BRITISH SAFETY COUNCIL

Cudmore Consulting

Engaging with Safety Culture

A review of current thinking and practice

- Review of recent safety culture research

- Case studies featuring four organisations that have put in place measures to promote 'positive safety culture'

- Descriptive model of safety culture and the interventions that can be made to influence people's behaviour

Author: Sarah Cudmore MSc, MBA, Dip Design & Innovation, BSc

Reviewer: Catherine Beardwell MBA, MA, CMIOSH

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Table of contents

EXECUTIVE SUMMARY

There is growing evidence that a positive safety culture increases safe behaviour and contributes to good health and safety performance. Improving safety culture and behavioural safety is widely viewed as a key 'tool' in improving safety performance. A large body of academic research around safety culture has been undertaken over the last ten years examining what it consists of and its impact on safety performance.

The British Safety Council commissioned this review to explore how four participating organisations' practical experience of assessing and seeking to improve safety culture, and its resulting impact on safety and business performance, matched academic research and prevailing theory. The work aims to contribute to the on-going debate concerning positive safety culture and its contribution to improving health and safety performance.

Four organisations that are actively working to improve their safety culture in order to improve their safety and business performance were identified and agreed to take part in this review. The British Safety Council and Cudmore Consulting wish to thank them for their time and their willingness to share their knowledge and experience.

The four organisations were ConocoPhillips's Humber Refinery, E.ON, Crawley Borough Council and ROK. Each organisation provided information on:

- **why** they were seeking to change their culture;

- **what** they had done to change it;

- **how** they measured various aspects of their safety culture;

- the **impacts** they felt their interventions had had in terms of changing safety culture, changing safety performance and on other aspects of performance.

The actions taken by the four companies can all be seen to be addressing the five elements of culture that were identified in the literature review. Some examples of these are:

1. Strong, visible, consistent senior management commitment and leadership to achieving good health and safety

ConocoPhillips	Crawley	E.ON	ROK
Corporate commitment to safety across all of the company's assets.	Managers visibly committing their time and resources.	Increased CEO attention to safety driving change down operational chain.	CEO visible actions, and great increase in size of SHE team.

2. **Visible line-management involvement and interest in supporting staff in improving health and safety**

ConocoPhillips	Crawley	E.ON	ROK
Managers full support for the Behavioural Safety Programme. Refinery 'Stand down' days; when operations stopped and all site workers and contractors spend time on safety activities, training etc.	Increased manager time and involvement in health and safety issues.	Managers in behavioural safety activities and other safety leadership activities.	Increased management involvement through training and coaching in leadership skills.

3. **A shared belief between members of an organisation that management are serious about safety**

ConocoPhillips	Crawley	E.ON	ROK
Belief developed over time and re-inforced Behavioural Safety Programme.	Visible uptake of staff suggestions. Commitment of resources to improving staff wellbeing.	Unions can see the result of their inputs to policies. Visible changes to organisation of health and safety department	Development of consistent organisational culture of which SHE is an integrated part.

4. **Organisational procedures and practices that support safe working**

ConocoPhillips	Crawley	E.ON	ROK
Significant focus of activity to improve process safety performance; defining job competencies.	Revamp of health and safety management, measurement and policies and procedures. New health and safety arrangements and training to support people.	Changes to absence management. Training to develop competency in technical and leadership aspects of safety. Analysis of key risks and staff involved in those activities.	Integration of SHE management system, policies and procedures with operational systems and company values.

5. People know what they are expected to do in relation to safety and their work activities

ConocoPhillips	Crawley	E.ON	ROK
Health and safety competencies for HSE critical jobs defined. Required standards enforced. Risk appreciation 'recalibrated' through training.	Increased levels of understanding of what is required through training, engagement and involvement.	Improved through behavioural safety programme, management and staff training.	Health and safety clearly aligned with and defined as part of company values and operational KPIs.

A new descriptive model is proposed that can be used to assist the identification of appropriate interventions, and measures of their impact. The model builds on existing safety culture research and combines it with other concepts of human behaviour.

It is argued that:

- elements of what are defined as 'safety culture' can influence behaviours and safety performance – behaviours are an output of culture.

- interventions to change elements of safety culture with the aim of improving safety performance should be developed by considering how they will affect individual's perceptions of their work environment, and their competence and motivation to act in relation to safety in that environment

- behaviours can be used both as a means of identifying what changes are needed to culture, and assessing the effectiveness of cultural interventions that are made.

How do people decide how to behave in terms of safety?

Individual's perceptions of work environment

Risk Assessment Appraisal
"is there a risk?"
+
Risk Management Appraisal
"what can I do about it?"

Behavioural intention

Individual's experiences of work environment

Incentives to acting

Barriers to acting

Actual behaviour

Experiential learning

Behavioural Decision Model

People decide how to behave based on their assessment of risks and hazards present in their immediate environment, their perceived ability to do something about them, and their perception of the outcomes choosing a particular behaviour will have; for example, ease of action, making their immediate environment better or worse for them in some way. This model provides a basis for identifying culture interventions that will have the most impact in enabling people to produce desired and effective safety behaviours.

The risk assessment and risk management appraisals, and incentives and barriers to acting, shown in the red boxes on the behavioural decision model are all influenced by the key elements of culture.

Behavioural decisions are an interaction, at a point in time, between: the existing state of the individual - in terms of their competence, motivation and other personal characteristics; their perceptions of what is required of them; their perceived ability to achieve it with their own internal resources and the resources in their environment; and the perceived benefits, or otherwise, to them of acting. This changes over time as individuals experience the effects of their behaviours on their environment, for example, whether their manager responded positively or negatively the last time they behaved in a certain way. This then influences their choice the next time they decide how to behave.

Using this behavioural decision model it is possible to identify what part of the process is working incorrectly, and consider how this can be most effectively altered in terms of the way in which a person perceives and responds to their immediate working environment.

The aim of any cultural change is to ensure that the part of behavioural decision process that is affected by it, is affected in such a way that individuals make better behavioural decisions – in this case, correctly identify and choose to act safely.

This can be compared to an optician identifying the correct lens a person needs to see clearly during an eye test. Different lenses are tried and adjusted to give the clearest vision. In the same way, different elements of culture that have been identified as key can be adjusted, to enable a person to 'see' clearly what is wanted of them and to enable them to perform it successfully.

How to decide what to change?

In terms of deciding what interventions to make to change an aspect of culture and therefore people's behaviours, it is proposed that interventions should be considered in

terms of changing individuals, changing their immediate work environment, or changing the organisational context that will then affect the immediate work environment.

<u>Changing an individual</u>

In terms of ensuring a person chooses the correct safe behaviour, changes could be made that increase their competency in recognizing and dealing with their work risks, and that they are motivated to act to do so. This can be done by:

- enabling them to recognize and assess hazards and risks through changing their knowledge of the hazards they work with and changing their competency through methods such as training and job aids. All of the case study organisations had undertaken this intervention. .

- ensuring that they have methods of dealing with those risks and know how to use them, providing suitable systems and processes for risks to be managed, and information and training on how to use the systems. All of the case study organisations had ensured that there were safety management systems in place within the organisation (part of 'setting culture') and ensuring, through training and communications, that individuals were aware of them and had the desired level of competency to deal with those risks.

- ensuring they are confident that choosing to act safely is what is wanted of them – developing their trust that safe behaviours are desired through visible management actions, communications, and recognition and reward to desired behaviours. All of the case study organisations had undertaken this intervention. .

<u>Changing an immediate work environment</u>

Changes to an immediate work environment to influence the desired selection of safe behaviours could include:

- changes to the design of tasks and equipment to remove or reduce unsafe acts - ConocoPhillips Humber Refinery – hazop analysis by operational staff and changes to maintenance arrangements; ROK - construction work planning put in place to design out health and safety hazards; E.ON – analysis flowing from high incident work group which identified and examined key aspects of equipment and task design that contributed to high incident rate. E.ON plan to make changes on the basis of this analysis.

- training for line managers to develop their leadership and communication skills, to enable them to engage visibly and effectively in improving health and safety with their line reports. All of the case study organisations were developing line management skills and confidence among managers to engage effectively with their staff on health and safety matters.

<u>Changing an organisational environment</u>

Changes to the organisational environment to influence the production of desired safety behaviours could include aspects such as:

- remuneration and recognition schemes for desired behaviour. ROK actively communicating and sharing instances of good and desired behaviours of individual members of staff; Crawley Borough Council – Council appraised amount of money donated to charity as result of near-miss reporting

- health and safety targets relating to desired safety behaviours and performance. ConocoPhillips – managers' annual performance contracts include targets for health and safety performance and set out personal behaviour goals s in relation to safety leadership. Pay is linked to performance.

- integration of health and safety performance with operational performance planning and risk assessment. All of the case study organisations were increasingly moving health and safety to be part of operational and business risk assessment and management.

- training for senior management to develop their leadership and competence in understanding and managing business risks. All of the case study organisations had carried out aspects of coaching and training for their senior managers to increase their competence in leading and managing health and safety risks.

In conclusion, it is important to state that the interventions necessary to bring about desired cultural changes will vary from organisation to organisation. As the Conference Board report noted, on the basis of a study of 68 major US companies, there is not a one size fits all solution. This new descriptive model of behaviours and how they can be influenced by the identified elements of culture builds on our existing knowledge and the experience of countless organizations. It is not a universal panacea but rather a tool to assist our understanding of the behavioural problems that need to be addressed and the practical approaches for achieving change in the individual, the working environment and the organisation's environment.

Model of Behaviours as both output and measure of culture

INTRODUCTION

There is growing evidence that a positive safety culture increases safe behaviour and contributes to good health and safety performance. Improving safety culture and behavioural safety is widely viewed as one of the main keys in improving safety performance. A large body of academic research around safety culture has been undertaken over the last ten years examining what it consists of and its impact on safety performance.

The British Safety Council commissioned this review to explore how the four participating organisations' practical experience of assessing and seeking to improve safety culture, and its resulting impact on safety and business performance, matched this academic research and prevailing theory. The work aims to contribute to the on-going debate concerning positive safety culture and its contribution to improving health and safety performance.

In Section 1 of this report key literature on safety culture is reviewed including what safety culture is understood to mean and how it relates to safety behaviours and performance. In Section 2 the five key elements that have been identified as being necessary for a 'positive' safety culture are examined:

1. Strong, visible, consistent senior management commitment and leadership to achieving good health and safety

2. Visible line-management involvement and interest in supporting staff in improving health and safety

3. A shared belief between members of an organisation that management are serious about health and safety

4. Organisational procedures and practices that support safe working

5. People know what they are expected to do in relation to health and safety and their work activities.

In Section 3 ways of measuring these elements are then described in terms of methodologies and types of measures that can be developed.

The information from the interviews with the four participating organizations, set out in Sections 4 and 5 of this report, was examined in light of the academic research. This review examines how these organisations were intervening to embed the key elements of safety culture and the perceived and measured impact of their interventions.

The information from these four organisations helped shape the proposed new model of safety culture and what needs to be done to positively influence people's behaviours.

The concluding section 6 summarises the key findings of the case studies in relation to the research literature on safety culture. It also proposes a new descriptive model to assist the identification of appropriate interventions and measures of their impact. The model builds on existing safety culture research and combines it with other concepts of human behaviour.

SECTION 1

IMPACT AND INFLUENCE OF A POSITIVE SAFETY CULTURE ON HEALTH AND SAFETY PERFORMANCE

What is "culture"?

Culture has been defined as "*shared behaviours, beliefs, attitudes and values regarding organisational goals, functions and procedures*" (Cooper, 2000 p 1). It is seen in how people do their jobs in an organisation. People act on their perceptions of what they are expected to do to achieve their organisation's goals.

Culture has also been defined in terms of what an organisation "is" – the values, attitudes and beliefs of the people in it, and what an organisation "has", its procedures, policies and activities - to guide and direct its people to achieve its values (Reason, 1998).

Culture can be thought of as consisting of psychological, behavioural and situational elements, all of which interact with each other.

'What the organisation has' Situational	The organisation's structures, policies, procedures and management systems
'What people feel' Psychological	Their values, attitudes and beliefs
'What people do' Behavioural	What, and how, they say, do and decide things
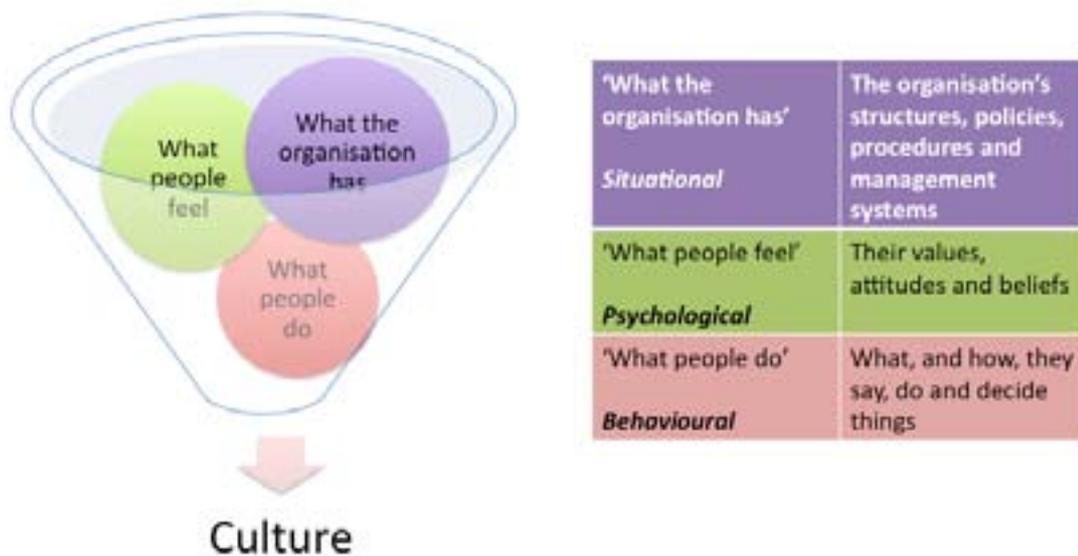
Figure 1 'Culture' consists of psychological, behavioural and situational elements (from Cooper, 2000)

Culture is relatively stable over time. "*…cultures evolve gradually in response to local conditions, past events, the character of the leadership and the mood of the workforce*" (Reason, 1998)

To change the culture of an organisation, it is argued that it is easier and faster to change what an organisation "has" – its policies, procedures and practices - than it is to seek to change what an organisation "is" – its attitudes, beliefs and values. It is argued that changing people's behaviour will, over time, lead to changes in attitudes and beliefs. Initiatives aimed at changing attitudes and beliefs have not been shown to lead consistently to behaviour changes.

