

FRAMEWORK FOR CHANGE IN SAFETY CULTURE IN UK CONSTRUCTION

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ABSTRACT

This paper provides an evaluation of safety culture in the construction industry. Firstly, a brief overview of recent changes in accident statistics in UK construction is given. The concept of safety culture is discussed including an assessment of its main characteristics. The cultural changes which health and safety law has sought to bring about in construction are provided. These include top management commitment, employee involvement, training, co-ordination, communication, information sharing, forward planning, risk assessment and control. Research on safety culture in the aviation, mining, nuclear, and offshore sectors is assessed with a view to drawing important lessons for the construction industry. It is concluded that the safety climate or culture of an organisation can be assessed and a toolkit to assist in this process has been developed and published by the UK Health and Safety Executive. However, studies are required to develop this toolkit further to take account of the regulations, risks and management systems that are specific to the construction industry.

Keywords: Health and Safety Law, Accident Statistics, Safety Culture.

1. INTRODUCTION

Many construction workers are killed or injured every year as a result of construction operations. Others suffer ill health. The hazards are not restricted to those working on site. Children and members of the general public are also killed or injured due to inadequate control of construction activities. The construction industry's performance has improved over the years but the rates of death, serious injury and ill health are still too high. Accident rates today in the construction industry are one-quarter of those reported in the 1960s and half those reported in the 1970s. A construction site is a more dangerous workplace in comparison to other places of work. According to the Health and Safety Executive (HSE), those who spend their working lives on construction sites have a 1 in 300 chance of being killed at work (HSE, 1995).

There is still great potential to improve the health and safety record of the industry. The Egan report – a government sponsored review of the UK construction industry published in July 1998 (DETR, 1998) recognised this and argued the industry to provide decent and safe working conditions. Measured in terms of the number of reportable accidents per 100 000 employees in any given year, the report states that some leading clients and

construction companies have achieved reductions in reportable accidents of 50-60% in two years or less. The report challenged construction companies to set targets to reduce the number of reportable accidents annually by 20% in addition to simultaneous improvements in other project performance measures (DETR, 1998). Cultural change throughout the organisation is recognised as one of the ingredients necessary to bring about these safety improvements. Ten years since publication of the Egan report, accident statistics reveal that the targets set in the report have not been achieved.

Safety culture may be considered as a sub-set of organisational culture. In this paper, the ten year targets set in the year 2000 to improve health and safety performance in UK Construction are firstly evaluated. The concept of safety culture is evaluated in this paper including an assessment of its key characteristics. The changes in safety culture which the UK legislative framework has sought to bring about are discussed. Finally, a review of research studies on safety culture in other high-risk industries such as nuclear, offshore, and the mining sectors is provided with a view to drawing important lessons for the construction industry.

2. ACCIDENT STATISTICS IN UK CONSTRUCTION

The UK Government and the HSE also recognised the potential to improve workplace health and safety. In July 2000, they set targets to improve the UK's health and safety record over a ten-year period. The targets set specifically for the construction sector are to (HSE, 2003):

- Reduce the incidence rate of fatalities and major injuries by 40% by 2004/05 and 66% by 2009/10.
- Reduce the incidence rate of cases of work-related ill-health by 20% by 2004/05 and 50% by 2009/10.
- Reduce the number of working days lost per 100,000 workers from work-related injury and ill health by 20% by 2004/05 and by 50% by 2009/10.

The HSE further recognised that cultural change in the industry is necessary to deliver these targets and that such improvements can only be achieved if all those involved in construction projects play their role.

There were 71 fatal injuries to workers in UK Construction in 2004/05, the same number as in 2003/04. The majority of these deaths (28 representing 39%) were due to falls from height. This means that in 2004/05, 32% of all work related deaths in the UK were in the construction industry. In 2000/01, there were 5.9 fatal accidents per 100,000 employees compared to 3.4 per 100,000 in 2004/05. This represents a decrease of 42% in the number of fatal injuries over this particular five year period. In the year 2006/07, there were 77 fatal injuries to workers in construction, a 28% increase on the previous year. Of these 77 fatalities, 50 were employees and 27 were self-employed, compared to 43 and 17 in 2005/6 respectively. In 2006/07, 32% of all worker deaths were in the construction industry. The rate of fatal injury to workers in construction rose to 3.7 per 100,000 workers, from 3.0 per 100,000 workers in 2005/6.

