



# Proactive occupational safety and health management: Promoting good health and good business



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## ARTICLE INFO

### Article history:

Received 23 September 2014

Received in revised form 8 June 2015

Accepted 11 June 2015

Available online 3 July 2015

### Keywords:

Safety management

Learning and training

Safety culture

Organisational performance

Employee health and well-being

## ABSTRACT

This research assessed the impact of organisational approaches to occupational safety and health (OSH) management on organisational performance, safety climate, employee attitudes, health and well-being. Interviews with health and safety personnel, company directors and worker representatives were used to categorise the organisations according to their approaches to OSH management, using the Continuous Improvement Cycle model (Budworth and Khan, 2003). A cross-sectional survey of 2067 employees from these organisations examined the impact of company size, industrial sector and approach to OSH management on indicators of organisational performance and employee outcomes. A structured questionnaire assessed demographic characteristics, organisation and job tenure, job satisfaction, organisational commitment, intention to quit and job motivation, safety climate, self-reported absence, performance and work-related ill-health. Organisations were also asked to provide data on profit, performance, accidents and absence indices. Organisations adopting a proactive approach to OSH management reported higher profit margins and lower accident rates, however these differences were not statistically significant. Organisations classified as 'very good' were found to show significantly more positive safety climate perceptions across eight out of the nine safety climate dimensions. Employees in proactive organisations were significantly more committed to their organisations and showed greater job satisfaction than employees in organisations categorised as 'yet to be fully engaged/complier'. Positive safety climate perceptions and organisational attitudes were associated with better self-reported physical and mental health. The findings add to the validation of the CIC model as an assessment and learning tool which may support the transition of organisations from reactive to proactive safety culture.

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## 1. Introduction

The latest statistics on work-related health and safety in the UK indicate that 27 million days were lost in 2011/2012 due to work-related ill-health or injury (Health and Safety Executive, 2013). It is clear that work related ill health, accidents and injuries present a significant financial cost to the UK economy. The social and personal burden of work-related ill health and safety failures is felt by employers, employees and their families, who often experience the effects long after the event (Marson, 2001).

Despite the obvious need to manage health and safety, many organisations do not give health and safety the priority it deserves. This may be due to a lack of knowledge, skills and motivation or limited staff resources. Another barrier can be a concern from

managers anticipating increased demands from employees if occupational safety and health (OSH) issues are brought into the open. Some organisations perceive health and safety as daunting and distracting bureaucracy. Cost is also an important issue, with companies feeling that they lack the capital necessary to make proper investment in health and safety and failing to appreciate the importance this investment (Dorman, 2000). In reality, competent OSH management reduces accidents, injuries and ill-health, and is likely to increase profitability (Tompa et al., 2009) however, these benefits are not always understood by organisations.

Measuring the cost of accidents and work-related ill health is a major challenge for many organisations. In a study of 129 UK organisations, it was found that whilst 25% had attempted to measure accident costs, none had systematically quantified work-related illness costs, and most participants were unaware of how much health and safety failures were costing their business (Haefeli et al., 2005). Miller and Haslam (2009) suggest that a cost

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rather than a value attitude, and a lack of recognition of the business case presents a significant barrier to organisations investing in improved OSH management.

Previous research on the impact of effective OSH management has focused largely on the financial benefits. One study presented 19 case studies demonstrating the costs and benefits of effective health and safety initiatives in organisations across a variety of industry sectors (Marsden et al., 2004). These benefits included cost savings such as improved absence management and reductions in specific occupational injuries (e.g. manual handling injuries). Indeed, the case for demonstrating the economic value of occupational health and safety investments and interventions is growing across academic, public policy and industry arenas (Baril-Gingras et al., 2006; Tompa et al., 2009). However, the value of OSH investments is by its very nature multi-faceted, with indices used to measure value extending across objective measures (e.g. turnover, absence, etc.) and subjective measures (e.g. employee attitudes, etc.) (Miller and Murphy, 2006).

Michael et al. (2005) suggest that employee perceptions of management's concern for employee well-being through a dedication to safety may result in positive outcomes beyond improved safety performance. Perceived management commitment to safety has been linked to employee attitudes such as: job satisfaction, organisational commitment and turnover (Michael et al., 2005; Zanko and Dawson, 2012). A meta-analysis by Faragher et al. (2005) found evidence that job satisfaction was associated with workers' mental health but the evidence for a link with subjective physical health was weaker.

Previous research has attempted to consider the maturation of organisational safety culture, and a number of different models have been proposed for classifying organisations by their OSH approach and the transition of organisational culture. Parker et al. (2006) used a framework of five levels of OSH culture developing on work from Westrum (1993) and Reason (1997) to test the validity of this framework for classifying organisations and promoting positive safety culture. Assessment of organisational safety culture can be a useful tool empowering organisations to learn about their current culture and begin to develop more proactive OSH culture.