Culture has been found to vary across organisations. It can vary between work groups, locations, management levels and individuals (, for example, BP US report, 2007; Clarke, 1999). Members of a large, multi-site organisation may share very few, if any, elements of an organisation's culture. This is

due to differences in people's perception of organisational goals, different accepted "ways of doing things" in different locations and within different working groups across the organisation.

What is "safety culture"?

Safety culture is generally defined as the parts of an organisation's culture that relate to safety. The degree to which an organisation's safety culture is the same as its organisational culture is likely to depend on the types and magnitudes of risks that are involved in its work activities. Where industries are high-risk, in terms of either process or personal safety, there is an expectation that the organisation's culture and safety culture would be one and the same, as safety should be a key driver in all organisational decisions and practices (Cooper, 2000).

Like organisational culture, safety culture is seen as evolving relatively slowly over time. It also can vary across large organisations.

Safety culture, which is influenced by organisational culture, is also affected by external business and societal influences; such as market conditions and changes in societal values (Cooper, 2000, Cox & Flin 1998).

How does a safety culture influence Health and Safety performance?

By focusing attention and effort on improving health and safety

The 'product' or output of a safety culture can be defined as **the _"observable degree of effort to which all organisational members direct their attention and actions towards improving safety on a daily basis"._** (Locke & Latham 1990 in Cooper 2000)

The direction and intensity of the culture is seen as determining the degree of attention and action that is directed to improving safety.

The development of a more positive safety culture is believed to lead to an increase in the amount of attention paid to improving safety. (Cooper 2000). In this way, it is seen as instrumental in directing people's attention and efforts to achieving improved safety performance.

By reducing unsafe acts and unsafe environments

Accidents are generally caused by recurrent unsafe behaviours and recurrent unsafe environments (Reason 1998). Safety management seeks to minimize the occurrence of unsafe behaviours and environments that, either singly or in combination, can lead to accidents. This is achieved by having a number of 'defences' in place to prevent an unsafe behaviour or environment from occurring. These defences are part of the 'culture' people operate in while working in their organisations.

A negative safety culture is one where safety standards and behaviours are not actively maintained, checked and enforced. Generally this is because safety is seen as having a lower priority than other organisation goals and drivers. This is 'known' by people in the organisation through the lack of active interest and attention given to safety by senior and line managers in their daily activities.

It is argued that a negative safety culture "pushes" people to act unsafely or to create unsafe environments through factors such as: acceptance of poor working habits ('normalized deviation'); non-compliance with procedures; belief that production comes before safety. This can lead to people repeatedly 'ignoring' or actively subverting the safety defences that are in place for their work activities:

for example a worker disabling a safety device when operating production machinery because it makes the work task easier and faster to perform; a manager postponing or canceling preventative maintenance activities to ensure production and cost targets are met.

This will, over time, lead to increasing risk and accidents as the various 'defences' against accidents, such as safe methods of working, identifying and acting on safety issues, personal and organisational appreciation of risks, decline to the point where they cease to operate. (Reason, 1998)

A positive safety culture is believed to deliver the converse of this. A positive safety culture is generally defined as one where employees know, through the visible actions of senior and line-managers that safety is a core organisational value; that they will be supported and not blamed or penalized when they act to improve safety or to prevent an incident; and where managers and staff are working actively together in a trusting and fair manner to improve risk management and health and safety. This approach is also visible in the nature of the organisation's procedures and practices, which support and encourage safe and healthy working.

In a positive safety culture people are consistently "pushed" towards acting in a safe manner in their work activities: due to their belief that this is what the organisation wants them to do; demonstrated in the visible behaviours line-managers and colleagues; and the design of tasks and supporting procedures and policies for their activities. This is seen as ensuring that unsafe acts and environments occur less frequently and exist for shorter times.

This maximizes the effectiveness of safety defences, by ensuring that any 'gaps' are infrequent and short-lived.

Researchers argue that this results in an organisation where people are aware of the risks they face and constantly seek to reduce them through improving procedures, attitudes and behaviours.

Within the safety profession it is widely held that 80-90% of workplace accidents are triggered by unsafe behaviours. Controlling unsafe acts is seen as key to successful accident prevention. (Cooper 1996)

Impact on other aspects of performance

Achieving good health and safety is seen to be something that everyone in an organisation would want to achieve. It provides a goal that all will want to identify with and be willing to work towards as part of their work activities. Because of this, involving people in improving health and safety performance is seen as an effective way of engaging people across an organization and providing a shared focus and identify as part of their membership of the organization.

Many of the key elements of a positive safety culture are also seen as elements of 'good management' - clear visible leadership, good consistent communication between people and groups, workforce engagement, clear definition of what is expected of people in their work roles and recognition when it is delivered. These types of skills, behaviours and organisational practices can be introduced into an organisation as part of changing how safety is "done", leading to more widespread improvements in how work is carried out in the organisation.

Time invested in identifying how to work more safely is also likely to result in higher quality work and more efficient working – all part of thinking through how to do work well. If this is done in a collaborative manner, there is likely to be high ownership and acceptance of the findings and hopefully, as a result, adoption of the identified 'better ways of working'.

Balancing organisational priorities- ALARP ⇔ ASSIB

Organisations generally have a number of competing, and sometimes conflicting, organisational goals that have to be achieved for organisational success and survival. In particular, higher-risk activities are often more profitable or less costly for organisations and the individuals working for them.

The challenge is to effectively and realistically manage safety goals and aspirations with other organisational requirements. In practice, this generally means balancing ALARP (keeping risks 'as low as reasonably practicable') with ASSIB ('and still stay in business") (Reason, 1998).

SECTION 2

DESCRIPTIVE MODEL – KEY ELEMENTS THAT INFLUENCE SAFETY CULTURE AND BEHAVIOURS
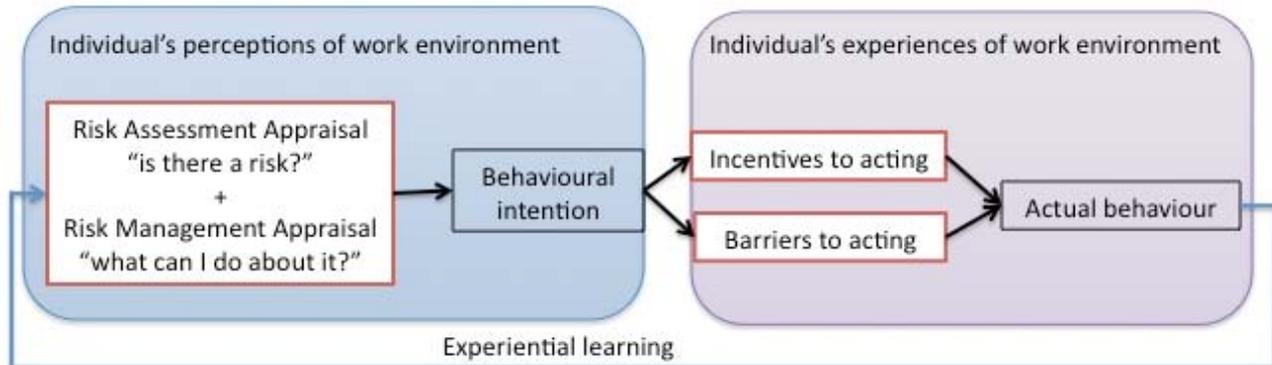
Behavioural Decision Model [1]

People will be able to respond appropriately to risks when:

- they can accurately recognise and evaluate the hazards and risks they are dealing with; and
- are equipped to deal with them appropriately; and
- are "pushed" by the safety culture to act to effectively mitigate or remove the risks.

The above model shows how people assess their risks and decide how to act in relation to them. Their perceptions of: the severity of the risks; their ability to do anything to change them; the perceived incentives and barriers to acting to change them all determine how and if people act.

A key question is how 'culture' and other elements of health and safety processes and practices can be altered to influence people and how they act in relation to risks.

People decide how to behave based on their assessment of risks and hazards present in their work environment, their perceived ability to do something about them, and how easy or hard it is to act due to their perception of factors in their working environment. They then try to carry out that behaviour. Their experience in carrying out that behaviour - whether it is achievable or not, the impacts the behaviour has - is then incorporated into their mental model of the work environment .This then influences their future behavioural choices.

Fundamentally they consider:

Risk Assessment Appraisal

- Is there anything here that is dangerous? (Hazard identification)

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[1] This model builds on a variety of theories and concepts. In particular: Rousseau – psychological contracts; Lazarus – primary and secondary appraisal; Ajzen & Fishbein – Theory of planned behaviour. It also seeks to use the existing, accepted language of safety culture; in particular Cooper's situational, behavioural and psychological elements of culture.

- How dangerous is it? (Risk assessment)

Risk Management Appraisal

- What should be done about it? (Identification of appropriate action)
- What am I able to do about it? (Identification of actions that the individual feels confident that they can carry out effectively)
- What are the implications of my acting? (Identification and assessment of perceived implications to the individual of carrying out identified action)

Key elements that have been identified from the literature as "pushing" people and organisations to good performance are:

1. Strong, consistent senior management commitment and leadership to achieving good health and safety that is visible to members of their organisation.

2. Visible line-management involvement and interest in supporting staff in improving health and safety – people follow the lead of their line-managers

3. A shared belief between members of an organisation that management, from the top down, are serious about safety and that staff will not be rewarded rather than penalized for acting to improve it.

4. Organisational procedures and practices that support safe working; through providing best practice and feedback on current performance and enabling upward and downward feedback about safety issues and concerns, current performance and suggestions for improvement.

5. People know what they are expected to do in relation to safety and their work activities. They know that they are accountable and responsible for working safety. They are given feedback and support on achieving it. They are involved in identifying and managing their risks.

These are each discussed in more detail below.

Senior management commitment and leadership on health and safety

Research has found that senior management leadership and commitment to improving health and safety has the greatest impact on changing health and safety culture and behaviours in an organisation.

People, at all levels in an organisation, generally look to their line-managers to understand what is expected of them in terms of their work performance. In addition, senior managers are expected to articulate and embody the aims and values of an organisation through defining strategy and allocation of resources. This then cascade through the organisation via the management chain and organisational policies and procedures.

Senior managers are the only people in the organisation that can place health and safety as a core value, and ensure that managing and improving health and safety performance receives sufficient resources compared to other competing organisational requirements. This enables the other identified key elements to be put in place, thereby enabling improvements to happen.

Extensive research has been undertaken by HSE between 2001/05 concerning director leadership and board responsibility for health and safety including an examination of the extent to which boards and directors take on this important role and to what effect (HSE RR 414, 2006). Among other tools HSE published a series of 40 case studies that demonstrated the vital role that directors have to play in ensuring that risk to health and safety are properly managed and how director-level leadership embeds positive safety cultures in organisations (HSE, 2005).

Visible line-management involvement and interest in working with staff to understand and improve health and safety issues

Line-managers' visible commitment and personal actions in relation to safety has been found to be a key element in developing a shared belief across members of an organisation that management is committed to safety (, for example, Cheyne et al 1999).

People have 'psychological contracts' with organisations (Rousseau, 1995) – these describe what each party believes the other has agreed to within the employment relationship. Psychological contracts start as being relatively close to the formally documented 'values' of the organisation embedded in employment contracts and other written statements of policies and procedures. Psychological contracts for the individual evolve over time as they experience the reality of their organisation and the organisation itself changes in relation to its circumstances.

A person's main interaction with 'the organisation' is via their day-to-day contact with their line manager. Line-managers embody and enact the organisation's values to their staff, in how he or she makes decisions, treats people, implements the organisation's policy and procedures. This is key for shaping the psychological contract a person has with its organisation and in determining how they perform their work tasks.

Actions such as providing good quality safety training, and personal actions were identified as key influencers of developing a trust in the reality of managers' commitment to safety. This was taken as a proxy for the organisation's and more senior management's commitment to safety as a key value in relation to other organisational drivers (Cheyne et al, 1999).

Shared perceptions and positive attitudes to safety across members of an organisation

This is probably the greatest challenge to an organisation – developing the <u>shared</u> belief and commitment to improvement across the entire organisation.

