions of safety at the workplace. Employees' perceptions of organisational politics are also connected with managerial behaviour.

However, the evidence regarding which level of management exerts the primary influence on safety outcomes, is equivocal. Andriessen (1978) concluded that while supervisors are a decisive factor in the safety behaviour of the workforce, it is management that set the supervisor's goals, objectives and priorities, thus higher level management have a greater degree of influence on workers' safety behaviour than supervisors. In fact Andriessen goes on to argue that even if direct supervision does not place a high priority on safety, workers may still work safely when higher management stresses safety. Thus supervisors are identified as crucial but their effectiveness hinges on the adequacy of their senior managers. On the other hand Simard and Marchand (1995, 1997) suggest that supervisors are the primary determinants of safety behaviour, with higher level management playing a secondary role through their influence on supervisory level factors. In fact the paths of influence between these two levels of management have not been adequately examined to date.

5 Employee factors

It is recognised that employee level variables mediate the relationship between leadership factors and safety outcomes. In the main, studies have concentrated on determinants of employee safety motivation.

- Motivation

It was Andriessen (1978) who first investigated the nature and determinants of employee safety motivation. The investigation was based on the premise that employee behaviour is dependent on their knowledge, skill and motivation to do the job. Assuming that the knowledge and skill are already present as a result of good selection and training practices, it remains the task of the manager to develop employee motivation. Factor analysis identified two relatively independent but related aspects to safety motivation, carefulness and safety initiative. The former is related to the individual's propensity to take unnecessary risks, the latter has to do with the individual's propensity to improve the general work situation on one's own initiative. Interestingly, each construct appears to have its own unique predictors; people are more *careful* when they recognise that it does not hinder their work speed, and that safe behaviour really does contribute to accident reduction, people show more safety *initiative* when the supervisor and colleagues react positively to it.

Simard and Marchand (1995, 1997) used the distinction identified by Andriessen (1978) in order to investigate the micro and macro level constructs which predict employee safety initiative and carefulness. Micro level factors are those that operate at the shop-floor level, they include: work processes, work hazards, workgroup cohesiveness and co-operation, supervisors' experience and supervisors' approach to safety management. These were hypothesised to be the most influential. Macro level factors operate at the organisational level and include variables such as senior management commitment to occupational safety and the socio-economic context of the firms. These are hypothesised to have a secondary influence on employee motivation and behaviour. The findings suggest that micro level factors such as participative supervision, non-routine work processes, co-operative relationships between workers and supervisors and work group cohesiveness are the best predictors of workers' propensity to safety initiatives, with

participative supervision being the most significant. In terms of predicting employees' propensity to comply with safety rules, again micro level factors are found to be the most predictive. Co-operative workgroup-supervisor relationships were by far the most important variable in the determination of rule compliance behaviour, followed by participative style of supervisory management. Multi-level analysis shows that the effect of supervision on employee safety initiative and rule compliance is increased when the supervisor has some power and influence over decisions and practises joint involvement with his/her work-team in safety activities.

Thus a decentralised approach by management involving a deployment of power and autonomy to supervisors and employees, may be an appropriate way to increase employees' safety initiative.

- Worker involvement

Cohen and Cleveland (1983) in their analysis of the top performing companies found that in the best companies in the USA, workers were more involved in the decision making process, they had a direct channel to communicate their thoughts and ideas to management and to receive feedback. Similarly, DeMichiei et al's (1982) questionnaire results (based on the responses of managers and safety officials) indicated that the safety suggestions and ideas raised by workers got more serious attention and consideration in the low-accident rate mines than the high-accident rate mines. Interviews with the miners themselves suggested that managers at low-accident rate mines were more receptive and responsive to requests and suggestions, and more frequently solicited input from the miners concerning mine policies and procedures. Furthermore, management in these organisations actively sought the input from safety and health committees in resolving safety and health problems.