Since 1999/00 there has been a downward trend in the number of major injuries sustained by employees in the UK construction industry. In the period since 2000, there has been a steady drop in the number of major accidents. In 2000/01 there were 380.9 major accidents per 100,000 employees. This dropped to 299.4 per 100,000 in 2004/05. This represented a 21 percent improvement over this five-year period. Furthermore, the rate of major injury to employees decreased by 4% from 370.8 per 100,000 employees in 2006/07 to 295.4 in 2005/06. This continues the general downward trend seen since 1998/99, and is the lowest since the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations were introduced in 1996.

In 2006/07, the most common kind of accident was a slip or trip 988 (27%). As in previous years, falling from a height accounted for a high number of major injuries, 987 (27%). The next two most common kinds of accident were being hit by moving/falling objects (649) accounting for 17%, and being injured while handling, lifting or carrying (525) accounting for 14% of major injuries.

HSE statistics show that the number of workers that sustained non-fatal (includes major and over 3 day) injuries in construction decreased by 8% in the year 2006/7, from 935 to 861 per 100,000 and continuing the downward trend since 1999/2000.

The ten year health and safety targets for the UK construction industry were set in June/July 2000. Today in 2008, it is only two years away from 2010 and therefore an appropriate point to analyse statistics and evaluate whether these well intended goals and targets set by government and the industry will be achieved. The industry aimed to reduce the incident rate of fatalities and major injuries by 40% by 2004/05. The data above shows that the number of fatalities actually fell by 42% which was a good indicator that the goal of a 66% reduction by 2009/10 might well be achieved. Unfortunately, fatal accident rates in the two year period from 2005/06 to 2006/07 show an upward trend. Based on the Labour Force Survey (LFS), the rate of reportable non-fatal injury in construction was 1600 per 100 000 workers (1.6) in 2005/6 and is statistically higher than the average for all industries (1000 per 100,000 workers – 1.0%) (HSE, 2008).

Research carried out into accident rates has shown that small enterprises have a below average health and safety performance across all industries (HSE, 2006). Workplace size has a significant influence on trends in occupational injuries, with Small and Medium Enterprises (SMEs) accounting for proportionately higher rates for major injuries than larger enterprises (Nichols, 1995). Some of the reasons found for SME poor health and safety management performance are due to (Walters, 1998):

- limited resources
- limited knowledge of regulatory resources
- poor awareness of economic advantages of health and safety
- poor knowledge and understanding of safe working practices
- short-term economic pressure and competition
- inadequate enforcement and absence of preventive services.

It should also be noted that there is a dominance of very small companies in the UK Construction industry, with 93% of all registered construction companies employing less than 7 people. It is clearly partly because of this that the construction industry has a poor health and safety record.

3. SAFETY CULTURE

Safety culture can be considered as a particular aspect or subset of organisation culture. No review of safety culture would be complete without an evaluation of the relevant aspects of organisational culture. The definition of safety culture must therefore be consistent with the parent term organisational culture. Establishing a link between safety culture and safety of construction operations requires an understanding of the characteristics of safety culture. Such characteristics must be consistent with the definition and key attributes of organisational culture. The culture on construction sites is inevitably a task culture where individuals may take risks and break rules and procedures to get the job done.

The factors which influence the type of culture in an organisation are (Handy, 1993):

- History of the organisation and its ownership,
- Size of the firm,
- Type of production technology,
- Objectives of the firm,
- The external business environment,
- and finally its people

There is general consensus that there is a difference between the terms organisational culture and organisational climate. Cox and Cheyne (2000) take the view that culture in general and safety culture in particular, is often characterised as an enduring aspect of the organisation with trait-like properties and not easily changed. On the other hand, organisational climate can be viewed as a manifestation of organisational culture. If culture represents the more trait-like properties of personality, climate can be taken to be more of state-like properties of mood.