The aim of this study was to explore the impact of proactive OSH management on both organisational performance and employee health and well-being. The method used in this research to classify organisations on the basis of their approach to OSH management is a framework known as the Continuous Improvement Cycle (CIC) model (Budworth and Khan, 2003). This framework was designed to be used by practitioners as a tool to determine how organisations, groups or individuals could be categorised by their view on health and safety, with the aim of helping them move on to the next level and improve their health and safety performance. The CIC model is like other systematic safety culture and cultural maturity models, in that it is based on the idea that organisations can be categorised into stages of development according to their approach to OSH management. The model identifies three main stages: those that are 'yet to be fully engaged', those that are simply 'compliers', and those that are more proactive, described as 'very good'.

This model shares the concept of a 'staged' approach to development of OSH management and safety culture with other systematic models, in that it identifies different levels of safety management and how organisations can move between levels. However, the primary reason for choosing this model above similar models is that the CIC framework was designed by practitioners and academics from across different industries, and is not focused on any one sector or sample population. Furthermore, the CIC model was designed as a tool to discriminate how organisations

approach OSH management, and therefore the focus is perhaps wider than models concerning just safety culture.

Drupsteen and Wybo (2014) state that the majority of organisations use experience of past safety related incidents to learn and improve safety and these authors developed a set of indicators for the propensity to learn from past safety related experience (attitudes, organisational conditions and systems). The use of the CIC model in the present study considers attitudes, organisational conditions and systems when classifying organisations into CIC categories by examining attitudes towards OSH, priorities for OSH management, management commitment, stakeholder involvement, training and communication, improvement to health and safety and formalisation of OSH management. The CIC model is focused on progression, facilitating organisations to move from one level to the next by identifying OSH culture and presenting organisations with a summary of the areas that could be improved to progress to the next level.

The present study employed the CIC framework to categorise organisations on the basis of their approach to OSH management, using data from semi-structured interviews with key stakeholders in the organisation. The CIC categories were then examined for their associations with organisational level 'objective' or economic outcomes (e.g. accident statistics, absence figures) and employee level attitudinal and well-being outcomes (using data from an employee survey). This study extends the previous research in a number of ways. First, it adds to both the 'perceived organisational support' and safety culture literature by examining the impact of a staged model of OSH management upon both 'objective' organisational level and 'subjective' employee level attitudes and health and well-being. It further builds on earlier work by combining these outcomes with an investigation of how the 'espoused' approach to safety is related to safety climate perceptions. It is hypothesised that proactive organisations will have improved performance and better employee outcomes. Finally, the study considers how an organisation's approach to OSH is related to outcomes across different organisational sizes, and between public and private sectors. The objectives were to:

- Undertake comparisons between organisational size and sector to understand how this affects OSH management and organisational culture and performance.
- Examine the relationship between OSH activity and organisational outcomes (e.g. absence, accidents, turnover).
- Examine the relationship between OSH activity and employee outcomes (e.g. employee attitudes, health and well-being and safety climate perceptions).

## 2. Method

### 2.1. Study design

The study employed a mixed methods cross-sectional design. The first part of the study consisted of a series of semi-structured interviews with key stakeholders in participating organisations. The second phase involved a survey of employees from these organisations.

### 2.2. Organisational sample

The study recruited 31 organisations across a variety of industries, with the sample incorporating small (<50 staff), medium (50–250 staff) and large (>250 staff) organisations. The employee survey comprised 2067 responses from across the organisations.

### 2.3. Recruitment

Purposive sampling allowed targeting of organisations across organisational sizes (small, medium and large) and industries, to ensure a wide range of organisations were represented. The first stage of recruitment involved an initial press release followed up with input into health and safety related publications and networks as well as local radio. Organisations were also identified using the commercially available business database ‘Thompson Business Search Pro®’. Identified organisations were then approached directly using phone calls, emails or by letter.

### 2.4. Stakeholder interviews

#### 2.4.1. Sample

The study employed a ‘triangulation’ approach, whereby different stakeholders from each participating organisation were interviewed to gauge an accurate picture of the organisation’s approach to OSH management. Respondents included senior managers, H&S personnel and trade union representatives.

#### 2.4.2. Interview schedule and protocol

The interview was designed to ascertain the approach to OSH management within participating organisations. A number of resources were used to inform the development of the interview schedule including [IOSH \(2003a,b, 2005\)](#) guidance reports on best practice for OSH professionals and management systems; Department of Trade and Industry ([www.dti.gov.uk](http://www.dti.gov.uk)) and Health and Safety Executive ([www.hse.gov.uk](http://www.hse.gov.uk)) websites. From these a set of questions were prepared, before being grouped into ten themes:

- Background to OSH function and personnel
- Attitudes towards OSH management
- Priorities of OSH management
- Management commitment
- Stakeholder involvement
- Training and communication of OSH information
- Future OSH improvements
- OSH management systems
- Monitoring of OSH activity
- Audit and benchmarking of OSH activity

A draft interview schedule was developed which was piloted on OSH professionals based at Loughborough University, which after a number of minor amendments, led to the finalised version. The corresponding author can be contacted for a copy of the interview schedule. All interviews with employees were conducted by the Research Associate on a face-to-face basis in their place of work. All interviews were recorded and transcribed. The time taken for the interviews ranged from 18 min to 1 h 41 min.

