Measurement of Safety Climate: A Component Analysis.

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Introduction

Every organisation has a culture, that can be best described as 'the way we do things around here'. This culture is thought to be reflected in an organisations system of norms and values, its history, the work process and physical environment, the modes of communication (i.e. its structure), and the style of management. Thus 'culture' comprises of the reciprocal relationship between organisation, job and person. Strong organisations tend to have strong cultures which dominate and permeate the structure and associated systems. As such the organisational culture serves as a powerful lever in guiding the behaviour of its employee's in their everyday work, while also being continually updated as members of an organisation repeatedly behave or act in ways that appear to them to be natural, obvious, and unquestionable. Employees generally conform to this culture via peer pressure, company policies, management practices, etc. Nonetheless, an organisation's culture will have several layers of conformity, each with its own models. There will be a tendency for different groups within organisations to behave more in some ways than others. Therefore, groups that behave cohesively and consistently toward some end, have in fact developed their own sub-cultures which may or may not be consistent with the overall culture. To a large extent these sub-cultures are determined by the management and/or leadership style at a local level.

What is safety culture/climate?

Safety culture is a sub-system of an organisations culture which alludes to organisational features that affect and influence safety. A good safety culture is believed to positively impact upon an organisations competitiveness, quality and reliability. A working definition of the safety culture of an organisation has been defined by the Health & Safety Commission (1993) as:

> *'... the product of individual and group values, attitudes, competencies, and patterns of behaviour that determine the commitment to, and the style and proficiency of, an organisations health & safety programmes. Organisations with a positive safety culture are characterised by communications founded on mutual trust, by shared perceptions of the importance of safety, and by confidence in the efficacy of preventative measures'.*

The procedures and rules governing safety within an organisation are at the centre of a safety culture and as such will serve to construct a perceived image of risk, danger and safety of the organisation that is self-sustaining. This perceived image forms what is known as a safety climate, which is largely concerned with employees perceptions of the importance of safety and how it is operationalised within the working environment. In essence, a good safety climate is characterised by a collective commitment of care and concern, whereby employees share similar positive perceptions about organisational safety features. This collective climate serves as a 'frame of reference' that shapes the attitudes and behaviours of members, and as such influences the outcomes of organisational safety initiatives. Nonetheless, it is known that different safety climates exist in different departments of the same organisation, even though each of these departments is subject to the same organisational policies and procedures. These differences can lead to conflicts that might lead to safety problems which impact upon safety management, communications, decisions affecting safety and resource allocation.

The core features of Safety Climate

Since safety culture is a dynamic entity that is continuously changing, a clear understanding of the processes and attitudes that have an impact upon safety related behaviour is necessary to determine the prevailing safety climate. Assessing an organisations safety climate requires the measurement of a number of applicable contextual dimensions, each comprising of different sets of questions. The

following eleven dimensions provide the main focus for ascertaining an organisations current safety climate, each of which has been shown to be clearly related to an effective safety culture.

Management Commitment

A recent survey by the CBI (1990) highlighted the crucial importance of leadership and the commitment of the chief executive toward safety, as well as the executive safety role of line management. Other research has shown that those companies which lack strong managerial commitment are associated with high accident rates, and vice versa. All too often discrepancies exist between the typical mission statement issued by organisations which state that 'safety is a top priority' and senior management actions. Developing a good safety culture requires the strongest possible commitment from senior management which can be demonstrated in many ways. For example, the status of safety officers can be enhanced by promoting them to senior levels within an organisations hierarchy; Senior management can become more visibly involved with safety committees on a regular basis. The safety committee's recommendations can be publicised and rapidly implemented; The shopfloor could be visited regularly with the express purpose of discussing safety with employees; Production pressures that cause employee's to cut corners, or circumvent safety regulations could be balanced so that productivity is not achieved by sacrificing safety, nor safety achieved by sacrificing productivity. Commitment to safety from senior management not only has positive effects on safety, but also reaps business rewards in terms of quality, reliability and profitability. Where employees perceive managerial attitudes and actions toward safety to be less than adequate, problems may ensue that affects the effective functioning of the organisation as a whole, as the workforce become less committed to the organisation *per se*, because management are seen as unwilling to provide a safe working environment.