Cox and Cheyne (2000) argue that climate is a temporal manifestation of culture, which is reflected in the shared perceptions of the organisation at a discrete point in time. Guldenmund (2000) states that organisational climate is commonly conceived as a distinct configuration with limited dimensionality surveyed through self-completion questionnaires and that up to a certain point, objective and semi-quantitative. On the other hand, organisational culture is often determined through a combination of methods including observations, focus groups, interviews, through mutual comparisons and so on. Measures of organisational culture are thus qualitative and difficult to quantify.

Although norms and values remain relatively stable, culture can be learned. That is why a lot of research effort has been directed towards understanding the influences, ingredients

and consequences of culture. The overall objective is to understand these aspects and influence them so as to change the overall culture of the group or organisation.

A culture is a set of norms and beliefs. It is about both individuals and groups of people who share common values and attitudes. The common-sense view of a culture could be summed up in the phrase “the way we do things around here”. The term “safety culture” was first introduced into common use in the nuclear industry following the Chernobyl nuclear accident in 1986. The reasons for the accident were proposed to be not only technical or individual human errors. It was suggested that management, organisation and attitudes also influence safety. In recent years, it has attracted considerable attention in the offshore industry following investigations into the 1988 Piper Alpha disaster in which 192 people died.¹⁸ Other high risk industries in which the concept of safety culture has been researched include tunnelling, mining and aviation.

On the concept of safety culture with specific reference to the construction industry, Anderson (1998) writes: “It is clearly a ‘good thing’. Quite how it should be researched, evaluated and improved within the construction industry is, as yet unclear, but the gains that have been made elsewhere just cannot be ignored.” A comprehensive definition of safety culture which has been widely adopted in research and other scientific publications is one proposed by The Advisory Committee on the Safety of Nuclear Installations (ACSNI). According to the ACSNI (1993), “the safety culture of an organisation is the product of the individual and group values, attitudes, perceptions, competencies and patterns of behaviour that determine the commitment to, and the style and proficiency of, an organisations’ health and safety management. Organisations with a positive safety culture are characterised by communications founded on mutual trust, by shared perceptions of the importance of safety, and by confidence in the efficacy of preventive measures”.

High standards of health and safety will be achievable if people can report errors and near misses. These are a source of vital information. A reporting culture and a learning culture in which people can admit and learn from such genuine mistakes without fear of blame or punishment requires also to establish a just culture in which employees are confident that they will be treated fairly if they report accidents and near misses. Obviously, wilful carelessness cannot be accepted. In any organisation, people should be disciplined or indeed prosecuted for wilful contribution to or creation of conditions in which accidents, injury or ill-health result.

4. CULTURAL CHANGES SOUGHT THROUGH LEGISLATION

The UK government commissioned the first comprehensive review of health and safety law in 1970. Results of this review were embodied in the Robens report which was published in 1972 and led to adoption of the Health and Safety at Work (HSW) Act 1974. The Robens report described in detail the shortcomings of workplace health and safety management as it had evolved in the UK. The HSW Act 1974 was designed to overcome these anomalies. The philosophy behind the HSW Act 1974 was to have an enabling

piece of legislation which applies to virtually all workplaces but with regulations issued from time to time under Section 15 of the Act to cover specific high risk areas. Section 2 of the Act lays down general duties of employers to their employees. Section 3 lays down general duties of employers and the self-employed to persons other than their employees. Employees at work also have general duties laid down under Section 7 of the Act (HMSO, 2000). Detailed specifics of these duties are well known and will not be reproduced here. The HSE was formed under Section 10 of the Act to improve enforcement of health and safety law.

Senior management involvement and commitment to health and safety is required in the HSW Act 1974. Unless an organisation has less than 5 employees, under Section 2(3) of the Act, every employer is required to prepare a written statement of his general policy with respect to health and safety including the organisation and arrangements for carrying out that policy. The statement of the policy and any revisions must be brought to the notice of all his employees. Some authors have criticised this provision of law on the grounds that it merely requires an employer to prepare a safety policy but does not require it to be adequate.