### 2.5. Employee survey

The employee survey aimed to assess job attitudes, motivation and commitment to the organisation as well as safety climate and self-reported health and well-being.

#### 2.5.1. Questionnaire development

Measures were chosen on the basis of their reliability and validity, with practical issues also considered with respect to length and readability. Consideration was also given to what factors might be correlated with the study variables, which therefore needed to be controlled for in the analyses. Such factors were included in the background information section at the beginning of the questionnaire. Once the questionnaire had been drafted and agreed by the research team, it was piloted on 10 volunteers. These

volunteers were chosen to provide a pilot sample that spanned age, gender as well as a variety of different job types. The volunteers were asked to note how long it took to complete, as well as any comments about content or layout of the questionnaire. Following this feedback process, a few minor changes were made to the questionnaire, prior to administering the survey across the organisations.

#### 2.5.2. Questionnaire variables

Participants were asked their age, gender, organisational and job tenure, job type (full-time, part-time, job-share, or fixed-term/casual), and if they had supervisory or management responsibilities. In addition, participants were asked to give their ethnic or national origin using a free response format, the answers to which were coded at the point of data entry. In order to ascertain some indication of socio-economic status, which is known to be correlated with health outcomes, participants were asked to indicate their highest educational qualification, and their current full-time equivalent salary.

Organisational commitment was measured using a 9-item scale developed by [Cook and Wall \(1980\)](#). Participants were asked to rate each item using a 7-point Likert-type scale, where 1 = ‘strongly disagree’ to 7 = ‘strongly agree’. This measure contains three subscales relating to ‘identification’, ‘involvement’ and ‘loyalty’, with these subscales summed to give an overall commitment score (with a range of 9–63, and high scores indicating high commitment). This measure showed good internal consistency ( $\alpha = 0.875$ ).

Job satisfaction was measured using a 3-item scale taken from the Michigan Organizational Assessment Questionnaire ([Cammann et al., 1979](#)). Participants were asked to respond on a 7-point Likert-type scale, where 1 = ‘strongly disagree’ to 7 = ‘strongly agree’. The scale is scored by averaging the responses, with a possible range of 1–7, with high scores indicating high levels of job satisfaction. Reliability was good for this scale, with a Cronbach’s alpha of  $\alpha = 0.873$ .

Intention to quit was measured using another scale from the Michigan Organizational Assessment Questionnaire ([Cammann et al., 1979](#)). This 3-item scale is split into two sections, with the first item asking participants to identify ‘how likely is it that you will actively look for a new job in the next year?’ using a 7-point Likert-type scale where 1 = ‘not at all likely’ to 7 = ‘extremely likely’. The next two questions ask respondents to rate the extent to which they agree with the statements: ‘I often think about leaving my job’ and ‘I will probably look for a new job in the next year’ using a different 7-point Likert-type scale where 1 = ‘strongly disagree’ to 7 = ‘strongly agree’. The measure is scored by calculating the average response across the 3 items, with a possible range of 1–7, with high scores indicating a strong intention to leave the job ( $\alpha = 0.875$ ).

Intrinsic job motivation was measured using a 6-item scale developed by [Warr et al. \(1979\)](#) defined as “the degree to which a person wants to work well in his or her job in order to achieve intrinsic satisfaction” ([Warr et al., 1979, p. 135](#)). Responses are given to each statement using a 7-point Likert-type scale, where 1 = ‘strongly disagree’ to 7 = ‘strongly agree’. Responses are summed to produce a score for the measure, with a range of 6–42, with high scores equating to high intrinsic job motivation. This measure showed good internal consistency ( $\alpha = 0.803$ ).

Self-reported absence and performance were measured using a number of questions from the World Health Organization’s Health and Work Performance Questionnaire (HPQ) ([Kessler et al., 2003](#)). In terms of absence, participants were asked to report how many days they had missed due to problems with their physical or mental health, over the previous 4 week period. Self-reported performance was assessed by asking participants to rate their overall job performance over the previous 4 week period, using a 0–10 Likert-type scale, where 0 = worst performance and 10 = top performance.

Work-related ill-health was assessed using questions from the Health and Safety Executive (HSE) Labour Force Survey (Health and Safety Executive, 2006). Participants were asked two questions relating to occupational illness. First, respondents were asked if over the previous 12 months they had suffered from an illness, disability, or other physical or mental health problem that they believed was caused or made worse by their job. This question encompassed a range of possible physical and mental work-related health issues. Respondents were then asked how many illnesses they had experienced over the past 12 months that they believed were caused or made worse by their job. This question is more specific to work-related illness.