*"Within companies known for safety and health excellence, safety and health is a shared value. If this value, both to the business and to **all** employees, is not shared, any improvements in safety will very likely not be sustainable – even if achieved for a period of time as the result of becoming a 'priority' "* (Conference Board 2002)

<u>**Actual**</u> differences in the relative value placed on safety compared to other organisational goals

As has been described earlier, aspects of culture such as the relative priority of organisational goals and the ways in which organisational policies and procedures are implemented by different line-managers, frequently vary between individuals, work locations, work groups, functions and management levels. These differences in implementation lead to local differences in culture. (, for example, Baker report 2007)

<u>**Perceived**</u> differences in the relative value placed on safety – across different management levels

Research has also found that there can be misperceptions as to the relative importance different levels of management give to safety and their awareness of risks compared to their staff (, for example, Clarke, 1999). People act on the basis of their perceptions of other peoples' views in relation to their own. Where these perceptions are inaccurate, , that is, views are actually more or less similar than they are perceived to be, the effectiveness of communications are reduced. This leads to distrust and reduced ability to communicate effectively about safety between different groups of people. This can often be seen in relationships between different levels of management and trade union – management groups.
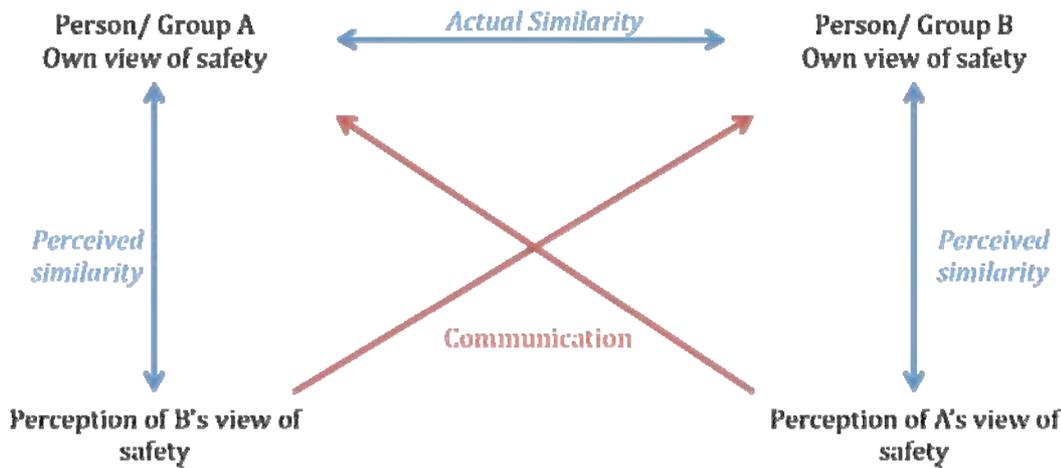
Adapted from McLeod's Co-orientation Model

Organisational procedures and practices that support safe working

"It is hard to change the attitudes and beliefs of adults by direct methods of persuasion. But acting and doing, shaped by organisational controls, can lead to thinking and believing." (Reason, p 294, 1998)

Health and safety integrated into operational activities and processes

"The challenge is to integrate … health and safety standards and activities directly to the way the business runs on the shop floor" (Conference Board 2002 p21).

A recent review of best practice (Conf Board, 2002) found that making health and safety an operational responsibility, rather than 'siloed' as a separate requirement, was felt to be the most effective way of changing safety culture and performance by the companies surveyed.

A safety management system that is appropriate to the risks being managed and fits within the operational management systems

Safety management systems need to gather and use meaningful, accurate and timely information about health and safety performance and the nature and levels of risk that are being dealt with by people in the organisation. This is required to monitor performance and to provide information that can be used by people at various levels of an organisation to generate continuous improvement over time.

The types and amounts of information required to do this effectively and proportionately will depend on a number of factors, such as the nature of the risks an organisation deals with, the size and number of locations and work activities undertaken.

It is seen as important that safety management systems fit within the organisation's broader management system, using a common language and format. This is to make the integration of safety into operational, daily thinking, as easy as possible. These could include safety-related performance targets in individual's performance contract or job description.

Transparency of reporting - making safety performance information available to all internally and, and possibly externally - was also felt to be a significant tool for improving health and safety performance. (Conference Board, 2002, p 8)

Multiple formal and informal communications – up, down and across an organisation

Effective formal and informal communication processes are needed to achieve this. People have to report safety issues upwards. Information has to be passed downwards relating to safety expectations, positive and negative feedback on performance, and actions taken by management in response to safety issues that have been raised, adherence to procedures and achievement of targets.

A reporting culture rather than a blame culture – people know they will be treated fairly and justly in relation to safety issues

Reporting culture	Blame culture
Reason 1997, Whittingham 2004	Paul (1997) in HSE 2005
'Just and open cultures ' - people are encouraged, and possibly rewarded, for providing essential safety-related information. It is accepted that mistakes are made, and that these must be reported and learnt from.	'Reinforcing cycle of blame' – fear of punishment reduces reporting and information sharing and more cover-ups.

The aim of a health and safety reporting and review system is to identify the systemic causes of errors and remove them, not to blame the individual for having made the error unless it was deliberate and unnecessary.

Safety can only be effectively managed where safety issues, near-misses, incidents and accidents are known about and can be acted on. Incentives can also be used to encourage open reporting, such as, target rates for near-miss reporting, financial incentives.

Features of a good reporting and review system can include anonymity if desired, easy and simple reporting process, incentives for reporting, fast, visible follow-up on reported issues and feedback as to actions taken and why (O'Leary & Chappell, 1997) and the involvement of workers in investigations.

Measurement of behaviours and safety culture are discussed in the next section.

Clear definition of individuals' responsibilities and accountabilities in relation to health and safety - specified competency requirements

In addition to trusting management to look to understand the causes of incidents and use them to improve health and safety standards and practices, members of an organisation also need to know: their responsibilities in relation to health and safety; that they will be held accountable for how they go about fulfilling these responsibilities; and will be punished where behaviour is unacceptable, for

example, working under the influence of drugs or alcohol (Reason 1998). Crucially, support will be given to the individual to ensure they have the necessary skills and knowledge to achieve their responsibilities, for example, health and safety training for new line managers.

Best practice reviews (for example, Baker Report 2007, Conf Board 2002) suggest that jobs, particularly when complex process risks are involved, should have defined competencies in relation to risk assessment, and knowledge of the process to ensure that process risks can be effectively managed.

People know what they are expected to do in relation to health and safety and their own work activities

Training should be provided to ensure that people have the knowledge and skills required to understand and effectively act in relation to the systems and the risks inherent to them.

Operational workers and managers should be responsible for, and involved in, developing their local safety practices and procedures in line with organisational policy and guidance. This could include hazard awareness, risk assessment and management training including how best to control and manage them individual's workplace hazards. Health and safety specialists should assist and advise rather than take responsibility for these tasks. This approach will assist in raising awareness and promoting workforce ownership. (HSE RR 367, 2005)

How the identified five elements of safety culture influence behaviours
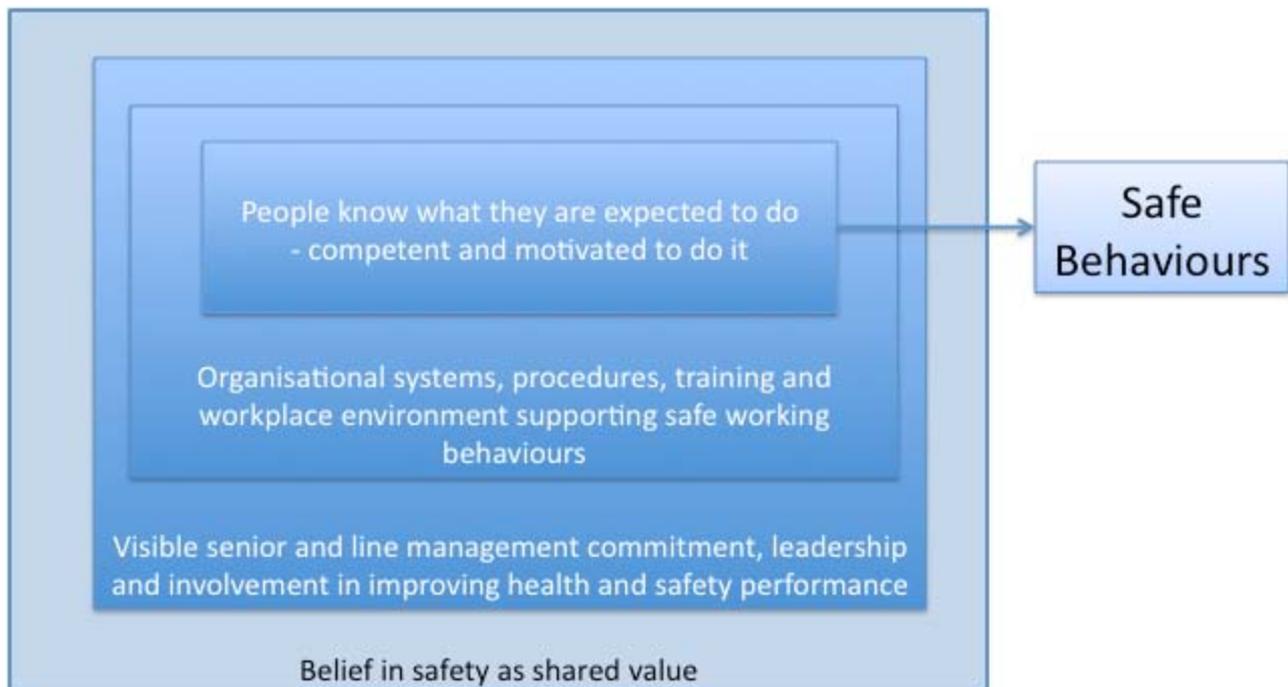
This diagram shows how the five elements examined in this section that have been identified as key for a positive safety culture support and enable people to act safely. The shared belief in safety as a core value, made visible by senior and line managements' attention to safety in their everyday activities, leads to organisational systems, processes and practices that are designed to encourage and require safe behaviours. These will, with technical competency training and support to members of the organisation, ensure that people can recognize and evaluate the risks that they need to deal with, and are competent and confident in dealing with them within their organisational context.

| Individual's perceptions of work environment | Individual's experiences of work environment |

Risk Assessment Appraisal "is there a risk?" + Risk Management Appraisal "what can I do about it?" → Behavioural intention → Incentives to acting / Barriers to acting → Actual behaviour

Experiential learning

What people feel | What the organisation has | What people do

Culture

'What the organisation has' Situational	The organisation's structures, policies, procedures and management systems
'What people feel' Psychological	Their values, attitudes and beliefs
'What people do' Behavioural	What, and how, they say, do and decide things

Linking the process of how people decide to behave with the cultural elements that have been discussed, it is possible to identify the ways in which the situational, psychological and behavioural aspects of culture can influence people's behaviours.

Influence on risk assessment and risk management appraisals

Risk assessment and risk management appraisals are affected by people's knowledge, skills and attitudes. These can be directly changed by situational factors, such as training, task procedures and checklists, incentives and performance-monitoring processes. Improving people's accuracy in assessing their risks, and improving their abilities to act to reduce or remove these risks will together increase the appropriateness of their behavioural intention.

Influence on incentives and barriers to acting

Situational, behavioural and psychological elements of culture are all influential in determining the actual behaviour.

Situational factors can be used to encourage people to carry out their behavioural intention, such as rewards for reporting, perceived career benefits for being visible in health and safety matters (Keenan 1951 in Cox & Flin 1998), ensuring that the desired behaviour is easy to carry out.

Psychological elements which would encourage people to carry out their behavioural intention would include the perceived social acceptability of acting in relation to safety, the satisfaction of doing 'the right thing' and 'being involved' in something important and that the action will make a difference. (DEFRA, 2008).

The psychological elements are developed and supported by the visible behaviours of people's peers and managers embodying the culture. The person has seen instances where acting in relation to safety has been rewarded not penalized, and the outcome for the individual is positive rather than negative.

SECTION 3

MEASURING AND ASSESSING BEHAVIOURAL PERFORMANCE AND CHANGES IN SAFETY CULTURE

This section describes how safety behaviours and safety culture can be measured, and therefore managed in order to improve safety performance. It recommends using a variety of methods of measurement to cover the situational, psychological and behavioural elements of culture; and describes how measures can be identified and tailored to an organisational context while addressing the key elements of culture that have been identified as influencing safety performance.

Why measure safety culture and behavioural performance?

Measuring safety culture and safety behaviours enables interventions to be planned and assessed in order to maintain and improve safety performance in organisations.

How can safety culture and behaviours be measured?

Culture itself is intangible. But it resides in people's heads – as their values, beliefs, attitudes, knowledge and experiences - and it is embodied in people's words and actions and in organisational decisions and documentation. Measures for aspects of culture can be developed from what people and organisations say and do and their reported perceptions, attitudes and beliefs.

Elements of culture	Elements consist of:	Measured using:
'What the organisation has' Situational	The organisation's structures, policies, procedures and management systems	Audits & reviews of documentation, systems, processes, work conditions
'What people feel' Psychological	Their values, attitudes and beliefs	Surveys – climate & culture Discussion groups, interviews
'What people do' Behavioural	What, and how, they say, do and decide things	Outcome and process measures, expert, peer and self-reporting of observed leadership and task behaviours

The 'product' – or the impact - of a safety culture is *"that **observable** degree of effort to which all organisational members direct their attention and actions towards improving safety on a daily basis"* (Locke & Latham 1990 in Cooper, 2000) , that is, the amount and type of visible behaviours that are safety related. What can be seen can be measured.

The key to measuring and then managing safety behaviours is identifying what behaviours drive safety performance in an organisation, measuring those behaviours, encouraging wanted behaviours and discouraging unwanted behaviours.

What should measures cover?

People are able to respond appropriately to risks when:

- they can accurately understand and evaluate the risks they are dealing with
- they are equipped to deal with them appropriately
- they are "pushed" by the safety culture to act to effectively mitigate or remove the risks; it is easy and positive for them to do so due to the situational, behavioural and psychological elements of the culture that are present.

> Measures should address all these aspects to give an understanding as to the best areas for intervention to improve safety performance and to be able to monitor changes in performance in these areas over time.

Identifying appropriate measurements for an organisation

Generating behavioural measures from own organization's safety performance

Key task-specific behaviours can be identified by analysing accidents over a time period to identify patterns of behaviours that have led to repeated accidents. These specific behaviours, either wanted 'good practice' or unwanted ' bad practice', can be used in self-reporting, peer and management reporting checklists as a measure that is directly relevant to the organisation's work context and which targets a key, identified risk (Cooper, 2000).