The aim of the HSW Act 1974 was to promote proactive safety management and to a large extent self-regulation, a concept which was advocated in the Robens report. The philosophy embodied in the Act was that competent and committed employers in consultation with their employees would identify hazards, assess risks and implement preventive measures within a framework of law and standards developed with the participation of all the parties. The Robens report and the HSW Act 1974 therefore aimed to promote a positive organisational safety culture. Despite these general duties imposed on employers and employees, some old legislation still continued to exist on the statute book. The change in safety culture sought by the Robens report and indeed the HSW Act 1974 was thus at best uneven and clearly unachievable. The concept of risk assessment was also not explicit in Section 2 of the HSW Act 1974 but merely implied.

The Management of Health and Safety at Work Regulations 1999 require explicit assessment of health and safety risks. Regulation 3 of the Management Regulations 1999 requires all employers and the self-employed to assess risks to their employees and any others who may be affected by their work or conduct of their operations. Risk assessments must be suitable and sufficient. Preventive and protective measures must be applied following such risk assessments. The following principles of prevention are laid down in Regulation 4 and must be considered in designing protective and prevention measures. They are (Perry, 2003):

- If possible avoid risks altogether,
- Evaluate risks which cannot be avoided,
- Combat risks at source,
- Adapt the work to the requirements of the individual,
- Take advantage of technological progress,
- Replace the dangerous with the non-dangerous or less dangerous,

- Implement risk assessment measures as part of a coherent policy and approach that takes into account work organisation, working conditions, the environment and any social factors,
- Give priority to collective protective measures over individual protective measures,
- Provide appropriate instruction to employees and the self-employed to ensure they all understand what to do.

Guidance to the Management Regulations 1999 requires development of a positive health and safety culture within the organisation. Avoidance, prevention and reduction of risks are expected to be part of every organisation's approach to all its activities. This should be the case throughout the organisation and must be recognised as such from junior employees to senior management. Regulation 5 requires every employer to manage health and safety arrangements in very much the same way that other important aspects of the business such as profits or sales are managed. The regulation imposes a requirement on every employer organisation to plan, organise, control, monitor and review its health and safety preventive and protective measures.

The concept of risk assessment is the cornerstone of modern health and safety legislation. Several regulations relevant to the construction industry require explicit health and safety risk assessments. Repeal of old health and safety law is now almost complete. The HSW Act 1974, Management Regulations 1999 and other modern regulations passed under Section 15 of the Act offer the UK construction industry a chance to develop a safety culture of forward planning, organisation and control to manage health and safety risks. They offer organisations the opportunity to develop mechanisms of self-regulation within a statutory framework first envisaged in the Robens report.

Active employee involvement in management of health and safety is also required in law and provided for through the Safety Representatives and Safety Committee Regulations 1977. These regulations provide for the appointment of safety representatives from among the employees by recognised trade unions. The employer has a legal obligation to consult such representatives on matters of health and safety at work. Safety representatives have powers to investigate potential hazards and dangerous occurrences at work and causes of any accidents. They can investigate complaints by employees and make representations to the employer on health and safety matters. They can carry out inspections of the workplace provided they give written notice to the employer. Even in organisations without recognised trade unions, the employer is required under the Health and Safety (Consultation with Employees) Regulations 1996 to consult representatives of employee safety.

Modern health and safety law also aims to promote a culture of training and information sharing. For example, Regulation 13 of the Management Regulations 1999 requires all employees to be provided with adequate health and safety training. Such training should be provided on first recruitment to the job and on being exposed to new or increased risks. Changes in risk exposure may result from change of job responsibilities, introduction of new work equipment, technology or systems of work. Regulation 10

requires every employer to provide his employees with relevant and understandable information on risk assessments and preventive or control measures put in place by the employer. Other information which the employer must provide includes emergency evacuation procedures including fire evacuation, the identity of competent persons appointed by the employer to assist with overseeing such evacuations and any information on risks passed to the employer by other employers.

In the UK, there has recently been another major and recent change in health and safety law. The Construction (Design and Management) Regulations 2007 took effect on 6th April 2007. The CDM regulations 2007 are comprehensive and apply to all construction work. The declared objectives of the CDM Regulations 2007 are to:

- Improve overall planning and management of a project from the early stages
- To improve health and safety risk identification and management
- To eliminate unnecessary bureaucracy
- To target resources and effort where they are likely to maximise benefits in terms of health and safety performance.