More recent work using questionnaire techniques have also found positive effects of worker involvement. For example, Cheyne, Cox, Oliver and Tomas (1998) found an association between employee personal involvement in safety and self reported levels of safety activity. Similarly, Dedobbeleer and Beland (1991) found that two factors were sufficient to explain the safety climate at 10 construction sites, these were management commitment to safety and worker involvement in safety, paths of influence went both

ways between the two variables. Mearns et al., (2000), found that favourable perceptions of involvement, communication and policy awareness act to improve perceived management commitment, which in turn suppresses unsafe behaviour. Finally, Rundmo, Hestad and Ulleberg (1998) found that management and employee commitment and involvement contributed most to satisfaction with safety.

- Worker Autonomy

This relates to the extent to which employees have the opportunity to influence the decisions being made about their jobs, how much participation they are allowed in decision making and how much autonomy they feel they have in their jobs. Cohen and Cleveland, (1983) found that when employees had specific and reasonable responsibilities, authority and goals, they tended to work more safety. Similar findings are reported by Dwyer and Raftery (1991), Simard and Marchand (1995), Sanders et al. (1976) and Wood, Barling, Lasaosa and Parker (2000), who found that leader power served to reduce worker autonomy and workgroup integration which are associated with higher accident rates.

- Risk perception/justification

It seems that higher threat perception (i.e. workplace hazards and risks) is positively related to safety behaviours. Goldberg, Dar-El and Rubin (1991) found that a high threat perception was related to readiness to participate in safety programs, the relationship was mediated by co-worker support for safety. Workers who sensed high co-worker support for safety were more likely to be positively oriented toward greater participation. Cheyne et al. (1998) found that perception of workplace hazards did not have a direct effect on levels of safety activity by the workforce, however an indirect effect was found, such that higher appraisals of workplace hazards were related to more positive perceptions of individual responsibility which, in turn affects levels of safety activity. Similarly, Dedobbeleer and Beland (1991) speculate that workers' perceptions of risk and control may be highly related to workers' involvement and responsibility for safety.

- Cohesive work relationships

A number of research studies have looked at the role of group level factors on workforce safety behaviour. On the basis of interviews with miners, DeMichiei et al. (1982), found

that miners at high-accident rate mines more often indicated that they were unhappy with the behaviour of some of their co-workers. Particular references were made with respect to those who failed to pull their weight at work or those who took advantage of disability or absentee policies. Conversely, Andriessen (1978) found that both carefulness and safety initiative were predicted by group standards and group cohesion. Likewise, Simard and Marchand (1997) found that a cohesive and co-operative workgroup relationship is by far the most important variable in terms of predicting workgroups' propensity to comply with safety rules. Co-operative relationships are characterised by more open communications and positive team spirit. In addition, Geller, Roberts and Gilmore (1996) found that the propensity to go beyond the call of duty for the safety of co-workers labelled 'actively caring' was predicted by personal control, group cohesion, extroversion and reactance.

Hofmann and Stetzer (1996) investigated three group level factors (group process, safety climate and intentions to approach other team members engaged in unsafe acts) and one individual-level factor (perceptions of role overload) in order to determine their relationship with self-reported frequency of unsafe behaviours. The results revealed that all of the measured variables were related to unsafe behaviours. Additionally there was marginal evidence that approach intentions mediated the relationship between group process and unsafe behaviours. Moreover, safety climate and unsafe behaviours were both related to actual accidents while group process and approach intentions were marginally related to actual accidents.

- Morale

Morale, as a potential determining factor in safety performance has not been included in many studies. Nonetheless, DeMichiei et al. (1982) found that in high-accident rate mines low morale was often directly related to management behaviour. Poor morale was attributed to management inability to plan effectively, and management's failure to fairly and equitably enforce established company policies including absenteeism, job assignment and standard operating procedures.