Adapting generic measures to own organisation

The previous section described the elements of culture that are seen to be key to achieving a positive safety culture. These are:

1. Strong, visible, consistent senior management commitment and leadership to achieving good health and safety

2. Visible line-management involvement and interest in supporting staff in improving health and safety –

3. A shared belief between members of an organisation that management are serious about safety

4. Organisational procedures and practices that support safe working

5. People know what they are expected to do in relation to safety and their work activities.

What might be appropriate measures for your organisation?

The following table sets out the factors that have been identified from the literature as indicators of the state of safety culture in relation to these five elements in the context of the situational, behavioural and psychological elements of safety culture.

They have been broken down into enacting, implementing and setting culture, that is, the operational, line-management and senior management aspects of particular roles, as shown in the following diagram
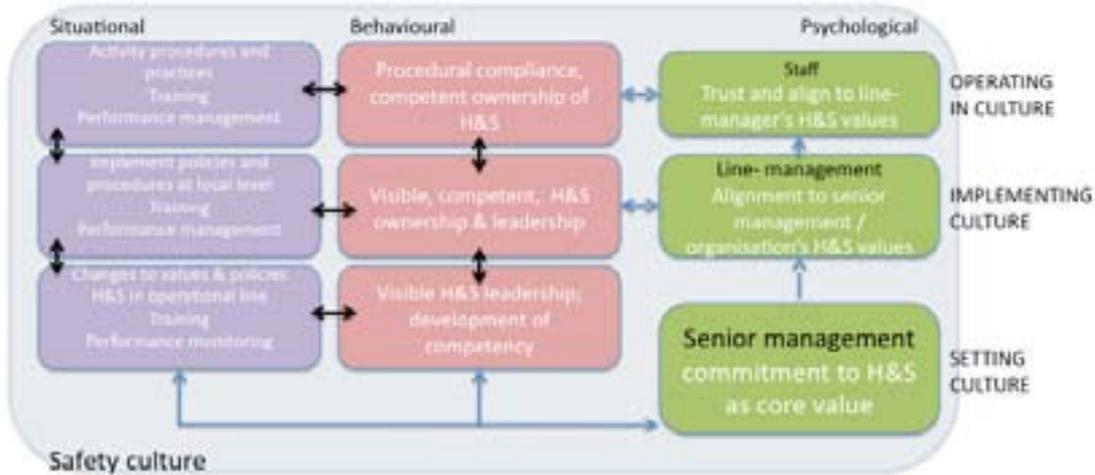
Many people in an organisation will have responsibilities for more than one of these aspects of culture. For example a senior manager will be responsible for deciding and setting culture, working with his or her staff to implement the culture and enacting the culture in his or her day-to-day work activities.

Measures of a particular element of safety culture can also be in all the psychological, behavioural and situational categories; for example visible leadership can be measured in what a person thinks (psychological), expressed in how they act (behavioural) and practices they put in place (situational).

This provides a set of generic aspects of safety culture that can be used to identify and develop an appropriate set of culture and behavioural measures for an organisation for it to monitor and improve its health and safety culture and performance.

	Situational	**Behavioural**	**Psychological**
Enacting the culture (Operational work activities)	Policies, procedures, task descriptions on how to do tasks safely. Safe environment in which to carry out tasks Clear statement of task performance requirements and development of competencies. Formal and informal channels of communication relating to health and safety – easy to use, confidential, provide quick feedback.	Compliance with health and safety requirements and aspirations. Amount of consideration and effort given to improving health and safety performance. Active involvement in activities to improve health and safety , for example, carrying out and reviewing risk assessments and method statements, discussions with peers and managers, involvement in formal health and safety groups	Confidence that senior managers and own line-manager take health and safety seriously and act to improve health and safety performance where opportunities are identified. Belief that acting to improve health and safety performance is seen positively by others in the organisation, and will be beneficial to self. Knowledge of how to act effectively in relation to health and safety issues and

	Situational	Behavioural	Psychological
	Health and safety staff in advisory and supporting role to operational staff groups in developing and operating health and safety controls and practices , for example, workshops, end-user trial evaluations. Measures of personal and role health and safety performance.	Active participation in training and other health and safety events and activities	concerns , for example, reporting system, competency in assessing risks in own work environment. Acceptance of responsibility for own behaviour in relation to health and safety. Responsibility discharged in active, not passive, manner.
Implementing the culture (Line-management activities)	Resources to improve health and safety performance – , for example, training, best practice information. Incentives to improve health and safety performance , for example, targets for near-miss reporting, public recognition of involvement in achieving improvements Management of formal channels for communication of health and safety issues and performance , for example, safety forums, monthly reporting of performance and actions taken, confidential reporting systems.	Active involvement in engaging and consulting with staff – upward and downward sharing of health and safety information and work to improve how work is carried out. Discussions up and down management chain on health and safety issues. Time and attention given to health and safety performance in 'everyday' operational activities , for example, during meetings, discussions, visits, written communications, in making day-to-day decisions. Health and safety considerations and materials are visible and easily available to staff.	Belief that senior managers take health and safety seriously. Confidence that can act to improve health and safety without being penalized. Belief that acting to improve health and safety performance is seen positively by others in the organisation.

	Situational	**Behavioural**	**Psychological**
	Operation of health and safety performance measurement systems , for example, audits, surveys, behaviour targets		
Setting the culture (Senior management activities)	Proportion of involvement and resources committed to developing and managing organisation's health and safety systems and policies compared to other organizational priorities. Number of health and safety professionals employed. Senior management health and safety competency training Quality and visibility of safety policy statement and other health and safety materials. Formal health and safety performance monitoring and review methods and measures , for example, surveys, performance targets, The health and safety	Degree to which health and safety considerations are part of 'good performance' Time given to health and safety specific activities , for example, attending health and safety training to develop own competencies, health and safety meetings, 'kicking off' and attending other safety training and events.	Importance of health and safety compared to other organizational goals. Improving health and safety performance is a personal goal. Confident that can act to improve health and safety without negative consequences to self.

	Situational	Behavioural	Psychological
	implications of top level business decisions are assessed		

Using existing culture measurement tools

There are a variety of tools for the measurement and management of safety culture. The majority are tailored to specific industries. They mainly use surveys to measure people's attitudes and perceptions to health and safety, that is, measure the psychological element of safety culture. They can be used as a 'leading indicator' of trends over time.

The HSE Health and Safety Climate Survey Tool published first in cd-rom format in 1998 (but no longer available) was a generic, cross-industry survey tool which asks questions about one's own attitudes and the perceived attitudes of others and observed behaviours. Tools are also available to assess the status of the situational elements of culture, by reviewing safety management systems and procedures.

The independent Five Star Audit service offered by the BSC includes reviewing the stated vs. actual use of safety procedures through direct observation and discussion with members of the organisation.

Use of direct observation of both the degree to which behaviours in the workplace are following specified procedures, and the way in which people are interacting and discussing work issues, is seen as key to fully understanding and assessing a safety culture. (HSE RR 367, 2005)

Measure desired outcomes not just inputs

The most significant challenge is to identify measures of **effectiveness** or impact of the actions of people, rather than an **efficiency** or frequency type measure that merely records that an action has taken place with no consideration of its quality or whether it achieves the goal it was initiated to achieve. For example, in relation to a training course with the aim of increasing quality and consistency of routine maintenance activities – course attendance could be an indicative measure. But this gives no indication as to how people's behaviours and safety performance differ as a result of people having attended the course. Effectiveness measures would seek to measure changes in behaviours that had occurred as a result; for example, changes in amount of time spent on maintenance activities, changes in number of reported maintenance requirements, number of reviews and changes to work processes. All these measures would show changes in behaviours and organisational practices before and after the training and illustrate the impact of the training in terms of desired or undesired behaviours and procedures.

All planned safety culture interventions should identify expected outcomes and measures that can demonstrate whether the intervention has been effective in achieving the expected outcomes. Care needs to be taken that the measures, and therefore desired outcomes, are focused on the key risks of the organisation (Baker, 2007).

Measuring what is not wanted as well as what is wanted

It has also been suggested that it is helpful to have in place measures of negative safety culture and behaviours as another indicator of the level of safety culture.

These measures might address factors such as: lack of confidence in senior management's commitment to health and safety compared to other organizational priorities; fear of blame in the case of reporting a health and safety issue; lack of line-management involvement in safety issues with staff. (HSE, 2005)

Using a combination of measures and methodologies

A recent report from the HSE looked at how best to measure safety culture. The report concluded that:

"*Measuring the behavioural and situational aspects of safety culture reveals more about what is shaping the culture of an organisation than measuring solely attitudes and perceptions*" (HSE 2005).

It recommended that elements of culture organisations are seeking to embed are measured in several ways, or triangulated, as a way of confirming the validity of the measurement. For example, management commitment to safety – can be assessed by: reviewing documentation and policies (situational), reported time spent on safety activities (behavioural), staff perceptions of management commitment (psychological) (Cooper, 2000).

SECTION 4

IMPACT OF POSITIVE SAFETY CULTURE ON HEALTH AND SAFETY PERFORMANCE

Four interviews were carried out during September 2008 in large organizations in a range of sectors with different business and operating risks. In each case the interview was carried out face to face with the specialist person responsible for corporate management of health and safety for the organisation. Cudmore Consulting and the British Safety Culture would like to thank the interviewees, and their organisations, for agreeing to participate in this research and their openness is sharing their experiences in seeking to change safety culture and the impact that it had had in their organisation.

The aim of the interviews was to explore how and why efforts had been made to change safety culture, and the impact that these interventions had been felt or seen to have. The interviews, which were semi-structured and included a short survey, covered:
  • drivers for changing safety culture,
  • how safety culture and performance are measured,
  • interventions that have been used to improve safety culture,
  • and the impacts that these have had on safety culture and performance

Organisation	Person	Role	Activities
ConocoPhillips (UK) Ltd, Humber Refinery	Alan Green	HSE Manager Europe & Asia Pacific Downstream	Oil and gas refining
Crawley Borough Council	Tim Mordaunt	Corporate & Public Safety Manager	Supply of public sector services
E.ON	Neil Budworth	Corporate Health and Safety Manager (UK)	Electricity generation and distribution
Rok plc	Shaun Davis	Group Director of Safety, Health & Environment	Construction

Key points from the interviews are discussed in this section. The responses to the survey and more detailed descriptions about what was done, why and the impacts on safety culture and performance can be found in Section 5.

Summaries of the four case study organizations

Each case study is briefly described in terms of the reasons the respective organizations were seeking to change the existing safety culture, the aims of the desired change, the actions taken to achieve that change and the impacts of these actions.

ConocoPhillips Humber Refinery – Alan Green

Why acting to change safety culture

A major accident occurred at Humber Refinery in 2001. Subsequent reviews identified a cultural balance strongly tilted towards occupational safety with a focus on recordable injuries. The elements of a process safety programme were in place and functioning, but did not always receive the same level of management attention as occupational safety. In addition, after a number of years of steady/improving occupational safety, performance deteriorated significantly.

Aims and desired outcome of change

The aim of changing the culture was to *'recalibrate people's risk tolerance'* in all areas of safety by improving refinery staff's understanding of the nature and level of the risks in their environment, and persuading them to accept accountability for managing the risks effectively within their operational roles.

Actions taken to achieve change

Began implementing a process safety management system beyond UK (COMAH) requirements based on US PSM regulations. This system included:

- A Process Hazard Analysis (similar to Hazop) programme to review the process safety issues for each plant within the refinery. Team members included staff working in the plant being assessed, supported by safety specialists.

- Comprehensive plant information packages which describe in detail the operation of the plant and the associated risks. These packages provide a rigorous basis for plant operation and staff training and awareness.

- Significantly revised Mechanical integrity programme with more rigorous and comprehensive equipment and piping inspection.

Implemented a behavioural safety programme which has been expanded and refined over the years.

Began tracking of all action items from PHA's, audits, incident and near miss investigations with a computerized data-base system (IMPACT)

Actively encouraged reporting of incidents and near-misses. Included metrics in overall safety programme which provides charitable donations for success. Report tracking system, allows staff to see the status of a reported issues. Worked to ensure closure as soon as possible. Strong emphasis on the need to report and the unacceptability of not reporting.

Began utilizing elements of the Energy Institute "Hearts and Minds" Programme, specifically to improve risk awareness, safety leadership and individual accountability for safety.

Highly transparent system implemented to see where outstanding risk exists in the business, thereby motivating management to close out quickly.

Providing divisional safety groups with a range of possible ways in which they can address their safety issues, and then supporting the group in designing and implementing their chosen intervention.

Impacts to date

PHA/Hazop group work has identified and helped to eliminate process safety risk. This has required more rigorous prioritization of risks and quicker close out of risk-reduction action items. It is estimated that approximately 80% of all risk identified thus far has been eliminated.

Better dynamic risk assessment and risk ownership in 'front-line' staff and managers due to increased safety competency.

Behavioural observation findings are being used to identify patterns of unsafe behaviours and interventions designed to prevent them. Significant changes in culture and safety performance in teams where managers accept that they are personally accountable for safety.

First aid reporting increased significantly whilst injuries have gone down, showing an improvement in reporting culture.

Have now removed mandatory element of behavioural safety programme without significantly reducing participation, indicating widespread support for the programme.

. Senior management and HR now using "Managing Rule Breaking Element" of Hearts and Minds Programme to further develop just culture.

Other comments

Emphasis on personal accountability for safety of individuals and there colleagues through management activity and the behavioural safety programme is felt to have been the most significant contributor to improved safety performance over the last 18 months

Continued strengthening of the contractor safety management programme and a focus on improving staff/contractor workforce relationship has also been a significant contributor.