For the benefit of readers who will be familiar with the CDM Regulations 1994, the key changes are these:

The Construction (Health, Safety and Welfare) Regulations 1996 have been repealed. Its provisions are now incorporated as part 4 of the CDM Regulations 2007. It should also be noted that provisions which were in the Construction (Health, Safety, and Welfare) Regulations 1996 relating to work at heights are incorporated in the Working at Heights Regulations 2005.

The CDM Regulations 1994 applied to all demolition and dismantling work regardless of the length of time or the number of people involved in carrying out the work. There are now no special provisions for demolition or dismantling work under the CDM Regulations 2007 other than to have a written plan of work before the demolition or dismantling begins (Regulation 29).

The CDM Regulations 1994 applied to all notifiable projects. They also applied to other construction work unless the work was expected to last less than 30 days and involve less than five people on site at any time. The five person rule does not exist in the CDM regulations 2007. The threshold for notification of a project to the HSE remains unchanged at 30 days or 500 person days. Where a project is notifiable, additional legal obligations specified in Part 3 of the CDM Regulations 2007 apply. For a project that is not notifiable, parts 2 and 4 of the CDM Regulations 2007 apply. Thus, the CDM regulations 2007 apply to all construction projects. There are no exemptions or disapplications. The only special case is domestic clients. Domestic clients do not have legal duties under CDM 2007.

Clients and contractors must tell those that they appoint how much time they have allowed to plan and prepare for construction work (mobilisation time).

In relation to project notification which is normally undertaken using Form F10, there is now an obligation to provide extra information. Specifically, the time allowed by the client to the principal contractor for planning and preparation for construction work must

be included in the information to the HSE. The name and address of any designer already engaged must also now be provided.

The Planning Supervisor role has been removed and replaced with a new duty holder of the CDM Co-ordinator.

Designers still have legal obligations to consider the hierarchy of risk control whenever they design a structure. There is however now an additional duty on designers to ensure that any workplace they design complies with the Workplace (Health, Safety and Welfare) Regulations 1992.

The Pretender Health and Safety Plan under the CDM Regulations 1994 Regulations has been removed and replaced by Pre-Construction Information in the new Regulations.

There are enhanced client duties to ensure that other duty holders have made adequate arrangements to ensure the health and safety of those working on the project including welfare facilities.

The provision for a Clients agent which was permissible in the CDM Regulations 1994 has been removed. Clients can still of course appoint consultants to act as their agents but must note that they still retain criminal liability.

A number of provisions which were implicit in the CDM regulations 1994 have been made explicit in the CDM Regulations 2007. For example, CDM Co-ordinators must prepare a health and safety file or update it if one exists. Under the CDM regulations 1994, the Planning Supervisor only had a legal obligation to ensure that this was done. By implication, this means that the Planning Supervisor could delegate or sub-contract the actual preparation of the file to another individual or company.

There is greater clarity regarding the criteria and procedures for assessment of competence of individuals and companies, contractors, designers, CDM Co-ordinators, etc.

The CDM regulations 2007 are designed to promote a culture of co-operation, communication and sharing of information, planning, organisation and control. Pre-Construction Information, the construction phase health and safety plan and the health and safety file are all designed to facilitate this. A fundamental requirement of CDM is the duty to undertake timely risk assessments, and to develop control solutions that provide continuing protection for every one potentially at risk. The systems approach to health and safety management introduced by CDM has the potential to produce health and safety benefits. The risk assessment process begins with the Client. Commissioning the following surveys would not be unreasonable:

- Asbestos survey
- Building Services survey
- Contaminated land survey
- Environmental noise survey
- Structural survey

Clients are expected to face extra costs if they are to comply with the CDM Regulations 2007. These costs depend on the size and complexity of the projects. The estimates costs according to the New Civil Engineer are as follows (NCE, 2007)

Project Size (Cost)	Costs of CDM 2007
Very large (£20m)	£30,000
Large (£10m)	£25,000
Medium (£5m)	£25,000
Small (£300,000)	£850
Very Small (£50,000)	£500

Perry (2003) lists some HSE criticisms of the construction phase health and safety plans. They are:

- Construction phase health and safety plans do not focus sufficiently on risk assessments

Site supervisors and managers have limited knowledge of health, safety and welfare requirements.