Employee health and well-being was assessed using the SF-36 Health Survey version 2 (Ware and Sherbourne, 1992). This measure is one of the most widely used functional health surveys in health research (Ferguson et al., 2002), and has been found to be a valid and reliable measure across both US and UK samples (Jenkinson et al., 1999). The SF-36 addresses eight areas of functioning and well-being, which together address both physical and mental health. For each dimension, item scores are coded, summed and transformed onto a scale from 0 (worst possible health state) to 100 (best possible health state). Reliability of the subscales used in this research were all high, with Cronbach's alpha statistics of 0.801 (general health), 0.847 (mental health) and 0.853 (vitality).

Safety climate was measured using the short-form version of the Safety Climate Assessment (Cox and Cheyne, 1999). This 18-item measure assesses the 'tangible' outputs of an organisation's safety culture, for example how employees may "perceive and describe the importance given to safety issues...and how local arrangements seem to reflect this" (Cox and Cheyne, 2000, p. 6). The toolkit has been tested across a number of industries (Whysall et al., 2005), making it appropriate to use in research conducted across a variety of industries and occupational groups. The measure asks participants to rate the extent to which they agree with the 18 statements, where 1 = 'strongly disagree' to 7 = 'strongly agree'. The measure represents nine dimensions of safety climate:

*Management Commitment* – employee perceptions of management's overt commitment to health and safety issues.

*Communication* – nature and efficiency of health and safety communications within the organisation.

*Priority of Safety* – relative status of health and safety issues within the organisation.

*Safety Rules and Procedures* – views on the efficacy and necessity of rules and procedures.

*Supportive Environment* – nature of the social environment at work, and the support for health and safety derived from it.

*Involvement* – extent to which safety is a focus for everyone and all are involved.

*Personal Priorities and Need for Safety* – the individual's view of their own health and safety management and the need to be safe.

*Personal Appreciation of Risk* – how individuals view the risk associated with work.

*Physical Work Environment* – perception of the nature of the physical environment.

These nine dimensions are assessed by two items each. Following the approach advised by Cox and Cheyne (1999) the scores for each dimension were summed to produce a range from 2 to 10 per dimension, and an overall safety climate score of 18–90, with higher scores equating to more positive attitudes towards the safety climate. The inter-item correlations showed a moderate to good internal consistency for each of the safety climate facets, with correlations ranging between 0.412 and 0.836, with a mean correlation of 0.652.

### 2.5.3. Questionnaire distribution

The research team liaised with the contact from each organisation to identify the target sample within each organisation, with three main options presented: (a) to sample all staff, (b) to sample discrete groups of staff (i.e. a department, site or occupational group), or (c) to target a stratified and representative sample of staff from across the organisation. In practice, each of these three sampling strategies was employed across the 31 organisations, although most small organisations targeted all staff, with the larger organisations tending to target discrete sites.

Organisations were provided with questionnaire packs which contained a copy of the questionnaire and a freepost envelope. Participants were asked to complete the questionnaire and return it direct to the research team using the freepost envelope enclosed in the pack. This returns policy was employed to reassure participants as to the anonymity of the process, as well as underlining the independent nature of the research.

In order to maximise response rates, a number of strategies were employed. First, each organisation was encouraged to publicise the project widely across staff prior to distribution of the questionnaire. This was done by email, newsletter or poster, with a view to raising awareness of the project and the anticipated outcomes. The research team was often involved in drafting publicity material for organisations, in order to maintain the quality of information available to potential respondents. The second strategy employed to increase response rates was to ask key contacts within organisations to contact staff a few weeks after distribution of the questionnaire, to encourage them to return their questionnaire, by reiterating the nature of the study and the importance of their contribution.

### 2.6. Organisational performance outcomes

In addition to the interview and employee survey data, participating organisations were also asked to provide information on a number of performance, accidents and absence indices. This allowed an examination of more objective performance outcomes alongside the subjective employee level data of the survey. Participating companies were asked to provide data on:

*Profit margin* – conceptualised as financial gain or excess of returns over outlays, and was measured as a percentage of turnover.

*Staff turnover* – measured as the number of leavers over the previous 12 months as a percentage of total staff.

*Number of reportable accidents (>3 days)* – number of reportable (over 3 days absence) accidents over the previous 12 months.

*Number of non-reportable accidents (≤3 days)* – number of non-reportable (under 3 days absence) accidents over the previous 12 months.

*Total number of accidents* – number of all accidents combined.

*Number of days lost due to accident or injury* – measured as the total number of days lost through accidents/injury over the previous 12 months.

*Total level of sickness absence* – measured as the number of days lost due to sickness absence over the previous 12 months.

### 2.7. Analysis

The qualitative analysis aimed to identify themes from the stakeholder interviews, which could be used as key indicators across the CIC categories. To do this, the transcribed interview data was analysed using template analysis (King, 2004). The interview transcripts for each organisation were reviewed to identify evidence for the key OSH indicators and drivers, allowing their categorisation in terms of the three approaches to OSH management

outlined in the CIC model. The categorisation process highlighted that few organisations ‘fitted’ exactly into one category defined by the CIC framework, however the category for each organisation was defined as that for which there was the most evidence. Table 1 outlines the CIC categories and details the: drivers; differences from lower levels; issues; and what is needed to get to the next level. The categorisation process was conducted by two members of the research team independently, after which time the researchers reviewed their results and to achieve consensus on the final categorisation of each organisation. There was a high level of initial agreement between the two independent researchers suggesting reliability in the categorisation process.