Data has shown that approximately 50% of all injuries had a behavioral safety issue as the main cause of the incident and that up to 80% of all incidents had behavioral safety as a significant contributing factor. This has enabled us to target our improvement efforts accordingly.

Crawley Borough Council

Why acting to change safety culture

The Council had major concerns in several operating areas over health and safety and was determined to reduce the incidence of injury and ill-health and consequent liability.

Responsibility for Health and Safety was moved to the Business Continuity planning team and recognised as a significant area of risk for the Council..

This has changed the approach to health and safety in the organisation. Health and safety issues are being communicated as an organisational risk and potential business liability that can impede the performance of Council functions.

Aims and desired outcome of change

To move managers and staff from viewing health and safety from an obstacle they have to deal with, with someone else being responsible for it, to something that they are responsible for, that they can manage, and that can assist them perform their tasks well and be part of their everyday thinking and activities.

Focus senior managers attention on health and safety as part of their role of managing business risks and liabilities.

Actions taken to achieve change

Actively engaged with staff teams to identify and develop ways of managing health and safety issues in the organisation. The engagement focused on using staff's own values and existing competencies to obtain ownership of health and safety issues in their work.

Rewrote all the health and safety guidance, policies and procedures to make them directly relevant to the organisation and its activities. These documents were made available to all staff to encourage and promote learning across all departments (a staff suggestion).

Developed improved reporting and monitoring systems for absence and accident reporting (format of near-miss reporting and use of charity incentive and performance measure from a staff suggestion).

Trained (nebosh certificate) health and safety 'champions' for each department, who provide local technical support to their work teams on health and safety.

Provided technical health and safety for Elected members (Councillors) and Executive Board members (Officers) to develop their competency in understanding and managing health and safety risks.

Training (1 day BSC Level 1 Certificate) being provided for all Council contractors.

Allocation of time and resources to visible activities that target staff wellbeing as well as addressing organisational risk if not addressed (, for example, workstation and eyesight assessments).

Actively and visibly communicated changes in approach and changes in working practices to staff.

Impacts to date
Managers and staff are increasingly confident and actively involved in identifying and addressing their health and safety issues.
Increased numbers of staff suggestions. Accident and near miss reporting increased.
Health and safety issues being discussed and addressed as part of 'everyday management" in operational meetings and informal discussions and seen as a performance improvement tool.
Improved measures of health and safety performance for managers have increased understanding of key issues and their effective management of health and safety.
Visible involvement in health and safety seen as assisting in promotion prospects.
Higher attendance at health and safety training; senior managers volunteered to be involved in running key elements of Council's health and safety training courses.
Senior managers determined to be seen to be effectively managing health and safety risks.
Council better managed its exposure to potential claims arising out of injuries to staff.

Other comments
"Informal measures of health and safety are more helpful that culture surveys. Look for amount and ways in which people are talking about and dealing with health and safety, how they approach health and safety team, housekeeping etc., styles of working (moving towards open, collaborative and trusting)."

E.ON

Why acting to change safety culture
1) Following a serious accident at a power station in 2006 it was recognized that the corporate focus of health and safety had started to drift away from safety, in addition following on from the BP Texas city explosion there was a desire to revisit the governance of process safety. The system where the corporate health and safety team and occupational health being managed centrally being managed centrally and independent health and safety teams operating in business units and locations was not delivering the level of performance expected. The initial incident cost EON in the order of £44M in lost operations.
2) Due to a series of acquisitions and developments there was wide variety in safety culture and performance across different businesses and locations This was felt to be unacceptable.

3) Management of process risk seen as increasingly important to the business as power generation and distribution plant exceeds its designed life.

Aims and desired outcome of change

To increase senior and line-management's attention and understanding of health and safety issues within the context of overall business risk management.

To increase managers' and operatives' levels of competence in relation to process safety.

To improve absence management, and reduce its cost to the organisation.

To improve safety performance and increase its consistency across the organisation.

Actions taken to achieve change

Monthly Board meeting reporting of health and safety changed from a passive report item to one where each business unit managing director provides a written and verbal report, and responds to questions from the CEO and other Board members.

Managers perceptions were challenged to take a fresh look at health and safety though a training session and were required to develop an action plan. In some areas managers are being trained to do behavioural observation and feedback.

Work is being done to develop task-specific business simulation training for first and second line managers to develop and assess their required health and safety competencies.

Changed absence management to being case-managed by Occupational Health advisors (qualified occupational health nurses). The Occupational Health Advisor support the manager and absent person in managing both the absence and the return to work process. The Occupational Health Advisor acts as both support and monitors actions of both parties.

Engaged Trade Unions and staff in the development of corporate health and safety initiatives, training and guidance.

Employed Engineering Governance Manager to assist in the understanding and management of process safety, and more Occupational Health staff.

Analysed the top 250 managers in the organisation in terms of their understanding and commitment to safety compared to the safety performance of their business unit.

Detailed task analysis of business activity with the highest accident rate.

Impacts to date

Change to Board reporting arrangement has greatly increased the time spent on health and safety issues, with managing directors ensuring that they are well prepared for the meeting. Their increased attention to health and safety issues and how they are being managed has cascaded down in their business units, leading to greater attention and involvement in health and safety management in operational activities in general.

The use of behavioural observation is felt to have assisted in developing an increased sense of empowerment and ownership of health and safety in the workforce.

Cost of absence to the organisation was quoted as having been reduced by £5million in the last year.

Occupational health support now more visible and accessible as teams now advise people at their desk as well as being available in their offices. The team have moved from an 'open door' policy to a 'go through the door and engage' policy

Analysis of management understanding and commitment to health and safety and business safety performance found a strong link between the two, with managers with poor commitment running business units with poor health and safety performance. This information will be used to target areas with the poorest scores and seek to increase their commitment to drive improvements in health and safety performance.

Considered to be better relations with Trade Unions and workforce following engagement and this resulted into beneficial input in resulting policies and training courses.

Other comments

"Health and safety has to act within the organisational culture. Hence the need to identify the 'position' and readiness for action…. Interventions have to be appropriate for the organsational readiness."

"The change to the board reporting arrangements has driven the biggest change. The CEO now actively explores issues, and business leaders want to make sure they can answer his questions and not look foolish in front of their peers by not knowing what is happening. This has led to the operational line much more actively engaging with the health and safety teams to ensure that they can make sure the managers are fully informed"

ROK

Why acting to change safety culture

ROK is a rapidly expanding construction company that invests in developing and communicating a strong, unified company culture as part of its CEO's strategy of minimizing business risk. This is embodied in its five company values (safety; delivery on time; customer satisfaction; staff retention; progress against programme) and its business KPIs. In 2006, a health and safety specialist was employed for the first time and given responsibility for safety, operational health and environmental issues (SHE). He has acted to place health and safety within the existing business and operational practices and culture and to be an integral part of organisational thinking, work planning and management.

Safety culture is not seen as separate to or a subpart of organisational culture.

Aims and desired outcome of change
To develop organisation's members understanding and technical competencies to assess, lead and manage health and safety as part of daily operational activities. To develop SHE technical support, policies, guidance and management systems that support people in making operational and business decisions. Ensure that members of the organisation are clear as to what is expected of them, why, and how they can achieve it in relation to SHE. To develop an acceptance of individual accountability for SHE and a 'fair' culture – where individuals will be rewarded or punished on the basis of clear evidence of their behaviours in relation to SHE. To increase the visibility of SHE risks within the organisation, in terms of bidding for, pricing and managing projects.

Actions taken to achieve change
The SHE management and reporting system was fully integrated with the existing operational systems and five organisational values. This is available to all staff on the company intranet. SHE policies, procedures and guidance were written to reflect the corporate values and business KPIs (safety; delivery on time; customer satisfaction; staff retention; progress against programme). Use of marketing, communications and psychology (neuro linguistic programming) in the development and delivery of written and personal SHE communications by members of the SHE team. Desired behaviours modeled by team members as part of developing visible, 'felt' leadership in managers in the organisation. Training in technical aspects of SHE and leadership and communication skills is being provided to managers and first-line supervisors to enable them to engage and communicate effectively on SHE and other business issues. Expansion of SHE team to provide 'SHE coaches' to support managers in developing their visible leadership and technical competence through coaching. Engagement of staff and managers as to how to best address identified SHE risks in relation to operational activities.

Impacts to date
SHE is regarded as an operational business risk and actively considered in business and operational decisions by senior managers. Members of the organisation now understand what is expected of them in relation to SHE, as there are now organisational guidelines and systems. They are also more competent to understand and manage their own operational risks following training and

coaching.

High acceptance and ownership of safety guidance that has been developed in consultation with members of the organisation.

Other comments

"CEO's awareness of SHE as a potential risk to profitability of work, and discussion of potential SHE issues in deciding what work the company should bid for has raised other senior managers' awareness of SHE and the attention they pay to it in work planning and selection."

"CEO's attention to SHE is highly visible to members of the organisation through quarterly letters to all staff, and monthly responses to staff questions on the company intranet."

Key points from case studies

Each interviewee described how they based decisions on the interventions that they chose taking account of their organisation's cultural readiness, and the state of existing organisational practices and systems. As a result, while the principles of what the case study organizations were seeking to do were similar, how they did it was very different, both in style and technical focus.

It was felt that some interventions could only be used when there was a sufficient 'cultural maturity'. This was particularly true of behavioural safety programmes; where a level of trust in management commitment and motives behind safety initiatives was felt to be necessary for success. Where this trust was present, behavioural safety programmes were felt to greatly improve safety performance.

All felt it was necessary to have some 'measure' of safety culture and performance in order to identify what to address and how best to address it. The range and types of measured used varied, and included formal and informal measures and indicators. Interviewees' discussion of culture covered existing attitudes, systems and behaviours.

All of the organisations were seeking to increase staff competence and perceived ability to manage health and safety themselves moving them towards taking on ownership and personal accountability for their actions.

All the organisations sought to align organisational support materials and safety processes to enable people to be more competent and motivated to act to improve health and safety.

All the interviewees were trying to position heath and safety within 'corporate' or business risks as part of integrating health and safety more effectively within the operational activities of their organisations.

Case studies in relation to literature findings on five key elements of culture

The actions taken by the four companies can all be seen to be addressing the five elements of culture that were identified in the literature review. Some examples of these are:

1 Strong, visible, consistent senior management commitment and leadership to achieving good health and safety

ConocoPhillips	Crawley	E.ON	ROK
Corporate commitment to safety across all of the company's assets.	Managers visibly committing their time and resources.	Increased CEO attention to safety driving change down operational chain.	CEO visible actions, and great increase in size of SHE team.

2 Visible line-management involvement and interest in supporting staff in improving health and safety

ConocoPhillips	Crawley	E.ON	ROK
Managers full support for the Behavioural Safety Programme. Refinery 'Stand down' days; when operations stopped and all site workers and contractors spend time on safety activities, training etc	Increased manager time and involvement in health and safety issues.	Managers in behavioural safety activities and other safety leadership activities.	Increased management involvement through training and coaching in leadership skills.

3 A shared belief between members of an organisation that management are serious about safety

ConocoPhillips	Crawley	E.ON	ROK
Belief developed over time and re-inforced Behavioural safety programme	Visible uptake of staff suggestions. Commitment of resources to improving staff wellbeing.	Unions can see the result of their inputs to policies. Visible changes to organisation of health and safety department	Development of consistent organisational culture of which SHE is an integrated part.

4   Organisational procedures and practices that support safe working

ConocoPhillips	Crawley	E.ON	ROK
Significant focus of activity to improve process safety performance: defining job competencies.	Revamp of health and safety management, measurement and policies and procedures. New health and safety arrangements and training to support people.	Changes to absence management. Training to develop competency in technical and leadership aspects of safety. Analysis of key risks and staff involved in those activities.	Integration of SHE management system, policies and procedures with operational systems and company values.

5   People know what they are expected to do in relation to safety and their work activities

ConocoPhillips	Crawley	E.ON	ROK
Health and safety competencies for HSE critical jobs defined. Risk appreciation 'recalibrated' through training.	Increased levels of understanding of what is required through training, engagement and involvement. .	Improved through behavioural safety programme, management and staff training.	Health and safety clearly aligned with and defined as part of company values and operational KPIs.

Fit with the proposed models of culture and culture change

All the case studies can be seen to be using the decision process model, which shows how people understand and choose how to respond to risks. This suggests that they believe that by improving individuals' recognition and appraisal of risks and hazards, increasing their ability to respond appropriately to the identified risks and ensuring that people are enabled rather than blocked in carrying out their identified actions, people will act as desired in terms of health and safety behaviours. This generally took the form of improved understanding (through changed knowledge) of acceptable and unacceptable risks, improved capability to respond (through changed knowledge, skills, or organisational system or process), increased likelihood of responding (through changes in perceptions of what action was required/ acceptable, increased inducements to act and reduced barriers to action), and increased ease of action (again through changes in knowledge, skills or organisational system and process).

Organisations tend to focus on what they want to change in terms of people's behaviours, and think how they can change it by altering aspects of the culture – situational, behavioural or psychological as

defined by the Cooper model. This model, and others like it, can therefore be treated as a checklist of 'levers' that can be used to create a desired behavioural change.

How these case studies compare other 'best practice' research

Conference Board Report - Whiting and Bennett, 2003

68 major US companies responded to a survey on health and safety best practice in terms of practices they used, and what was needed to make them successful in achieving excellent health and safety performance. They found that "*there are similar core principles in play …. there is no common template. Each company faces unique needs and opportunities inherent in the nature of its operations and workplaces, and from whatever company culture is bought to bear*"

The key findings from the work were that:
- All members of an organisation need to be engaged and involved, empowered to make the adopted practices work, to be clear what is expected of them and feel accountable for their health and safety actions.
- There needs to be strong leadership from the top of the organisation and members need to believe that health and safety is a core shared value. This gives them confidence to get engaged and involved.
- There needs to be good health and safety systems as well as an engaged workforce
- **Integrating health and safety into operational activities was the most highly rated practice for achieving excellent health and safety.**

This can be seen in the case studies in this work. While they have all addressed these key points in how they approach and manage health and safety, they have all been done in ways that fit their organisational context; existing operational systems and culture.