Site supervisors and managers are unaware of the contents of the construction phase health and safety plan.

Some sources of risk including site-wide activities are not taken into account in health and safety risks assessments,

Plans do not lay down in sufficient detail welfare provisions

The implications of tight schedules on project health and safety are rarely recognised in risk assessments

- Fire safety is often overlooked

5. SAFETY CULTURE IN OTHER HIGH-RISK INDUSTRIES

According to Laurence (2005), a positive safety culture requires:

- Higher management commitment to safety
- Open communication channels
- A stable, experienced workforce
- High quality housekeeping
- A safety emphasis on training
- Full-time safety personnel reporting to top management.

A positive safety culture provides a platform on which to build greater awareness, understanding, and compliance with safety rules and regulations. Although research by Laurence (2005) did not focus on safety culture in the mining industry per se, analysis of responses from 500 mineworkers on the development of more effective mine safety rules and regulations revealed that:

- Management and regulators should not continue to produce more and more safety rules and regulations to cover every aspect of mining because miners will not read nor comprehend this level of detail.

- Detailed prescriptive regulations, detailed safe work procedures, voluminous safety management plans will not influence activities or behaviour of a miner. The aim should be to develop a framework of fewer rules but of the highest quality.
- Achieving more effective rules and regulations is not the only answer to a safer workplace. Emphasis should be placed on ensuring that a positive safety culture exists and that communication channels are open and working well.

The Piper Alpha disaster led to a fundamental review of health and safety law in the offshore oil and gas processing sectors in the UK. A lot of research was also initiated although these efforts were initially focussed on improvements in technology and management systems. Cox and Cheyne (2000) take the view that further improvements in safety in the offshore sector may best be realised through enhanced efforts in the areas of human factors and through associated developments in health and safety.

Cox and Cheyne (2000) carried out extensive research on safety culture in the offshore industry and have developed, tested and validated a safety climate assessment toolkit. The key areas which can be "measured" using the model on a scale of 1 to 10 in relation to health and safety culture or climate are:

- Management commitment
- Communication
- Safety systems
- Work environment
- Supportive environment
- Involvement
- Co-operation
- Personal appreciation of risk
- Personal priorities
- Competence
- Management style

Use of such a toolkit brings a number of benefits. The first is that it can raise the profile of health and safety in the organisation. Secondly, it allows active monitoring of the health and safety culture in the firm. Thirdly, it provides an opportunity to discuss openly issues relating to health and safety culture and encourages participation of all workers in health and safety matters. Finally, the performance of the firm can also be benchmarked against the performance of similar firms in the sector.

In their international report, Sese' et al (2002) note that there has been a general improvement in occupational health and safety in Spain in the last ten years. This is mainly due to enacting the Law of Prevention of Labour Risks in 1995. This body of Spanish law also promotes the concept of proactive accident prevention and a positive safety culture. Despite the general improvement in safety, Spain still has the highest incident rate for nonfatal occupational accidents in the European Union and occupies third place for fatal accidents. The fatal incidence rate per 100,000 persons in employment is 5.5 in Spain compared to 1.6 in the UK. Sese' et al (2002) also report that

behaviour based safety programs for enhancing safety behaviour are not widespread in Spain. Workplace behaviour in Spain is to a large extent governed by a culture of fulfilment of legal obligations mainly due to prosecutions for unsafe behaviour. There is no real intervention for reinforcement of safe work behaviour. It is recommended that a multi-disciplinary approach where human behaviour plays an important role is essential to improve health and safety performance in Spain.

Gurjeet and Gurvinder (2004) report findings of research based on a very extensive survey of businesses and individuals in the aviation industry in New Zealand. They reiterate the view that a positive safety culture will thrive where there is a senior management commitment to safety. Their study revealed that aircraft maintenance businesses considered positive safety practices and safety education as the two most important factors for ensuring safety. Furthermore, aircraft maintenance engineers considered positive safety practices, safety education, implementation of safety policies and procedures to be the most important aspects in ensuring safety in the aircraft maintenance system. They found that a positive safety sub-culture appeared to have emerged amongst aircraft maintenance engineers. This is a sub-culture of commitment to ensuring safety by strongly following standards, regulatory procedures and safety practices. This was a positive finding given that 12 percent of major aviation disasters are due to inspection maintenance inadequacy. The study also revealed that pilots considered luck to a significant contributor to safety. Overall they concluded that various sectors in the aviation industry need to do more to improve the prevailing safety culture.