5.2 Overview of employees

It is not just the characteristics and behaviours of managers and supervisors that are the determining factors in workplace safety, employees also play a role in shaping the safety climate. One of the most important outcomes of the studies is the recognition that there are two relatively independent facets of worker safety motivation: carefulness (or compliance with the rules) and safety initiative (or pro-activity), each of which is thought to have its own unique motivating factors. It would seem that the initiative dimension is particularly important because it is proactive and as such it has much greater potential for influencing the safety performance of the industry in a positive manner. Simard and Marchand (1995, 1997), found that a decentralised approach by management involving a deployment of power and autonomy to supervisors and employees, thereby increasing their cohesiveness, may be an appropriate way to increase employees' safety initiative. Thus, although workers' safety behaviour seems to be primarily determined by factors operating at the shop-floor level, nonetheless employee behaviour can be substantially influenced by managerial action at higher levels. In particular, it is suggested that a decentralised approach on the part of senior management will be the most effective by encouraging joint involvement of supervisors and employees in safety activities which in turn influence workers' motivation for safety. In fact it is concluded that workers' behaviour should be interpreted as being part of a larger cultural set of safety practices that involves not only members of the workgroup itself, but also supervisors and more senior management (Simard & Marchand, 1997). In recent years a number of reviews have been conducted which attempt to synthesise the expanding body of research, (Cohen, 1977; Flin, Mearns, O'Connor & Bryden, 2000; Guldenmund, 2000; Hale & Hovden, 1998; Shannon, Mayr & Haynes, 1997). These studies have identified factors very similar to those highlighted here.

6 Summary of findings and model development

One of the aims of this review was to develop a holistic model of the leadership factors at each level and to show how they interact to influence safety outcomes. Table 6.1 summarises the factors at each level of management which have been shown through empirical research to be influential on organisational safety outcomes. Figure 6.1 displays a model of the factors and how the levels interact with each other to determine safety outcomes.

The model highlights that factors such as the economic climate, national culture, shareholders, the public, the regulator, the industrial sector and the competitive environment can influence organisational culture. Indeed they are likely to have different or even conflicting influences on organisational culture. Culture is also influenced by factors internal to the organisation. Cultural artefacts such as mission statements, organisational goals and values are likely to impact the entire organisation, not just one aspect of it. However they are likely to have a particularly powerful impact on the priorities of senior management, their commitment to safety, the importance given to statutory compliance and styles of leadership. Such senior manager attributes are shown in the model to have a direct impact on the attitudes and behaviours of their representatives at the worksite – namely middle (or site) level managers. Middle managers attitudes and behaviours such as their commitment to safety, the priority they give to safety relative to production goals, and the kinds of relationships they develop with supervisors and workers are likely to be strongly determined by such senior management attributes. These in turn will determine the relationships and styles of leadership further down the hierarchy. The evidence from the literature suggests that involved, decentralised and participative styles will encourage more positive attitudes at supervisory levels. In particular supervisors who perceive that they are allowed some decision-making latitude within their own role are more likely to develop participative relationships with employees, they are also likely to be more supportive of employees. Such supervisor/employee relationships are associated with greater participation and involvement by the workforce and increased motivation for safety. Motivation is represented by employees willingness to take the initiative in safety and to comply with the rules. Both of these factors have been shown to be related to improved incident and accident rates.