All questionnaires from the employee surveys were entered into SPSS (Version 20.0. Armonk, NY: IBM Corp.). Analysis proceeded with data screening, to identify any outliers and data entry errors. This was followed by a number of tests to assess normality, homogeneity of variance and other key assumptions of parametric statistics. Reliability for the main study variables was assessed using Cronbach’s Alpha. Descriptive statistics for the data were then produced, followed by a set of correlations between the main study variables to identify key covariates for the main analysis. For all multivariate analyses the following individual level covariates were controlled:

- age
- gender
- organisational tenure

- job tenure
- job hours
- ethnicity/national origin
- supervisory status
- socio-economic status (educational level and salary combined score)

The organisational performance and employee level variables were first compared on the basis of public vs. private sector and organisational size to identify if there were differences across public and private sectors, and between small, medium and large organisations in terms of the organisational and employee outcomes. The analysis then proceeded with an examination of the principal research question – whether a ‘proactive’ approach to OSH management is associated with benefits for both employers and employees. Using the categorisation of the organisations outlined above, the organisational performance data and the employee levels outcomes could be compared between different categories of OSH approach.

In order to examine whether sector, size and the approach to OSH management are related to differences in employee level outcomes, three multivariate analysis of covariance (MANCOVA) analyses were conducted. This test allows differences in a number of outcome variables to be tested simultaneously, whilst controlling for the effects of potential confounding variables (covariates). From the correlation matrix a number of confounding variables were identified, and these were controlled for in order to ensure

**Table 1**  
Continuous improvement model classification.

CIC category	Yet to be fully engaged	Complier	Very good
Basic drivers	Enforcement Regulation Insurance Cost	Enforcement Regulation Insurance Cost Humanitarian concerns Benchmarking Embarrassment if caught	Cost – investing in health to save in the future Insurance Humanitarian concerns translated into action Understanding Desire to be excellent Reputation/brand image Corporate social responsibility
Differences from lower level		Awareness – higher level Resources applied to health and safety management Expertise – some limited access to advice	Awareness – understanding of business costs of poor performance Awareness – occupational health staff better able to articulate arguments and persuade senior managers Size (in some cases) – large companies often see more health problems and therefore they become business issues Expertise – a high level is often available in-house Visible senior management commitment Measurement
Issues	Lack of awareness of occupational health issues Lack of awareness of the scale and severity of the problem	Occupational health often not integrated into day-to-day management Line managers do not perceive need to manage ‘softer’ issues Often restricted view of occupational health Complying with the letter of the law may not equate to fulfilling moral duty	Where does occupational health stop? What are the issues we can effectively manage in the future? Decisions sometimes delayed because ‘everyone’ has to be consulted Difficulty of keeping tabs on everything that is being done
Needs to get to next level	Understanding of issue Understanding of a proportionate response Easy, low-cost access to support services Push from insurers Simple activities that staff can do with minimal training Individual to champion the cause Mentoring from businesses in the ‘very good’ Category	Stronger emphasis on occupational health in management training Best practice examples from exemplar companies Supply chain/peer pressure Development of an occupational health champion Mentoring from businesses in the ‘very good’ Category	Competitions for ideas in key areas; open areas up to people beyond the traditional stakeholders, e.g. Back to Work programme Exchange forums Involvement in education of the next generation, in both large companies and SMEs More employee ownership of health and safety

that any results were significant over and above the effects of the potential covariates (e.g. does a proactive OSH approach result in differences in employee well-being over and above the effects of socio-economic status?).

In terms of the organisational level performance outcomes, due to the different sizes of the organisations within the sample, for accident and absence data all responses were divided by the number of staff within the organisation, to give a figure per staff head (e.g. total sickness absence per staff member). These data were analysed using a series of *t*-tests to identify if there were differences between organisations on the basis of sector, size and approach to OSH management.

### 3. Results

#### 3.1. Descriptive statistics

A total of 31 organisations participated in this research. The sample is represented by organisations across small (<50, *n* = 9), medium (50–250, *n* = 12) and large (>250, *n* = 10) categories, and across a wide range of industrial sectors. Table 2 lists the organisations by size, with information about the general nature of their business.

Semi-structured interviews were conducted across the 31 participating organisations, with 78 employees interviewed in total. The interview sample comprised 35 senior managers, 27 staff with operational OSH responsibility, and 16 trade union or staff representatives. All organisations were asked to provide data on organisational level performance, accident and absence levels, and the response rate was 97%. A total of 2067 employees completed the questionnaire from across participating organisations. The average age of the sample was 43 years, with 61% male and 1% not specifying their gender. In terms of job status, 78% of the sample were in permanent full-time employment, 11% were in permanent part-time employment, 3% worked in a job-share arrangement, with 6% of the sample working in fixed-term or casual capacity.