Baker 2007 - report of the BP Texas Refinery accident

The Baker report is perhaps most pertinent to E.ON and ConocoPhillips both of who deal with major process risks. And both organisations acknowledged facing similar issues as those described in the Baker report; of creeping 'drift' in process safety culture as technical competence and competing priorities eroded attention and reduced the resources that were given to process safety issues, and variations in safety culture across sites. ConocoPhillips explicitly had the aim of 'recalibrating' staff as to the seriousness of the risks that they were working with, as the 'fear' had reduced over time as no incidents occurred. E.ON's corporate management was also 'refocused' and trained on managing process risk following a major incident.

With process safety, there is more emphasis on the requirement for technical understanding and competency in safety matters. The Baker report recommended that safety competencies are defined and assessed for jobholders. This has been addressed in the ConocoPhillips and E.ON case studies.

Another key identified aspect was *"what gets measured gets managed"*. New data and measures, where relevant to identifying and monitoring levels of risk, can assist to improve understanding of a risk and enable it to be dealt with. Each of these four case studies show examples of how what is measured, assessed and monitored has changed what is attended to and how it is dealt with. For example; ConocoPhillips' behavioural safety programme is a new way of measuring task behaviours and their degree of safety. This information, coupled with visible management involvement and workforce

engagement in improving safety performance is felt to have been the most powerful tool in improving safety performance in the ConocoPhillips change programme. E.ON's mapping of its senior managers' commitment to safety has enabled them to identify key managers and business units to target to best address poor safety performance. Also, the change in how E.ON's CEO monitored health and safety was felt to have had a very significant impact on health and safety performance in the organisation. Managers focused more of their attention on improving health and safety as a result of their line manager's increased attention to these issues.

One of the key findings of the Baker report was that sometimes things that are easy to measure (, for example, personal safety indicators such as minor injuries which happen reasonably frequently) are monitored and used as proxy measures of process safety. This is misleading, as they are often totally different. Process safety indicators are much harder to identify, as process incidents are relatively infrequent. The report recommends that organizations seek to identify 'leading' indicators, or precursors that can indicate likely levels of process safety; such as closing out reported process safety issues. This can be seen as having been done by ConocoPhillips as part of their culture change; putting in a new work completion tracking system to ensure work was being carried out as specified. HSE published new guidance in 2006 concerning the development of process safety indicators for the chemical and major hazard industries which can be equally applied to other organizations requiring a high level of assurance that systems and procedures continue to operate as intended (HSE, 2006).

SECTION 5

MAIN ISSUES ARISING FROM THE CASE STUDY INTERVIEWS

Detailed interview findings

ConocoPhillips *Humber refinery*	*Crawley Borough Council*	*E.ON*	*ROK*
Case study context			
A step-change in activities relating to health and safety occurred at the Humber refinery following a major incident there in April 2001 (http://news.bbc.co.uk/1/hi/uk/1281221.stm). While there were only two with minor injuries; one employee on the site, and one resident, the incident significantly changed employees and residents perceptions and attitudes towards the level of safety at the plant, and the risk to jobs and the local community of a major incident occurring.

ConocoPhillips, in common with most large international companies, is risk averse. This together with HSE being a core ethical value for the company has led to this being a key focus. The Humber incident focused attention on how standards of health and safety were being managed in the business.

The Humber site employs about 800 people, and there are typically between 300 – 2,000 contractors on site at any time.

Work to improve the health and safety culture and performance at Humber has been accelerated since the incident in 2001. It is felt – but not formally demonstrable – that the culture has changed; that the workforce better understands and believes that safety is as important as production and profitability and therefore taken seriously. This is seen as an important ,step in the overall aim to develop a culture of personal accountability, interdependence and a 'trust' culture. It is this level of culture that has enabled the behavioural observational programmes, to be successful, particularly among the contract workforce. Notable improvements in health and safety performance have been seen as the result of this work in the last 18 months. | The Chief Executive transferred responsibility for health and safety from a health and safety professional to a manager in the Council who had been working in business continuity / emergency response. The title of the team was changed from "Health and Safety" to "Corporate & Public Safety"

This change in manager has led to a significant change in the way health and safety is presented to people in the organisation and managed

Health and safety are now managed in the context of being one of many organisational risks that could impact on business continuity.

Areas of risk and possible liability were identified to the Chief Executive to raise awareness of health and safety issues as a key corporate continuity risk. This has led to increased resourcing to address identified key corporate health and safety risks within different departments. In turn, this has led departmental managers to see identification of health and safety non-compliance and risks as a way of levering funding to enable them to improve safety and business performance.

The new manager is focusing on improving the knowledge, skills and attitudes in managers, elected members, and workforce about health and safety. The aim is to enable them to be actively involved in health and safety as part of their everyday working activities. To support this, work is also being done to provide easily accessible, relevant, health and safety | EON is a large multi-national power generation and distribution business. It employs 18,500 people.

The safety culture varies across the organisation. This is felt, in part, to reflect how individual senior managers feel and act in relation to health and safety. Another factor in the variation in safety culture has been due to the acquisition of businesses and locations over time.

EON purchased Midlands Electricity in 2004, the second large acquisition in a relatively short time. Safety specialists were based in individual businesses and a corporate health and safety team and the occupational health team located within the corporate Human Resources Group. This approach lead to safety cultures in different H&S teams and businesses.

Although standards were good on Friday 30 June 2006, three people were involved in an incident at Ratcliffe-on-Soar power station. Two were taken to hospital for treatment for burns as a result of exposure to high temperature water vapour released when a piece of pipe work failed at the bottom of the boiler. The accident cost the company in the order of £44M as the plant was closed for about three months. This incident was instrumental in a refocusing on health and safety standards in the organisation.

H&S was centralized as a | ROK is a construction company that works in building, refurbishment and planned maintenance. It currently has 60 offices in the UK. It is growing rapidly; going from about 2,500 employees in 2006 to 6,000 in 2008 and 10,000 planned for in 2010. This is through a mix of organic growth and acquisition of regional businesses.

ROK has an unusually strong corporate ethos for a construction business. It has a direct-employment policy and there is a five day induction process for all people joining the organisation regardless of their role. Part of this time is spent communicating the organisation's five core values, and how ROK 'citizens' (employees) are expected to work. All ROK staff have common terms and conditions in relation to holidays and absence, and bonus arrangements. There are no differences between manual/ site workers and office workers. **This strong initial 'culture setting' process reduces cultural variation across work locations and work teams.**

ROK aims to reduce its reliance on and utilisation of sub-contractors which is seen to increase business risk due to the different cultures, and therefore working practices and behaviours, between ROK and other construction organisations.

The CEO of ROK manages on the basis of minimizing business risk, and ensuring good margins on the work that ROK bids for and takes on. He has become increasingly aware of heath, safety and environment issues as risks that can be identified and considered in both deciding |

ConocoPhillips Humber refinery	Crawley Borough Council	E.ON	ROK
	information and management systems and initiatives, and to implement ideas and initiatives that are developed by staff. The changes in style and approach have been seen to be beneficial. Other organisations, are asking to work with Crawley Borough Council to develop a similar approach in their organisations. Crawley Borough Council employs about 800 staff, Mid Sussex Council, which has asked to link with Crawley to adopt their approach to safety, employs about 600.	function, and attention given to increasing management focus and resources to managing safety, in particular process safety. EON, like other power generators, is operating with plant that is now beyond its designed life and therefore has unknown performance and failure characteristics. The effective management of process risk for these business activities is recognized as increasingly important to the organisation. The highest accident rates, have been identified in domestic retail sellers. This group has a much higher accident rate than all other work groups in the organisation.	whether to compete for work, and in managing work. Health, safety and environment are therefore seen as an integral part of all the organisation's values and achieving business success. In April 2006 Shaun Davis was appointed to manage Safety, Health and Environment (SHE) across the ROK organisation. He was the first person appointed with specific responsibility for these areas. There were two health and safety consultants working for ROK prior to that. At that time people were actively looking for guidance on how to manage SHE issues.
Organisational arrangements for health and safety			
Line (Divisional) managers are responsible for health and safety. There are local and central health and safety specialists who provide advice and support. Health and safety budgets are provided for central health and safety function and within line-management budgets for different locations and business activities. Most of the money is allocated within line- management budgets for safety management activities. Minimum compliance standards are set at ConocoPhillips Group level (meeting international regulatory requirements). These are then 'translated' into appropriate requirements for different business streams and locations. Compliance with these standards is driven through a Corporate level auditing process and a rigorous risk identification, reporting and closure system with comprehensive corporate reporting requirements. Job health and safety competency requirements are mandatory for roles having a potential HSE impact throughout ConocoPhillips. Defining and ensuring required competencies for job roles is seen as key to ensuring that people can be held accountable and responsible for their health and safety performance.	Tim has a direct reporting line to the Chief Executive and is authorized to act in relation to health and safety with his authority. He has an assistant that is being trained in health and safety. The team provides support and guidance to the staff, directorates and council cabinet and members.	Health and safety became a centralized corporate function in Nov 2006. A number of investigations and new initiatives are currently being developed to improve health and safety across the business and in targeted activities on identified key risk individuals and groups. Senior managers have recently undergone a safety leadership engagement course that aims to challenge thinking on the organisation's safety culture and accident statistics. Following this course, the CEO has agreed changes in Board level reporting and management of health and safety; Managing Directors are now required to report and be able to discuss health and safety issues within their businesses at monthly Board meetings. There are corporate minimum standards for compliance in health and safety. Each business unit defines, and is responsible for, how it will meet those standards.	Shaun now heads a team of 36 people. They are organised in a central corporate group and five regional groups who are based in each geographic business region and support the business unit. SHE staff work as SHE 'coaches', at both local and corporate levels, facilitating operational staff to manage their SHE issues, and to appropriately implement the corporate SHE guidelines and management system requirements. Members of the SHE team spend most of their time doing 'front end' planning work and only about 20% of their time is spent on audits and 'fixing' problems. The aim is to identify and avoid issues before they occur rather than deal with them as they occur. The SHE team reports directly to Board level via the Group Operations Director. There is active use of psychology, communications and marketing approaches to maximize their impact and the improvement in safety and business performance. The SHE management system is part of the operational management system. It is a "toolkit" that aims to support

ConocoPhillips Humber refinery	Crawley Borough Council	E.ON	ROK
			the planning and operation of work processes. "*A handrail, not handcuffs*".
What is 'safety culture' in this organization?			
"How people work and react within the organization" ConocoPhillips desired safety culture is one of adherence to management systems and having personal accountability for own performance.	Culture was *'health and safety is something you have to do and work around'*. Aiming to move it to *"safety is good business practice, health is about ensuring the health and wellbeing of staff"*.	The Board act to improve health and safety performance in the belief that it is socially responsible to do so, and that good health and safety performance increases productivity. The safety culture currently varies significantly across different parts of the business.	There is no separate 'safety culture'. It is part and parcel of the organisation's culture; how it plan and works - 'good safety is good business'. *"Culture is what people do when no-one is looking – people's actions and inactions"*
Key aims for culture and performance changes			
Use the "wake up call" of the incident to refocus people's competencies and accountabilities for safety required in their roles: • Reset people's understanding of the process risks that were being managed. *"re-calibrate risk tolerance"* • Define required competencies for roles, and ensure that training is available to develop competence in post holders. • Drive sense of personal accountability for risk management throughout the organization • Achieve 0.35 recordable accidents / year / 100 workers at the site. • Develop a strong reporting culture – reporting of incidents helps to prevent a re-occurrence and is not a tool to apportion blame. Not reporting incidents and near misses is unacceptable.	Develop the understanding and skills of managers and staff in relation to health and safety so that they can move from viewing health and safety as something 'they have to do and work around', to thinking about it in their everyday work; health and safety as good business practice to ensure that people have safe working environments are receive the support they require and are entitled to for their wellbeing. Focus senior managers attention on health and safety as part of their task of managing business risk and liability. Generate staff ownership and management of health and safety for their work rather than it being seen 'someone else's job'.	Increase line-management attention to health and safety within operational management and have it considered within a risk management context. Ensure organisation improves competencies in process safety – increasing focus on operational integrity of generation and distribution activities. Improve the organisation's management of absence. Identify and target key health and safety risk 'hotspots' in terms of business activities and individual senior managers.	The overall aim is to develop SHE leadership and competence in members of the organisation such that they take personal responsibility for SHE and integrating SHE management with other operational activities, both in terms of organisational processes and individuals' thinking. There were four aspects that were addressed in developing SHE skills and performance: • Communicating what had to be done, why and how to do it within the organisation • Working with staff to develop their input and ownership to SHE solutions to identified issues • Developing individual accountability for SHE - a 'fair' culture. Ensuring recognition and reward to good SHE performance and personal behaviours, and discipline for bad, as for other organisational values. • Aligning the SHE and operational management systems to ensure that organisational priorities were clear and unambiguous to staff and that systems are easy to

ConocoPhillips Humber refinery	Crawley Borough Council	E.ON	ROK
			use.