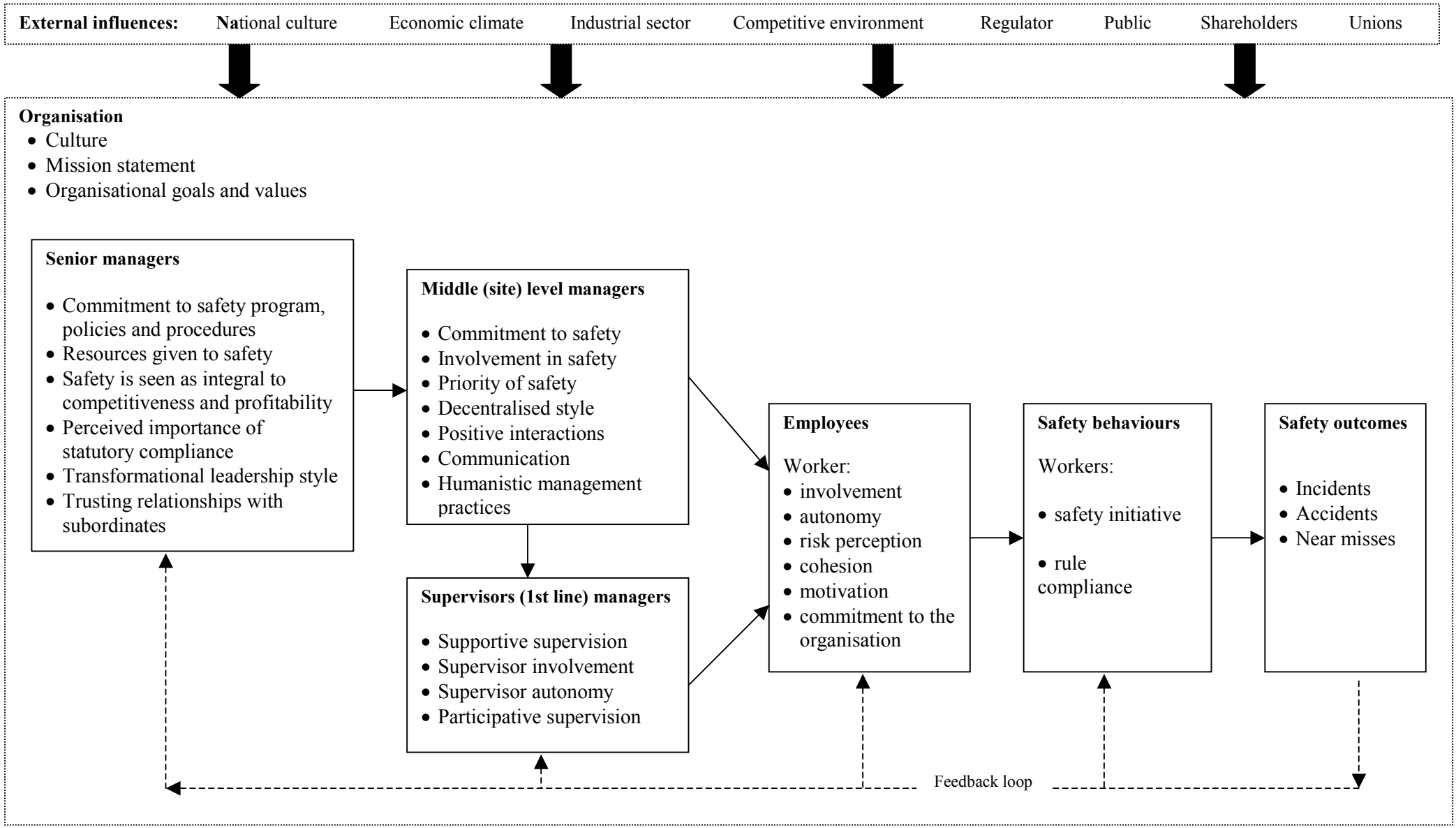
The model includes a feedback loop between safety outcomes i.e. incidents, accidents and near misses and safety attitudes at all hierarchical levels. It is likely that when accidents occur it affects they way individuals at all levels thinks and behaves in relation to safety and has a strong impact on their future safety behaviour.

The model is descriptive rather than explicative. It does not show how the different elements interact with each other to determine safety outcomes. Only recently have such inter-relationships been examined empirically. While some inroads have been made in identifying the paths between individual elements, future research needs to go further in uncovering these paths.

Table 6.1 Summary of factors associated to positive safety outcomes

Senior management Factors	Attitudes to safety	Safety viewed as integral to competitiveness and profitability Perceived importance of statutory compliance
	Leadership style	Transformational leadership Charisma
	Trust	Commitment to developing trusting relationships with subordinates
Management factors	Commitment to safety	Resources given to safety Safety program, policies and procedures
	Involvement in safety	Visibility at the worksite Informal communications with workers Retaining personal responsibility for safety
	Priority of safety	Work planning and scheduling Safety practices intrinsic to production
	Leadership style	Decentralisation of power Decisiveness Transformational leadership
	Interactions	Co-operation between workers and management Informal contact between workers and management Multiple communication vehicles
	Communication	Open door policy by management Feedback to employees
	Humanistic management practices	Appreciating employees Demonstrating concern for employees Health promotion policies and practices
Supervisory factors	Supportive supervision	Openness on safety issues Initiating safety discussions Providing feedback Fairness
	Supervisor involvement	Regular safety meetings with workers Involvement in safety programs and training Involvement in inspections and investigations
	Supervisor autonomy	Supervisory influence in decision making Supervisory control
	Participative supervision	Participative style Emphasis on the importance of teamwork Valuing the workgroup Recognition of safety as a major part of the job Trust in subordinates
Employee factors	Worker involvement	Involvement in decision making Willingness to approach management Involvement in safety programs
	Worker autonomy	Specific and reasonable responsibilities, authority and goals
	Worker risk perception	Awareness of the risks Individual responsibility Support for safety
	Worker cohesion	Workgroup integration Group standards and norms Positive team spirit
	Worker motivation	Safety initiative Rule compliance