Management Actions

The management of safety is in many respects exactly the same as managing productivity or other functional areas of operations. An effective manager is usually seen as an effective leader who is both caring and controlling. Caring refers to ensuring the welfare of subordinates, communicating with them on a daily basis on a wide range of issues, and being friendly and available. Controlling refers to the setting of targets, maintaining performance standards, ensuring clear job roles and responsibilities, and getting subordinates to follow rules and procedures by consistent encouragement. Leaders who are both caring and controlling, usually adopt a 'democratic' approach and involve subordinates in the decision-making process. This management style often results in the ownership of the workgroups goals by all concerned, leading to increases in performance. In relation to enhancing the organisations safety culture, effective leaders involve personnel in decisions affecting the safety of their jobs, discuss safety with the workgroup on a daily basis, ensure all personnel are clear about their safety responsibilities, consistently encourage and reinforce personnel to follow safety rules and procedures, and match words with deeds.

Personal commitment to safety

Research has shown that companies with strong, clear cultures are associated with higher levels of employee commitment. Commitment to safety is defined as 'an individuals identification with and involvement in safety activities', characterised by a strong acceptance of and belief in the organisations safety goals and a willingness to exert effort to improve safety in the workplace'. Thus, personal commitment to safety is very important as the intensity of this commitment tends to determine both an individuals acceptance of company safety initiatives and their personal approach towards safety in the workplace. Much research has shown that personal commitment to safety can be considerably enhanced by involving personnel in the decision-making processes that affects safety in their jobs.

Perceived risk levels

The safety culture of an organisation is partly based upon the perceived risk level of a particular job or task. Objective hazards exist in all types of work settings such as exposure to moving machinery, asbestos, chemical fumes, poisonous gases, falling objects, etc. The ability to determine the risks of perceived hazards is influenced by different factors such as the ease with which past instances can easily be recalled or imagined; the 'on-the-job' experience of the individual; the manner in which hazards are

presented in communications; attributions of blame in accident causation; and, the amount of control individuals feel they have over hazards. However, hazard detection can also be problematical as illustrated by research findings that approximately 50% of accident victims had difficulty in detecting the hazards that caused their accidents. This finding may be due to individuals applying different criteria when assessing situations that are likely to result in minor, as opposed to major injuries. There is other evidence that workers show little concern about dangerous situations, because of misplaced trust that the environment is continuously monitored by those in authority. However, different groups of people differ in regards to their perceptions of the probability of an accident occurring due to a particular hazard, because of differing group characteristics that have important influences on risk perception. For example, evidence shows supervisors to be poor sources of information about the dangers inherent in a workers task. Supervisors are often too far removed from operations to make meaningful assessments and tend to underestimate the risks involved, when compared to workers own risk assessments. If employee's perceive the risks of a given job to be underestimated by management, it is likely that the employees commitment and loyalty to that organisation will be undermined as the employer will be perceived to be unwilling to provide a safe working environment. Thus, companies with positive safety cultures not only involve worker representatives who have intimate knowledge of the operational processes when formal risk assessments are conducted, but they also take steps to reduce the risks as much, and as quickly as possible.

The effects of the required work pace

A frequently cited factor of accident causation is speed of work, commonly termed 'work pace', which is the component at the heart of the 'productivity and safety conflict'. It is often thought that improvements in safety require personnel to be much slower and methodical in their approach to work, whereas productivity can only be achieved by a fast turnaround. Although this notion appears to be well established in the minds of many, the converse is actually the case because excessive production pressures increase job strain, unsafe behaviours and accident rates, all of which can combine to decrease performance and increase costs. For example, people commit unsafe acts because they are rewarded for doing so by managers either ignoring unsafe behaviour, and/or rewarding unsafe behaviour through giving bonuses for extra production that has been achieved by cutting corners. Because unsafe behaviours are often the triggering event leading to accidents, the costs of these accidents is likely to seriously dent the organisations competitive cost base. Accidents are very expensive. In 1993, for example, the HSE demonstrated across a wide range of industries that the ratio of insured to uninsured accident costs was approximately 1:11. In 1990, the CBI estimated that the minimum non-recoverable cost of each accident was £1,500, whether investigated or not. Reducing these costs can only add to the capital value of an organisation. However, this requires that everything possible is done to remove the safety-productivity conflict, by ensuring that safety always wins out. This is a vital feature of an effective safety culture, that often leads to associated increases in productivity and profits.