**Table 2**  
Study sample by organisational size and nature of the business.

Small (<50 staff)	Medium (50–250 staff)	Large (>250 staff)
Biotechnology consultancy <sup>b</sup>	Asbestos management company <sup>b</sup>	City Council (North) <sup>a</sup>
Ceramics manufacturer <sup>b</sup>	Clay and synthetic additives manufacturer <sup>b</sup>	City Council (South-East) <sup>a</sup>
Dental practice <sup>b</sup>	Construction company <sup>b</sup>	Facilities management company – defence and logistics <sup>b</sup>
Electronic components manufacturer <sup>b</sup>	Construction component manufacturer <sup>b</sup>	Facilities management company – nuclear <sup>b</sup>
Hairdresser <sup>b</sup>	Electrical power supply manufacturer <sup>b</sup>	Fire & rescue service <sup>a</sup>
Scaffolder <sup>b</sup>	Housing association <sup>a</sup>	Further education college <sup>a</sup>
School <sup>a</sup>	Housing developer <sup>b</sup>	Police constabulary <sup>a</sup>
Site mixing company <sup>b</sup>	Leisure Centre <sup>a</sup>	Students union management company <sup>b</sup>
Windpower developer <sup>b</sup>	Ceramics manufacturer <sup>b</sup>	University <sup>a</sup>
	Polymer manufacturer <sup>b</sup>	Utilities company <sup>b</sup>
	School <sup>a</sup>	
	Waste recycling company <sup>b</sup>	

<sup>a</sup> Public sector.

<sup>b</sup> Private sector.

#### 3.2. Public and private sector comparisons

The first set of analyses examined how the organisational and employee level outcomes varied between the public and private sector organisations in the sample. A series of *t*-tests were run to compare sector and organisational performance, accident and absence indices. No significant differences between the public and private sector were found for any of the organisational level variables of: staff turnover; reportable accidents; non reportable accidents; all accidents; days lost per head due to accident or injury; days lost per head due to sickness absence.

The next stage of analysis involved the comparison of employee-level outcomes (e.g. job satisfaction, safety climate perceptions) between public and private sectors using a MANCOVA analysis which showed a statistically significant influence of sector on employee level outcomes,  $F(20, 1098) = 5.047$ ,  $p < 0.001$ . The test of between subject effects revealed a number of significant differences between the public and private sector organisations illustrated in Table 3.

As can be seen in Table 3, there are a number of differences between the public and private sectors across the survey outcomes. In terms of health and well-being, the public sector organisations reported lower health scores for vitality only, no significant differences were reported for general or mental health. Similarly, public sector employees reported lower safety climate perceptions compared with private sector employees. There were no significant differences in terms of organisational and job

**Table 3**  
Employee outcomes – public vs. private sector.

Outcome	<i>F</i>	<i>df</i>	<i>P</i>	Private	Public
<i>Health and well-being<sup>a</sup></i>					
General health	3.486	1	0.062	75.27	70.50
Mental health	3.298	1	0.070	78.04	73.05
Vitality	9.987	1	0.002**	62.80	55.01
<i>Safety climate<sup>b</sup></i>					
Management commitment	20.043	1	<0.001***	7.57	6.71
Communication	13.103	1	<0.001***	7.55	6.70
Priority of safety	49.882	1	<0.001***	7.86	6.70
Safety rules and procedures	18.275	1	<0.001***	6.92	6.30
Supportive environment	11.974	1	<0.001***	8.02	7.02
Involvement	5.916	1	0.015*	7.30	6.17
Personal priorities/need for safety	6.76	1	0.009**	7.61	6.67
Personal appreciation of risk	46.214	1	<0.001***	7.38	6.39
Physical work environment	17.329	1	<0.001***	6.72	6.10
<i>Job attitudes</i>					
Organisational commitment <sup>c</sup>	1.962	1	0.162	47.33	45.44
Job satisfaction <sup>d</sup>	0.791	1	0.374	5.46	5.30
Intention to quit <sup>e</sup>	0.571	1	0.450	2.79	3.02
Intrinsic job motivation <sup>f</sup>	0.063	1	0.802	35.39	35.23
<i>Performance measures</i>					
Overall performance <sup>g</sup>	0.392	1	0.531	8.06	8.03
Self-reported absence <sup>h</sup>	0.060	1	0.807	0.20	0.41
Self-reported work-related illness <sup>i</sup>	8.939	1	0.003**	0.22	0.43

Columns marked Private and Public represent the adjusted mean scores for private and public sector organisations.

\* Significant at  $p < 0.05$ .

\*\* Significant at  $p < 0.01$ .

\*\*\* Significant at  $p < 0.001$ .

<sup>a</sup> Range (0–100): 0 = worst possible health – 100 = best possible health).

<sup>b</sup> Range (2–10 higher scores = more positive safety culture).

<sup>c</sup> Range (9–63: higher scores = higher organisational commitment).

<sup>d</sup> Range (1–7: higher score = higher job satisfaction).

<sup>e</sup> Range (1–7: higher score = greater intention to leave one's job).