Figure 6.1 Holistic model of leadership factors influencing safety outcomes.



7 General Discussion

Corporate governance of safety is recognised as an important component of any organisations attempt to tackle occupational illness, injury and death. The HSE's role in regulating, enforcing and monitoring corporate governance has been successful in improving state of industrial safety in the UK. This position is likely to be strengthened further by the recently introduced legislation on corporate manslaughter. However, the HSE also take a motivational approach which is designed to cultivate a culture of self-regulation within organisations. The main thrust of their argument is that expenditure in occupational health and safety makes good business sense. However, unless we can identify for whom safety pays, the argument has little capacity to motivate management action to reduce injury and illness (Hopkins, 1999). It is now being proposed that regulators should move towards a more holistic model where safety is seen as fundamental to organisational competitiveness and profitability. In order to do this it will be necessary to raise the level of safety consciousness of corporate decision-makers. However, as yet, little is actually known about how corporate decision-makers assess the role of health and safety in the organisation's performance. The studies which have been conducted highlight the effectiveness of regulatory mechanisms in motivating senior managers to achieve good health and safety standards. In addition the evidence highlights that top manager's attitudes and decisions are critical drivers in setting the priorities of the organisation. Their styles of leadership are also likely to impact on the styles, behaviours and priorities of those below them in the organisational hierarchy. However, this path of influence between corporate level decision makers and site level managers is not well researched, as yet the nature or extent of the influence of senior managers behaviours, and styles of leadership on middle and front line managers is not well understood. This gap in knowledge needs to be addressed in future research.

The studies at middle and front line management level reveal a number of interesting findings relating to the nature of workforce motivation and changing roles of managers, supervisors and workers. Just as senior level managers are thought to influence the attitudes, behaviours and priorities of middle level managers, similarly, middle level managers' styles' and attitudes influence the kinds of relationships which

develop between supervisors and employees further down the hierarchy. In particular, a decentralised approach by managers, appears to increase supervisors' capacity to develop participative relationships with subordinates. Such relationships are associated with workgroups that are more internally cohesive and more co-operative with the supervisor, they are also likely to have more positive safety norms and be more supportive of organisational goals (Simard & Marchand, 1994).

In addition, it seems that management's role is changing. No longer does their task simply involve directing work and monitoring compliance with rules and regulations. They are now expected to act as facilitators, elicit suggestions, devolve decision-making power and motivate subordinates. Similarly, supervisors' main task is no longer to monitor workers' compliance to rules and regulations but rather to facilitate the work and engage with the workforce in solving problems. Correspondingly, it seems that employees are now expected to do more than just comply with rules and regulations, rather they are expected to act proactively, be personally committed to safety, take responsibility and ownership for safety and be committed to corporate safety goals. Developing employee safety initiative is increasingly being recognised by researchers and organisations, as having a far greater potential to positively impact on the safety of the entire organisation rather than just one aspect of it.

Interestingly, many of the factors which are associated with better safety performance are also implicated in the trust relationship between managers and employees. Specifically, greater trust by managers in employees, leads to greater willingness by managers to engage in behaviours, such as delegation and empowerment which are highlighted as being strongly predictive of employees' safety motivation. Managerial trust in subordinates has also been shown to be related to organisational citizenship behaviour and enhanced individual performance on the part of subordinates. Again both behaviours which are significantly related to improved safety performance. Thus, trust should be highly beneficial to organisations seeking to improve their safety record. It seems that organisations can be designed (or redesigned) in ways that enhance trustworthiness, in particular, less hierarchical, decentralised and less formal structures are thought to increase trustworthy behaviour.