Beliefs about accident causation

Beliefs about the causes of accidents are an important element of an effective safety culture because they guide peoples thinking and actions when accidents occur or when trying to solve safety problems. Much research has revealed a tendency for others to attribute the cause of accidents to the victims own behaviour, whereas the victim is more likely to attribute the cause of the accident to external circumstances. Indeed, researchers have found that attributing the causes of accidents to a lack of attention and care is linearly related to the position of personnel in the organisations hierarchy. The more senior the position, the more likely accident causes will be attributed to the victim not paying attention rather than poor working procedures or conditions. In reality, however, accidents are often caused by a number of organisational failings (e.g. bad management, unsafe working procedures, poor working environment, etc.) that lay dormant until triggered by the victims own behaviour. Unless these organisational failings are recognised as causation factors, and not dismissed by those with the power and influence to rectify the situation, very little will tend to get done to improve working systems. Thus, one of the critical factors in establishing an effective safety culture, is to ensure that all personnel have a greater understanding and appreciation of the potential organisational causes of accidents and their manifestation to help ensure that they are assessed and addressed. Equally personnel need to have a clear understanding of their own behaviour, as this will help them to avoid being the triggering event and possibly the victim.

The effects of job induced stress

A well known relationship exists between accident rates and job induced stress. Although some degree of stress is beneficial to performance, too much stress induces role strain that results in lower job performance and an increased likelihood of being involved in an accident. Personnel are particularly prone to role strain when the demands of the job are too high (work overload) or too low (work underload), such that there is either too much, or too little to do at any one time. Work overload not only tends to cause undue anxiety leading to coronary heart disease, but also results in lapses of memory and attention, such that errors and mistakes are commonly made that can put others at risk which in turn further increases job anxiety. On the other hand, work underload induces boredom, apathy and fatigue, again causing lapses in memory and attention which leads to errors and accidents. Both work underload and work overload are causal mechanisms of impaired mental health that can result in increased accident rates, and absenteeism from work as personnel seek coping mechanisms. However, a considerable amount of research has shown that role strain can be mitigated by increasing employees opportunity for controlling their work activities and events. Greater opportunity for control and involvement is also a central feature of an effective safety culture. Increasing peoples opportunities for control over their work activities leads to greater acceptance of the necessity and the desirability of safety rules, which results in safety belonging to everyone. This also provides the motivation for people to conform to safety rules in spirit as well as to the letter of the law. This is not to argue that employees should be given complete freedom to do as they see fit, just that they should be given greater opportunities to be fully involved in discussions about safety management issues that affects peoples jobs, and be involved in the review of all types of incidents, including near-misses.

The effectiveness of safety communications within the organisation

Organisations with good safety cultures can be characterised by a good safety communication system that flows from top to bottom, bi-directionally through both formal and informal communication channels throughout an organisation. Recognising and harnessing the informal channel has been shown to be a feature of low accident facilities, as questions about safety tend to become a part of the everyday work-related conversation. However, both formal and informal communication between line-management and the shopfloor is one of the most crucial areas for safety information to be disseminated. Unfortunately, this area of communication is often the most neglected as perceived work pressures result only in 'crisis communications' when a specific issue needs to be addressed. The greater visibility of management on the shopfloor to discuss safety contributes enormously to a positive safety culture and morale in general. Moreover, as dialogue flows between the groups, providing useful feedback to management, improvements in safety are likely to increase at an even greater rate. A related area of safety communications that requires careful preparation is the development of written safety procedures, so that they can be easily understood and followed by the end user. If the language is complex or unclear, or the procedure has vital steps missing, accidents are likely to ensue. A company with a strong safety culture tends to enhance all forms of safety communications by involving personnel in every aspect.

The effectiveness of emergency procedures

An employee who is unable to respond to an emergency is a potential hazard. However, emergencies impose a considerable demand on the effectiveness of peoples responses, particularly if complex decisions are necessary when under pressure. Confidently responding to an emergency necessitates that requisite responses be thoroughly and meticulously learnt, and reinforced by frequent practice. Frequent practice is very important as it also highlights where potential deficiencies might exist. For example the physical state of emergency equipment may have deteriorated, the emergency plans may need to be modified, personnel may need extra training in fire fighting, team responses may need to be improved as peoples job roles change, new members of staff may not be familiar with all aspects of the plant and be unaware of the effects of an emergency shutdown, etc. A company with an effective safety culture will ensure that all members of personnel are highly familiar with emergency procedures, to the point where responses are well rehearsed and almost automatic as this significantly reduces the possibility of panic behaviour.