What was done (interventions and activities)

ConocoPhillips Humber refinery	Crawley Borough Council	E.ON	ROK
Reviewing and changing existing process safety systems: Set up new process safety groups; tasked to carry out hazop studies for each plant and process at the refinery. Led to new risk assessment prioritizations for management to implement. Upgraded inspection and quality assurance processes Stronger compliance verification process through use of monitoring of reporting and close-out of identified risks (IMPACT system). **"Recalibrating" personal risk awareness and tolerances:** Behavioural safety programmes – observations of task performance and direct feedback to operatives. Carried out across contracting companies so can compare good and bad practices between them and identify and develop interventions based on observed unsafe behaviours. Instituted 'safety stand-downs' Sites where all staff and contractors take part in workshops with employees and contractors to discuss and identify safety issues. These issues are then publically reported, followed up and the actions taken are reported back to the workforce. Such Stand downs have not been limited to situations subsequent to an incident occurring. **Allowing choice of initiatives to improve safety** Feedback from staff at the refinery indicated that people felt that new safety initiatives were constantly being imposed on them. To change this range of tools have been promoted but not made mandatory. **Encouraging reporting** • Donations to charity • Performance targets for near-miss frequency • Spot bonuses for 'good' suggestions • Recording and progress of reported health and safety issues visible to all on safety management system. All leaders trained to enter reported issues. **Changing performance indicators** • Use of close-out statistics by mangers on	**Reviewing and changing existing health and safety management systems:** Rewrote all health and safety policies to make them: relevant to the organisation and the tasks being undertaken; accessible to staff - information is up-to-date, and in non-technical language. All health and safety documents available across the organisation so that different departments can use and adapt them as appropriate (this was implemented after it was suggested by a member of staff). Improving reporting systems for absence and accidents. Any staff reporting an accident are now contacted by letter at home asking them to report any further issues arising from the accident and given details of available organisational support. Increased and improved measures of health and safety are now collected and reported to management**.** **Working with staff to identify and develop improved ways of managing health and safety issues in the organisation** Tim works with staff on issues relating to health and safety, seeking to get them to identify, and take ownership of, how they can best achieve what is required. Examples of this approach are: Reducing number of trained first aiders. There were more than were required for the organisation, as people previously had been encouraged to train through the use of additional pay. All existing first aiders were consulted as to how they felt the required number and location of first aiders would best be achieved. They identified the required reduction in training and took	Changing absence management system: Move to active case management of long-term absence. Occupational Health Advisors actively support both the absentee and their manager. Specific advice is given on how best to proceed with each individual case. Cases are closely monitored to prevent them from falling in the gaps or stalling.. Using anonymised information from outsourced staff counseling service to identify key issues that are affecting staff and supporting managers in communicating and providing support around them. Eg Debt issues identified as a cause of stress and money management seminars provided in house. Change in monthly Board meeting reporting arrangements Health and safety changed from a passive written agenda submission, to a verbal and written 'headlines' report from each business head to the board, the Chief Executive and board members ask questions into the detail of the report. Identifying key risk and accident areas for targeted interventions Work has been carried out to identify key managers and work groups with higher accident rates and less good safety culture and performance. This will be used to develop targeted interventions at individual and work group levels. New health and safety posts A new role, of Head of Engineering Govenrnance, has been created, and more people are being employed	**Aligning SHE management system with operational management systems and the organisation's values** The SHE management system is on the organisation's intranet interfaced with organisation's values and operational management systems. This can be accessed by all staff and provides information about SHE requirements, activities and performance. It also allows staff to pass feedback and suggestions to the SHE team. All the SHE policies and procedures were also developed to fit with the organisation's operational management KPIs and values. **SHE communications strategy** Marketing principles were applied in creating and implementing a programme of communication activities to explain what the SHE team were setting up within the organisation, why it was important and what staff were expected to do to deliver the required SHE performance. This was all in the framework of the existing operating practices and values. SHE is part of the ROK five day induction programme that all ROK staff undergo on joining the organisation. **Reward, recognition and discipline – demonstrating a 'fair' culture not 'no blame'** Modelling by the SHE team of how people should be held accountable for their behaviours - good behaviours are actively encouraged using public recognition, such as awards, public recognition etc. Discipline is also being visibly applied where staff have knowingly acted wrongly. SHE successes and awards are being widely publicized – with the individuals responsible for them being

ConocoPhillips Humber refinery	Crawley Borough Council	E.ON	ROK
reported issues as a performance indicator	ownership for operating the new system. Improving health and safety standards in childcare services. Tim ran a series of sessions with childcare workers seeking to 'reframe' their perceptions of what they did and their ability to understand what was or was not 'reasonable risk' and their abilities to change it for the better. , for example, "would you accept this in a holiday crèche for your child? What would make it acceptable?" Developed the staffs' ownership of their identified improvements and supported them in introducing the improvements. Set up health and safety champions (unpaid role) for each department. Each champion has received technical training in health and safety (nebosh certificate) and acts as a local 'technical support' for health and safety issues in their work group. Adoption of staff suggestion for near miss reporting system – donation to charity for each report, staff appraised on the amount of money raised. **Changing people's understanding and perceptions of health and safety risks** Elected members and council cabinet members have received training to increase their understanding and ability to manage organizational risk. Training is also being provided for health and safety champions within the organisation (nebosh certificate) and to Council contractors (BSC Level 1 HEALTH AND SAFETYcertificate) Health and safety now being presented to them in the context of organisational risk and business continuity. **Active communication of health and safety activities and changes** Staff are informed, through a number of different channels, of what the health and safety	in Occupational Health. Training Role-specific training is being developed. This will assess and develop first and second line managers' health and safety competencies. Managers will be asked to respond to scenarios based on the business risks that they deal with in their particular roles. Challenge sessions for managers to require them to consider their attitude to health and safety and to get them to actively plan. Behavioural training programmes using internal observers Increasing accessibility of health services Health team visits to work locations, and installation of health measurement equipment on two sites.	named. **Increasing technical and leadership competencies in SHE** Managers have received five days CITB HEALTH AND SAFETY training, and are being individually coached on effective visible, 'felt' leadership in their work activities and workforce engagement. Supervisors have received communications /presentation training to increase their skills in delivering SHE briefings. SHE risks are made more visible to CEO and other senior managers as the result of having in-house SHE staff providing information and coaching them to develop their recognition and understanding of risks and potential risks of work. **Significant expansion of SHE role and resources in organisation** From a new function in 2006, there are now 36 people employed within the SHE function. These staff are being developed into SHE 'coaches' supporting managers and staff in managing their operational SHE issues and acting as behavioural role models.

ConocoPhillips Humber refinery	Crawley Borough Council	E.ON	ROK
	team have changed, why, and what staff need to know to do in relation to those changes,		
What has improved the culture?			
Recognition of the need to ensure buy-in to safety systems rather than through imposition **Recognition of common staff and contractor goals around safety performance** **Accountability** – seen as key to support the development of a 'just' culture – where it is acknowledged that mistakes happen but that deliberate unsafe behaviours are unacceptable, rather than a ' no blame' culture which can limit personal accountability for safety. **Site stand-downs, choice of safety initiatives, new process safety groups -** these have all given increased operational involvement and ownership of health and safety.	**Developing management and staff competencies in health and safety –** giving people increased confidence that they know enough to act in relation to improving health and safety. **Behavioural leadership -** demonstrating through own, pragmatic – 'how can health and safety management help you with this' – the desired approach to health and safety. **Developing and supporting ownership of own health and safety** – resources have been provided to support ideas, discussions, and actions in relation to improving work environments and health and safety management. Seek to work within the context of the values and morals of staff. **Communicating what health and safety can do for people in improving their lives -** significant time and effort has been put into communicating the health and safety activities and initiatives that have been carried out. Developing sense among staff that their suggestions and actions to improve health and safety are wanted and acted upon by the organisation.	Increased senior management attention to health and safety issues The Chief Executive Officer's increased time and attention on health and safety issues in monthly Board meetings has led the board members to spent more time understanding and managing health and safety within their businesses directly in order to be able to respond effectively in the Board meetings; both to the CEO and other business managers in discussions of health and safety issues. This has led to increased operational engagement with the central health and safety group and consideration of health and safety within operation decisions. Behavioural training programmes Assisted in developing culture of empowerment at workforce level, leading to increased ownership of health and safety. Managers carry out observations and feedback.	**Integration of SHE management with operational management practices** SHE considered as other operational business risks. **Increased technical competency and SHE support – management systems and people** Staff are now able to manage SHE more confidently as there are management systems and support available to them which clearly informs them what is required. **Disciplining as well as rewarding SHE behaviours** Staff feel that the will be held responsible and accountable for their actions in relation to SHE – for good and bad. **Developing staff ownership of SHE issues and how best to manage them "selling rather than telling"** The SHE team has worked as facilitators with staff on identified key organisational risks, and staff have generated acceptable methods of managing the risks (, for example, agreeing to wear long trousers and gloves on sites to reduce 1st aid injuries)
What has improved the health and safety performance			
Health and safety competency training for first line supervisors and workforce – improved dynamic risk assessment, and hence ownership in terms of reporting and actions taken in relation to health and safety issues. **Performance targets for health and safety performance** – felt to drive people's behaviour to acting to achieve specified targets. **Workforce behavioural safety programmes -** significant changes in health and safety	**Health and safety involvement now seen as increasing promotion prospects** – seen as a positive rather than negative thing to be actively involved in as part of performance appraisals. People at all levels of the organisation are now more actively seeking to attend health and safety training. Senior managers are now also doing internal health	Improved absence management Changes to the way in which managers and staff are supported in cases of absence has reduced the absence rate for eight consecutive months. Reducing the cost of absence to the organisation by £5M Identifying key risks to the	**Increased managerial competency in SHE – technical understanding and SHE leadership skills**

ConocoPhillips Humber refinery	Crawley Borough Council	E.ON	ROK
performance have been seen in the last 18 months. It is felt that these can be, in part attributed to the behavioural observations and training that started at the site about five years ago. These were started following the development of a more 'trusting' culture and improved health and safety competency and accountability at the site.	and safety training (Reported change by Learning and Development Manager) **Senior managers see poor health and safety as risk to them (corporate manslaughter)** - now act to reduce health and safety risks as part of their everyday jobs. **Health and safety increasingly part of work and everyday discussions** – more time is being spent talking about health and safety in formal operational settings such as meetings and reviews, and informal discussions. People are actively identifying issues that they regard as unacceptable in terms of health and safety and offering suggestions to change them. (Reported independently by three members of staff). **More useful health and safety performance information – absence and accidents** - enabling better identification and understanding of health and safety issues and how to address them effectively.	organisation – work groups and individual managers A strong correlation has been found between individual senior managers' attitudes and behaviours in relation health and safety and the lost-time accident rate of their business. Individual managers will be targeted for health and safety performance improvement, which is expected to lead improvement in their business' performance over time.	
The health and safety tools and risk assessment approach are being seen as leading to better business decisions and being adopted as operational processes across various parts of the business. The additional focus on process safety has led to a significant reduction in overall risk, which, in addition to improving overall safety performance has potential benefits such as reduced insurance premiums. Has improved relations with the Health and Safety Executive and other external regulators.	Reduced employer insurance premiums.	Improved relationships with Trade Unions and workforce following health and safety consultation with them, and direct use of the Unions inputs into new corporate guidance and training on Drugs and Alcohol	**Increased understanding of SHE as part of business risks** Senior managers actively consider SHE risks (likely impact on profitability of work) as part of deciding what work to target as a business. This approach is being communicated downwards to regional business managers and becoming part of their business analysis. Driven by increased CEO awareness of SHE as key business risk and actively explored in discussing business decisions.
Other comments			
Need to ensure that initiatives 'fit' the culture of each work group/ business. Not possible to have a 'one solution fits all' approach. Used measures of cultural maturity to identify appropriate interventions. Strong safety leadership from executive management who make clear that safety and environmental protection are the foundations for effective production. Safety and environmental protection are the foundations for effective production. Safety and environmental protection are viewed by ConocoPhillips as essential	Don't find annual culture survey particularly helpful. Informal measures more useful – walking around seeing & hearing what people are doing in relation to H&S, changes in management style in the organisation, how and why they approach Health and safety staff,	"Health and safety has to act within the organizational culture. Hence need to identify the 'position' and readiness for action." Interventions have to be appropriate for the readiness. More robust reporting to board and increased CEO attention to health and safety has been key catalyst for	CEO receives and answers staff questions in a monthly posting on intranet. This is used informally by SHE team as a mini culture / stress survey and look to see if any particular issue is being raised repeatedly and the tone of communications from a particular area or work group. CEO sends out quarterly letter to all staff at their home addresses. Letter focuses on a

| ConocoPhillips

Humber refinery	Crawley Borough Council	E.ON	ROK
attributes when fostering relationships with potential business partners.

 "Need constant, visible 'pushing' and leadership to maintain trust and safety messages."

"Housekeeping at a location is a key cue that people are thinking about safety." | | change. | particular theme, and always includes SHE. |

CONCLUSION

This section summarises the key findings of the case studies in relation to the research literature on safety culture.

A new descriptive model is proposed that can be used to assist the identification of appropriate interventions, and measures of their impact. The model builds on existing safety culture research and combines it with other concepts of human behaviour.

It is argued that:

- elements of what are defined as 'safety culture' can influence behaviours and safety performance – behaviours are an output of culture.

- interventions to change elements of safety culture with the aim of improving safety performance should be developed by considering how they will affect an individual's perceptions of their work environment, and their competence and motivation to act in relation to safety in that environment

- behaviours can be used both as a means of identifying what changes are needed to an organisation's culture, and assessing the effectiveness of cultural interventions that are made.

Where the case studies fit the literature findings and recommendations

Addressing five key elements of culture

The actions and outcomes described by the interviewees in the four case studies all related to addressing the five elements of culture that were identified from the literature review as being necessary for achieving a positive safety culture.

There was also a good fit with reviews of best and poor practice, with common issues and findings between the four case studies in this report and the Baker and Conference Board reports.