<sup>f</sup> Range (6–42: higher scores = higher intrinsic motivation).

<sup>g</sup> Range (0–10: 0 = worst performance – 10 best performance).

<sup>h</sup> Number of days absence per staff head.

<sup>i</sup> Number of self-reported work-related illnesses per staff head.

attitudes between the sectors. In terms of self-reported performance outcomes, only work-related illness showed a statistically significant difference, with employees in public sector organisations reporting more work-related illnesses (over the previous 12 months period) per head.

### 3.3. Organisational size comparisons

The second set of analyses examined how the organisational and employee level outcomes varied between organisations on the basis of their size. Due to the lower number of survey responses from individuals in small and medium-sized organisations (192: small; 320: medium) compared to those from large organisations (1555: large), responses from small and medium organisations were combined, creating a 'small/medium' group. In order to maintain equivalence across the analyses, the organisational outcomes were also compared across small/medium and large organisation groupings.

A series of *t*-tests compared how organisational size was related to the performance, accident and absence indices measured in the study. A statistically significant difference between staff absence per head was found  $t(20) = 2.976$ ,  $p < 0.01$ . With large organisations reporting a staff absence per head rate ( $M = 6.87$ ) more than twice that of small/medium organisations ( $M = 3.16$ ). No significant differences were found for: profit margin; staff turnover; reportable accidents; non reportable accidents; all accidents and days lost due to accidents or injury.

The next analysis compared the employee survey outcomes on the basis of organisational size. To do this, a further MANCOVA analysis was conducted to examine whether the employee outcomes differed between small/medium organisations and large organisations. The multivariate test showed a significant effect of size upon the employee level outcomes,  $F(20,1098) = 2.829$ ,  $p < 0.001$ . The test of between subject effects revealed a number of significant differences between the small/medium and large organisations reported in Table 4.

Table 4 illustrates a number of differences between organisational size groups across employee survey outcomes. Employees from large organisations reported significantly higher scores for mental health and vitality, with no significant difference found for scores of general health. This suggests that working in larger organisations may promote better mental health and lower levels of fatigue. The picture on safety climate was slightly different. For three of the climate perception scores there were significant differences between small/medium and large organisations, with employees in large organisations reporting poorer safety climate perceptions. The results suggest that in larger organisations employees felt that safety rules and procedures were less important or necessary, felt less involved in the process of OSH management, and identified working safely as less of a personal priority than those in smaller organisations. As far as organisational and job attitudes were concerned, the only significant difference was intention to quit the organisation. Employees in larger organisations reported less desire to leave their job and the organisation. Finally, on self-reported performance measures, the only significant difference between the groups was in work-related illness. Employees in small/medium organisations reported a higher number of work-related illnesses per head over the previous 12 months than those in larger organisations.

### 3.4. Approach to OSH management

This phase of the analysis examined the relationship between OSH activity and organisational outcomes (e.g. absence, accidents, turnover) and employee outcomes (e.g. employee attitudes, health and well-being and safety climate perceptions). Organisations

**Table 4**  
Employee outcomes by organisational size.

Outcome	F	df	P	Small/ medium	Large
<i>Health and well-being<sup>a</sup></i>					
General health	2.017	1	0.156	71.22	73.01
Mental health	7.282	1	0.007**	71.54	76.06
Vitality	5.972	1	0.015*	54.43	59.41
<i>Safety climate<sup>b</sup></i>					
Management commitment	1.468	1	0.226	7.30	7.08
Communication	0.171	1	0.679	7.18	7.08
Priority of safety	0.667	1	0.414	7.38	7.23
Safety rules and procedures	6.527	1	0.011*	6.87	6.54
Supportive environment	0.899	1	0.343	7.57	7.48
Involvement	7.100	1	0.008**	6.96	6.66
Personal priorities/need for safety	8.614	1	0.003**	7.40	7.07
Personal appreciation of risk	1.454	1	0.228	6.62	6.89
Physical work environment	2.167	1	0.141	6.58	6.36
<i>Job attitudes</i>					
Organisational commitment <sup>c</sup>	1.100	1	0.295	45.40	46.49
Job satisfaction <sup>d</sup>	1.256	1	0.263	5.29	5.38
Intention to quit <sup>e</sup>	3.921	1	0.048*	3.21	2.91
Intrinsic job motivation <sup>f</sup>	1.147	1	0.284	35.38	35.29
<i>Performance measures</i>					
Overall performance <sup>g</sup>	0.11	1	0.740	8.09	8.04
Self-reported absence <sup>h</sup>	1.256	1	0.263	0.46	0.29
Self-reported work-related illness <sup>i</sup>	27.816	1	<0.001***	0.62	0.28

Columns labelled Small/Medium and Large represent the adjusted mean scores for small/medium and large organisations.

\* Significant at  $p < 0.05$ .

\*\* Significant at  $p < 0.01$ .

\*\*\* Significant at  $p < 0.001$ .

<sup>a</sup> Range (0–100: 0 = worst possible health – 100 = best possible health).