Findings on a comprehensive study of safety culture in the nuclear industry are presented in Lee and Harrison (2000) and conclude that personnel safety surveys can be usefully applied to deliver a multi-perspective, comprehensive and economical assessment of the safety culture in an organisation and to explore the dynamic inter-relationships of its composition or parts. They also comment on the HSE's Health and Safety Climate Assessment Toolkit based on Guidance HSG65 entitled "Successful Health and Safety Management"²¹. This signifies official endorsement of health and safety climate or culture assessment by the UK regulatory body. It should however be noted that Guidance HSG65 provides generic guidance for planning, organisation and control of health and safety across all workplaces. Clearly, risks, safety problems and safety management will differ from sector to sector although there are bound to be similarities. This HSE Safety Climate Assessment Toolkit ought to be developed further so that it is customised for relevant sectors such as agriculture, construction, offshore oil extraction, manufacturing or service sectors to take account of the risks and management procedures and systems in different industries.

6. CONCLUSIONS

The concept of safety culture has been defined and discussed in this paper. It is the shared and learned knowledge, experiences and interpretations of safety which guide employees' attitudes and actions towards hazards, risks and their prevention. Safety culture is shaped by people working together in organisational structures and social relationships in the

workplace. This paper has provided a brief review of accident statistics in UK construction. Although the long-term safety performance of the industry has improved in recent years, there is no evidence to show that the targets set for 2009/10 will be achieved. In fact, the rate of fatal injury to workers in construction rose to 3.7 per 100,000 workers in 2006/07 from 3.0 per 100,000 workers in 2005/06. Furthermore, the actual number of reported major injuries to employees rose slightly in 2006/07 to 3,711 compared to 3,706 in 2005/06

The Robens' committee report that led to enactment of the HSW Act 1974 in the UK aimed to promote a culture of self-regulation within a statutory framework. This was not achieved initially because of the presence of wide ranging legislation on the statute book. However progressive repeal of old legislation is now virtually complete. The substantive body of health and safety law is now the HSW Act 1974 supplemented by the various regulations made under Section 15 of the Act. The Management of Health and Safety at Work Regulations 1999 make explicit the provisions of the HSW Act 1974. The Act and the Management Regulations aim to promote a culture of planning, organisation and control of risks arising from workplace activities. They also aim to promote a culture of training, communication and information sharing.

There has been a recent and major change in health and safety law in the UK. The CDM regulations 2007 aim to promote a culture of good safety management with emphasis on avoidance, mitigation and management of construction health and safety risks. The philosophy is to involve everyone in the management process through proper planning and co-ordination of the phases of a construction project. The CDM Regulations 2007 aim to promote a culture of sharing and communicating information including keeping a proper record of information to promote health and safety during subsequent use, cleaning, maintenance and eventual demolition of the structure.

The construction industry could improve its health and safety performance further by improving its safety culture. This is in addition to developing a culture of generating, distributing and acquiring knowledge on hazard causation and control (a learning culture). All managers and employees must be motivated to willingly expend effort to minimise health and safety risks. Good health and safety management is the product of effective harmonisation of technical and managerial systems including human factors. If one of them is absent or poorly in evidence, the product of effective management and potential for improvement is severely undermined.

There has been a substantial amount of research into the concept of safety culture in the aviation, mining, nuclear, and offshore industries. The safety culture of an organisation can be measured or assessed and indeed improved over a period of time. This has been recognised by the Health and Safety Executive which has issued a Health and Safety Climate Assessment Toolkit. This toolkit is however based on generic HSE Guidance document HSG65 - successful management of health and safety. Further research is required to customise this Toolkit and develop it further to take account of specific legislation, hazards and management systems which are applicable to the construction industry.

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