Integrating health and safety into operational management activities

All the case study organisations were seeking to increase the degree to which health and safety was an integral part of operational management activities and overall risk management rather than being seen as separate. The aim was to use health and safety to support good business practices and management processes. In the same way, safety culture was treated as being part of the overall organisational culture.

This was particularly strong in the ROK case study, where health and safety was integrated across the company's five 'values' rather than being a separate aspiration. For example, health and safety risks, its predicted costs and possible impact on profit margin, are actively reviewed as part of the company's decision process on whether to tender for work.

No 'one size fits all' solution

As discussed in the previous section, research into best practice across 68 companies in the US found that *"there are similar core principles in play …. there is no common template. Each company faces unique needs and opportunities inherent in the nature of its operations and workplaces, and from whatever company culture is bought to*

bear" (Conference Board Report, 2003).

This was borne out by the findings in the four case studies in this work, and also fits with the models presented on how to identify and address unsafe behaviours via cultural change. This must be done within the organisational context, its risks, existing practices and people in order to effectively change behaviours from undesired to desired.

Multiple measures of levels of safety performance and culture

All the case study organisations used a wide range of measures to get a sense of health and safety culture and performance in their organisations. All interviewees also stressed the importance of 'informal' assessment; looking for indicators as to how people were behaving in relation to considering health and safety in their everyday working. These indicators included styles of communication, tidiness/ housekeeping in work areas and offices, degree to which health and safety was talked about in 'everyday' and operational meetings as well as having separate health and safety forums. These types of indicators were seen as very valuable, but harder to measure 'formally'.

Where the case studies do not fit the literature findings

Key focus in case studies was how to change aspects of individuals' competencies

The academic literature was not felt to be helpful in explaining how elements of safety culture influence behaviours, and how, using that knowledge, effective interventions could be identified and assessed. In particular the academic literature does not explain how people came to make their behavioural choices, and the way in which their competency and motivation in relation to understanding risks in their environment and their means of dealing with them within the organisational context.

The need to define and enforce competency requirements to help to create individuals' ownership and accountability for their health and safety issues was a key finding of the two best practice reports. Improving people's competence and confidence in relation to taking ownership of health and safety was also a key desired outcome of culture change for the organisations studied in this work.

New descriptive model of behaviour and how it is influenced by culture

A new descriptive model is proposed to address this identified gap in the research and academic literature. This starts from the perspective of individuals within an organisation; how they experience their organisation's culture, and how that influences their behavioural choices.

How do people decide how to behave in terms of safety?

Risk Assessment Appraisal "is there a risk?" + Risk Management Appraisal "what can I do about it?" → Behavioural intention → Incentives to acting / Barriers to acting → Actual behaviour. Experiential learning.

Behavioural Decision Model

People decide how to behave based on their assessment of risks and hazards present in their immediate environment, their perceived ability to do something about them, and their perception of the outcomes choosing a particular behaviour will have; for example, ease of action, making their immediate environment better or worse for them in some way. This model provides a basis for identifying culture interventions that will have the most impact in enabling people to produce desired and effective safety behaviours.

The risk assessment and risk management appraisals, and incentives and barriers to acting, shown in the red boxes on the behavioural decision model are all influenced by the key elements of culture.

Behavioural decisions are an interaction, at a point in time, between: the existing state of the individual - in terms of their competence, motivation and other personal characteristics; their perceptions of what is required of them; their perceived ability to achieve it with their own internal resources and the resources in their environment; and the perceived benefits, or otherwise, to them of acting. This changes over time as individuals experience the effects of their behaviours on their environment, for example, whether their manager responded positively or negatively the last time they behaved in a certain way. This then influences their choice the next time they decide how to behave.

Using this behavioural decision model it is possible to identify what part of the process is working incorrectly, and consider how this can be most effectively altered in terms of the way in which a person perceives and responds to their immediate working environment.

The aim of any cultural change is to ensure that the part of behavioural decision process that is affected by it, is affected in such a way that individuals make better behavioural decisions – in this case, correctly identify and choose to act safely.

This can be compared to an optician identifying the correct lens a person needs to see clearly during an eye test. Different lenses are tried and adjusted to give the clearest vision. In the same way, different elements of culture that have been identified as key can be adjusted, to enable a person to 'see' clearly what is wanted of them and to enable them to perform it successfully.

How this model can help identify what aspects of culture to change to improve safety behaviours and performance

Model of Behaviours as output of culture

People are constantly adjusting their 'image', or mental model, of their environment, and what works and what does not work within it, in terms of them successfully delivering what is required of them as they "**operate in the culture**". 'Success' in this context could include: financial rewards and recognition; social acceptance by peers and / manager; self-esteem; maintaining job position.

An individual's line manager plays a key role. Line managers "**implement culture**" and therefore embody the organisation and its performance requirements - to their line-reports and others that they come in contact with. They define, through their words and actions, 'success' in the immediate work environment, for example, whether they tend to reward people for prioritising safety or for delivering on production targets even though this may involve unsafe behaviours.

The physical characteristics of the work task and environment and accepted work practices also are part of the implementation of culture – visible signs of the investment of time and resources by senior and line managers.

More senior managers, who might be seen only occasionally if at all in person, impact on the individual through their actions in "**setting culture";** in defining the organisational systems, policies and practices that are implemented by the line manager in the individual's work environment. Also through corporate communications that the individual receives, either directly or 'filtered' by their line manager.

Therefore, when seeking to use culture as a tool for achieving desired safety behaviours, it is argued that interventions should be considered in terms of changing the person, their immediate work environment or the organisational environment, and how those changes will affect a person's behavioural decision process. **Any change should be made with the aim of making the desired behaviour clearer and easier for a person to perform.**

Other key influencers in a person's behavioural choices

Organisations and people operate within the wider cultural context of society. Trends and changes in this culture will affect people and the organisations they operate in over time. In its widest sense, this culture covers political, economic, social, technological, legal and environmental aspects of societal change.

Individuals experience these cultural aspects filtered through the various non-work environments that they operate within; their home and families, friends, other organisations and social groups that they are involved in.

These non-work environments and previous work environments also influence an individual's perceptions of appropriate behaviours in relation to their current organisation. All these environments contribute to the knowledge, skills, attitudes, expectations and assumptions about what is acceptable, normal and right that an individual brings to their immediate work environment.

The learning and knowledge from people's experience of non-work environments can be used in developing ownership and accountability for health and safety in their immediate work environment. This approach was explicitly used in the Crawley case study where people were asked to look at their health and safety issues as 'experienced users' of similar services in their personal lives. This enabled them to see that they already had relevant competencies in assessing hazards and risks and in knowing what should be done about them that they could use in their own jobs.

The other key influence on the behavioural choice is the variation in personal characteristics between people at any point in time.

People vary in numerous ways:

- in various permanent and semi-permanent characteristics such as personality traits, abilities, size and strength, vision, hearing and dexterity;

- in their knowledge, skills, attitudes, beliefs and values due to previous and on-going experiences and learning, both from their current immediate work environment and from other current and previous environments;

- in temporary characteristics such as energy levels, stress, satisfaction, motivation, which can vary on a day by day basis and may be caused by factors in the work or non-work environments that the individual operates in.

Behaviour = the output of culture
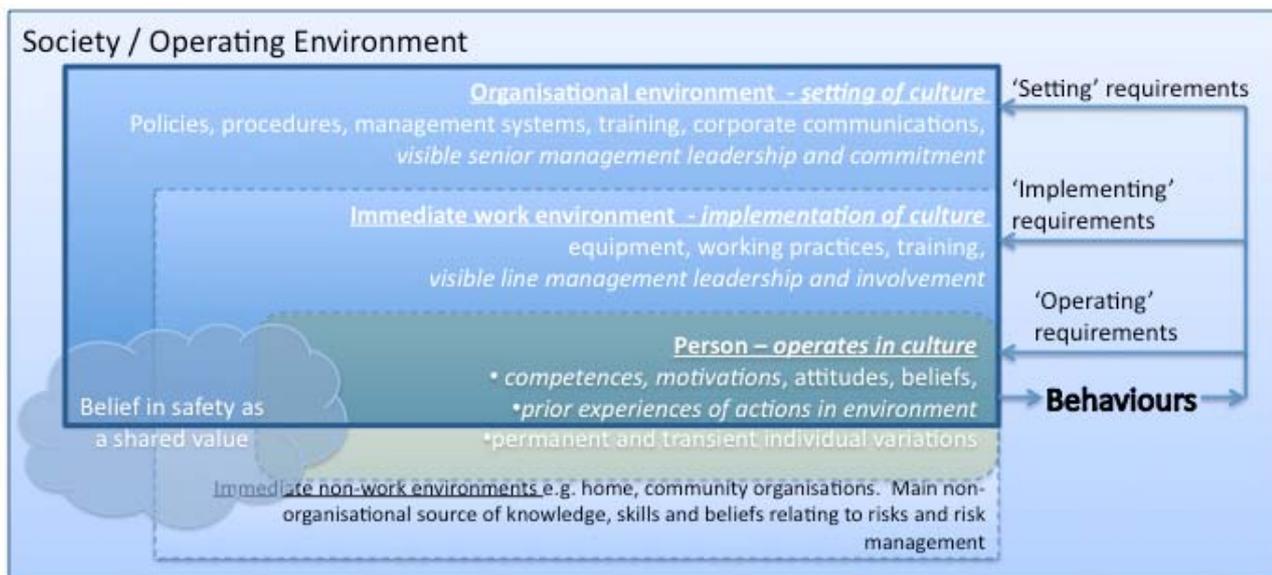
Model of Behaviours as both output and measure of culture

One of the definitions of 'culture' is that it is the sum of everyone's behaviours, that is, behaviour can be the output measure of culture. Behaviours can therefore be used to identify what aspects of culture could best be modified in order to produce wanted rather than unwanted behaviours, and measured over time to assess whether interventions have had their desired effect. The behavioural decision model can be used to identify which stage in the behavioural decision process people are not performing as desired. From this a suitable cultural intervention to support them in performing as desired can be designed.

For example, a common issue in complex process operations is a lack of technical understanding of the system being dealt with. This means that people are unable to accurately identify hazards in their environment, and the risks of their behaviour in relation to those hazards. This leads them to act unsafely in carrying out their work tasks. Providing people with information about the process and the effects of various actions on, in the form of task information or training, would enable people to more accurately assess the risks they are dealing with, and also give them information on how to manage them effectively (the risk and coping appraisal stages of the proposed Behavioural Decision Model). Measures of the effectiveness of this intervention could be reduced frequency of observed unsafe acts, a reduction in reported near-misses relating to the targeted behaviour, self-reported changes in confidence and changed behaviours in dealing with task.

How to decide what to change?

In terms of deciding what interventions to make to change an aspect of culture and therefore people's behaviours, it is proposed that interventions should be considered in terms of changing individuals, changing their immediate work environment, or changing the organisational context that will then affect the immediate work environment.

Changing an individual

In terms of ensuring a person chooses the correct safe behaviour, changes could be made that increase their competency in recognizing and dealing with their work risks, and that they are motivated to act to do so. This can be done by:

- enabling them to recognize and assess hazards and risks through changing their knowledge of the hazards they work with and changing their competency through methods such as training and job aids. All of the case study organisations had undertaken this intervention. .

- ensuring that they have methods of dealing with those risks and know how to use them, providing suitable systems and processes for risks to be managed, and information and training on how to use the systems. All of the case study organisations had ensured that there were safety management systems in place within the organisation (part of 'setting culture') and ensuring, through training and communications, that individuals were aware of them and had the desired level of competency to deal with those risks.

- ensuring they are confident that choosing to act safely is what is wanted of them – developing their trust that safe behaviours are desired through visible management actions, communications, and recognition and reward to desired behaviours. All of the case study organisations had undertaken this intervention. .

Changing an immediate work environment

Changes to an immediate work environment to influence the desired selection of safe behaviours could include:

- changes to the design of tasks and equipment to remove or reduce unsafe acts - ConocoPhillips Humber Refinery – hazop analysis by operational staff and changes to maintenance arrangements; ROK - construction work planning put in place to design out health and safety hazards; E.ON – analysis flowing from high incident work group which identified and examined key aspects of equipment and task design that contributed to high incident rate. E.ON plan to make changes on the basis of this analysis.

- training for line managers to develop their leadership and communication skills, to enable them to engage visibly and effectively in improving health and safety with their line reports. All of the case study organisations were developing line management skills and confidence among managers to engage effectively with their staff on health and safety matters.

Changing an organisational environment

Changes to the organisational environment to influence the production of desired safety behaviours could include aspects such as:

- remuneration and recognition schemes for desired behaviour. ROK actively communicating and sharing instances of good and desired behaviours of individual members of staff; Crawley Borough Council – Council appraised amount of money donated to charity as result of near-miss reporting

- health and safety targets relating to desired safety behaviours and performance. ConocoPhillips – managers' annual performance contracts include targets for health and

safety performance and set out personal behaviour goals s in relation to safety leadership. Pay is linked to performance.

- integration of health and safety performance with operational performance planning and risk assessment. All of the case study organisations were increasingly moving health and safety to be part of operational and business risk assessment and management.

training for senior management to develop their leadership and competence in understanding and managing business risks. All of the case study organisations had carried out aspects of coaching and training for their senior managers to increase their competence in leading and managing health and safety risks.

In conclusion, it is important to state that the interventions necessary to bring about desired cultural changes will vary from organisation to organisation. As the Conference Board report noted, on the basis of a study of 68 major US companies, there is not a one size fits all solution. This new descriptive model of behaviours and how they can be influenced by the identified elements of culture builds on our existing knowledge and the experience of countless organizations. It is not a universal panacea but rather a tool to assist our understanding of the behavioural problems that need to be addressed and the practical approaches for achieving change in the individual, the working environment and the organisation's environment.

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