It seems that managers and supervisors play different, but complementary roles in

safety. Thus, it is likely that managers and supervisors will be most effective if they each concentrate on those areas where they are likely to have the greatest impact. The evidence here suggests that managers should concentrate on promoting employees' higher level motivations and engage participatively with employees. Supervisors should demonstrate their sincere and genuine commitment to safety they should also reinforce management's goals and values.

Overall, the evidence is growing regarding the styles, attitudes, behaviours and priorities of managers at all levels which are conducive to improved safety. However, evidence from offshore installation managers O'Dea and Flin (2001), suggests that while managers are increasingly aware of best practice in safety leadership and the behaviours which are likely to be the most influential in promoting more positive employee behaviours, many find it difficult to translate this knowledge to practice. Furthermore, it appears that the managers tend to underestimate the impact that their own attitudes, behaviours, styles of leadership may be having on employee attitudes and behaviours. Yet without a clear understanding of their role in determining organisational attitudes and values, it is unlikely that they will be successful in achieving the desired safety climate.

Encouragingly, research evidence suggests that having identified the leadership styles and behaviours associated with effective leadership, leadership training programs can be highly successful in developing such traits in potential leaders (Yukl, 1998). The turnaround of the Failing Millstone plant in the USA (Caroll & Hatakenaka, 2001) also supports this view. However, experience of working within high reliability industries over a number of years suggests that many of the commercial leadership training programs which are purchased, lack theoretical or empirical grounding. In few if any cases is the training based on a training needs analysis, and in most cases is the training is not evaluated in a systematic way. Thus although many industries are now recognising the importance of effective leadership for safety performance, still it seems that leadership training programmes do not receive the same attention as other more technical matters. The following section explores the various training techniques which can be used by organisations to improve leadership effectiveness.

7.2 Leadership training

Training can be provided in many different ways however, performance feedback techniques and classroom teaching are the most commonly used.

- The feedback technique

The feedback technique has been found to be an effective strategy not only as a training tool, but also in identifying future training requirements. The technique involves comparison of superior, self, peer and subordinate ratings of particular managerial behaviours. Training is then based on the discrepancies between espoused and perceived leadership behaviours. Such programs (often called 360^{o} appraisal) purport to increase the accuracy of a leader's self-image. Yukl (1982) fed back specifically observable leadership behaviour using subordinates', peers' and supervisors' descriptions of what they regarded as optimal behaviour for effectiveness in the position occupied by the leader; the focus of the training was then on the discrepancies between actual and desired behaviours. A similar strategy was adopted by Bass and Yammarino (1989) for feeding back to managers, on an item-by-item basis, their transformational and transactional leadership as seen by their subordinates. Congruence between leader and subordinate has been shown to be associated with higher subordinate morale, higher quality leader-subordinate relationships (Graen & Schiemann, 1978), satisfaction with communication, and superiors' evaluations of leaders (Bass & Yammarino 1989).

Such a technique has recently been used with senior managers from a UK offshore oil company. A questionnaire (measuring senior managers' safety commitment, prioritisation of safety, production, cost reduction and reputation, as well as standard leadership scales), was administered to 70 directors and senior managers, who also gave a mirror-version of the questionnaire to five or six of their direct reports. Standard guidelines for administering 360 degree appraisal (e.g. BPS, 2001), were put in place (e.g. confidentiality of individual reports and opportunities for individual feedback/ counselling). At a one day workshop, managers were given a personal report describing his/her own self-perception contrasted with the view of his/her subordinates (shown as average and range data). Aggregate results were prepared for the group and presented at the workshop resulting in a frank discussion of whether

senior managers were successfully communicating consistent messages about their safety commitment. According to the company, the exercise produced a very positive response from the managers involved, with subsequent evidence of managers taking action to change their behaviour in relation to safety management (Flin, 2002)

As stated in the above study, feedback must be given in a controlled way. A number of principles of effective feedback training have been identified (Bass, 1990):

- Feedback should be about the recipients' observed behaviour, not the recipients' personality, motivation or intentions.
- The recipient should be open to accepting the feedback
- Feedback should be coupled with the opportunity for self reflection, which will expand self-awareness and strengthen relationship with colleagues.