Safety training

Safety training remains the fundamental method for attempting to effect self-protection against workplace hazards. Most safety manuals advocate training as the means of accident prevention, while safety legislation demands the appointing and training of competent persons to carry out particularly dangerous tasks. It has been found that low accident companies with a strong safety culture had developed integrated job and safety training programmes (i.e. the job training included elements of safety training that was specific and relevant to the job). This highlights a general point that the content of safety training has to be relevant to the jobs of the trainees. Of particular importance is the safety training of managers to ensure they are up to date with current safety practices and legal requirements. However, it must be noted that the implicit assumption of much safety training is that in itself, it is a good thing, because safety trained personnel who know what to do will automatically conduct themselves in a safe manner for extended periods of time, regardless of the consequences on the job. This assumption is inaccurate because normal everyday practice will almost inevitably negate the effects of this training, unless it is reinforced by management and practised by everyone on a daily basis.

The status of safety people & safety committees within an organisation

The role of safety representatives in promoting a positive safety culture is to assist in the development and monitoring of communication links between management and the shopfloor on matters of company safety policy. As such safety representatives need to be respected diplomats with enhanced status if they are to positively influences events in the workplace. Similarly, the role of safety advisor also necessitates very high status within the organisation as their role is one of a facilitator or consultant. The status of safety advisors within an organisation can be determined by their ease of direct access to the most senior levels of management, their level of seniority and salary. Not only should they be effective and positively influence events, but they should also be seen to do so by being highly visible. The general aim of a safety committee is to involve both management and workers in the safety planning process, and as such is thought to add a political dimension to safety management activity that is rarely acknowledged. The perceived effectiveness of the organisations safety committees may be judged from varying perspectives. To some extent they can be seen as an indirect measure of the safety communication flow, the prevailing industrial relations context in which the committees function, and management commitment toward safety. In addition, safety committees are judged by how well they influence and improve health & safety in the organisation. The more rapidly their recommendations are implemented and publicised the more they will be seen to be effective, and the more credibility they accrue.

Contextual features

All of the above dimensions indicate that an effective safety culture is made up of many important facets. However, although the above facets form the core of a safety culture, other prevailing features such as organisational changes, de-manning, job-redesign and insufficient resourcing may affect safety. As such, perceptions of these features also need to be measured so that their effects on the prevailing safety climate can be ascertained.

Tests of Safety Climate Measures

Research was initially conducted in the construction industry and subsequently in the manufacturing sector by the author and colleagues to develop, test and validate a safety climate measure suitable for a British population. After 3 years development the resulting measure was shown to be highly reliable (0.93). Moreover, the measure revealed that implementation of the behaviour based approach to safety positively impacts upon perceptions of safety climate. Similarly, in line with much previous research, the results indicated that perceptions of safety climate are affected by age, task experience, accident involvement and organisational position. As such the safety climate measure was demonstrated to be a highly reliable and effective diagnostic tool for evaluating the effects of safety improvement initiatives, which hitherto has been somewhat difficult. More recent research conducted in the chemical industry extended this research by developing and measuring additional dimensions that took account of organisational change issues. This demonstrated the importance of the prevailing conditions (i.e.

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context) in impacting upon the above safety climate dimensions, while supporting many of the previous findings. In addition, this body of research has consistently revealed that risk perception differences between organisational levels is so large that it raises the fundamental question of 'who should conduct risk assessments? In my view, all parties should be involved. However, in many organisations this may not be practicable, and therefore some form of weighting may need to be applied to figures entered into risk formulae, depending on who conducts assessments. Other issues commonly identified suggests that [a] safety training needs to emphasise the organisational features that may cause accidents, in addition to focusing on individual's attitudes; [b] that safety training enhances personnel's personal commitment to safety; [c] that line management are often inconsistent in their application of safety management, which often undermines the effects of previous safety training; [d] safety climate is considerably enhanced when all personnel feel involved in the safety decision-making process; and, [e] safety advisor's need to adopt a much higher profile in organisations if they are to be seen as an effective influence on events.

In summary, it is the unspoken anxieties, grievances and resentments that are contrary to a positive safety culture. Measuring perceptions of safety climate by focusing on the eleven core dimensions, previously described, is an extremely effective method of identifying prevailing safety management issues that need to be addressed, as well as providing quantitative baseline information with which to assess and evaluate safety improvement initiatives. As such the findings enable management to direct their remedial attention and effort in a highly focused manner.

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