Programmes based on such principle should provide a positive learning environment for participating managers and elicit beneficial change for the organisation.

- Classroom training courses

Undoubtedly, the most common form of training program is through class-room lectures and discussion groups. In a meta-analysis of the effectiveness of management training programs, Burke and Day (1986) found that lectures can have a positive value. However, these should be supplemented with videos, and discussion groups which can arouse the audience and provide information and stimulate thinking. It is critically important that practitioners should look to empirical research literature to inform their course content and development. Theories of leadership such as those presented in chapter four should be included in order to promote a deeper understanding of the development of theory and practice of leadership. Managers too need to learn how to become intelligent consumers. They need to be able to examine which theories are relevant and applicable to their own circumstances and which are not. On an organisation level, it is important for organisations to recognise that the burden for improvement should not be shifted to the individual manager. The organisation must show that it supports what is to be learned, by adapting structures, resources, policies, and principles in line with the training principles, otherwise real

and lasting change will not occur. Key leaders at various levels of the organisation will need to set examples of their support for the principles of the training.

A study by Stokils, McMahan, Clitheroe and Wells (2001) supports many of the contentions of this review. The study looked at the effectiveness of a managerial training program to enhance corporate compliance with worksite health and safety regulations in forty-eight small and medium-sized companies in the USA. These were compared with forty-six control companies that did not receive the training. The training program offered participants information about regulatory requirements and emphasised organisational and environmental strategies for reducing occupational injuries and illnesses. It was found that participation in the training program was associated with higher levels of corporate regulatory compliance twelve months after the training. Moreover the effects were mediated by post-training changes in managers' knowledge of regulatory requirements. The findings highlight two important issues. Firstly, managerial training programmes can be effective in improving workplace health and safety performance. Secondly, managers' knowledge of regulatory requirements is an important determinant of safety performance.

- Training evaluation

Whatever training method is chosen, it must be followed up by adequate evaluation. It is only through evaluation that change in performance can be assessed, areas of strength and weakness in the training identified, and whether the training is accomplishing its objectives. Evaluation can be conducted at four levels as outlined by Kirkpatrick (1998): (1) assessing participants' reactions to the training program, (2) using a questionnaire to assess whether participants have acquired knowledge or modified their attitudes or beliefs as a result of attending the training course (3) using observations of feedback to assess whether their has been a change in participants' behaviours (4) identifying whether the training program has produced any tangible benefits at the organisational level, such as an improvement in safety performance. The difficulty of evaluating training at this level is that it can be both difficult to establish discernible indicators and to be able to attribute these to the effects of a single training course. This is particularly the case in high reliability industries where there are few accidents and incidents.

8 Conclusions

The realisation of management as an important source of stability and reliability (or otherwise) within industrial organisations does not reflect a sudden increase in management failures, rather it reflects a development in our thinking about accidents, their causes and their consequences. It also reflects a change in regulation, which places responsibility for the management of safety squarely on the shoulders of management.

Management styles which are characterised by openness and flexibility are likely to be the most effective in promoting a positive safety climate and increasing worker commitment to the organisation (Zeffane, 1994). Such styles appear to helps employees to develop their own reasons for working safely (O'Reilly, 1989). Thus one of the challenges facing management is to find styles of management with balanced amount of flexibility, to cater not only for employees' aspirations/expectations, but also for the need to maintain appropriate control over their activities. This will require a high level of adaptability and flexibility on the part of management to adapt to changing relationships with subordinates. Management training programmes that are founded in training needs analysis, well designed and executed, can be an effective strategy to this end.

To date the path of influence between corporate level decision makers and site level managers is not well researched, as yet the nature or extent of the influence of senior managers behaviours, and styles of leadership on middle and front line managers is not well understood. This gap in knowledge needs to be addressed in future research. Overall though, it is critical that a consistent and unified message, emphasising the priority of safety, is communicated throughout the organisation.

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