<sup>b</sup> Range (2–10 higher scores = more positive safety culture).

<sup>c</sup> Range (9–63: higher scores = higher organisational commitment).

<sup>d</sup> Range (1–7: higher score = higher job satisfaction).

<sup>e</sup> Range (1–7: higher score = greater intention to leave one's job).

<sup>f</sup> Range (6–42: higher scores = higher intrinsic motivation).

<sup>g</sup> Range (0–10: 0 = worst performance – 10 best performance).

<sup>h</sup> Number of days absence per staff head.

<sup>i</sup> Number of self-reported work-related illnesses per staff head.

were categorised according to their approach to OSH management, on the basis of the drivers and key indicators outlined in the CIC model. From the qualitative data from the stakeholder interviews, each participating organisation was categorised as 'yet to be fully engaged', 'complier' or 'very good'. Five organisations were categorised as 'yet to be fully engaged', with 13 organisations in both the 'complier' and 'very good' categories respectively. Due to the relatively low number of organisations categorised as 'yet to be fully engaged' compared to the other two categories of OSH approach, it was decided to group the 'yet to be fully engaged' and 'complier' categories together. This allowed a comparison between more 'proactive' organisations and those more 'reactive' in terms of their approach to OSH management, whilst ensuring that the analysis was statistically sound.

A series of *t*-tests were run on the organisational outcomes to identify if there were differences between the 'yet to be fully engaged/complier' and 'very good' organisations. None of the differences found in the organisational outcomes were found to reach statistical significance. However, profit margin was found to be higher in 'very good' organisations, staff turnover was also higher in the 'very good' organisations. Reportable accidents, non-reportable accidents, days lost due to accidents or injury and all accidents were found to be lower in 'very good' organisations.

Total days lost to sickness absence were found to be higher in 'very good organisations', full results are shown in Table 5.

The next stage of analysis involved the comparison of employee survey outcomes (e.g. job satisfaction, safety climate perceptions) between organisations categorised as 'yet to be fully engaged/complier' and 'very good'. This MANCOVA showed a significant influence of the approach to OSH management on the employee level outcomes,  $F(20, 1097) = 7.526, p < 0.001$ . This revealed a number of significant differences between the organisations categorised as 'yet to be fully engaged/complier' and 'very good' organisations, illustrated in Table 6.

As can be seen in Table 6, significant differences were found between CIC categories in terms of safety climate perceptions, and two of the organisational attitudes. Organisations classified as 'Very good' were found to show more positive safety climate perceptions across eight out of the nine climate scales. The results suggest that employees in organisations more 'proactive' in terms of OSH management are more committed to their organisation and show significantly greater satisfaction with their job, than employees in organisations which are categorised as 'yet to be fully engaged/complier'. No significant differences were found between the 'yet to be fully engaged/complier' and 'very good' organisations, in any of the three health and well-being outcomes.

Finally an analysis was conducted which explored how health and well-being is related to safety and organisational attitudes at an individual level. This analysis considered how an employee's perceptions of their job, organisation and the approach to safety were related to their self-rated health. To do this, a series of three regression analyses were undertaken. These regressions tested the relationships between organisational/job attitudes and safety climate perceptions, and the three health and well-being outcomes of general health, mental health and vitality. Table 7 displays the results of the regression analyses.

As can be seen from the table, each of the three health indices is associated positively with at least one organisational attitude and safety climate perception.

Self-reported general health was positively associated with job satisfaction and personal appreciation of risk (2 out of 13 comparisons were significant), suggesting higher levels of general health were found where individuals were more satisfied in their job and felt less at risk of an accident (higher personal appreciation of risk). Self-reported mental health was associated with a number of organisational attitudes and safety climate perceptions in the predicted directions. Higher levels of mental health were reported by employees who also reported greater job satisfaction, less intention to leave the organisation, as well as more positive safety climate perceptions in terms of safety rules and procedures, personal appreciation of risk and where they felt more supported

**Table 5**  
Organisational outcomes by CIC category.

Organisational outcome	<i>t</i>	<i>df</i>	<i>p</i>	'YTBFE/Complier'	Very good
Profit margin (%)	0.906	10	0.193	10.71	13.34
Staff turnover (%)	1.223	26	0.627	9.64	14.95
Reportable accidents (per head)	0.814	28	0.211	0.02	0.01
Non-reportable accidents (per head)	0.321	26	0.375	0.09	0.08
All accidents (per head)	0.602	25	0.276	0.11	0.09
Days lost per head to accident or injury	0.804	23	0.215	0.23	0.12
Days lost per head to sickness absence	-0.460	20	0.325	4.21	4.87

Columns labelled YTBFE/Complier and Very Good represent the mean scores for 'YTBFE/complier' and 'very good' organisations.

**Table 6**  
Employee outcomes by CIC categorisation.

Outcome	<i>F</i>	<i>df</i>	<i>P</i>	'YTBFE/Complier'	Very good
<i>Health and well-being<sup>a</sup></i>					
General health	0.236	1	0.627	73.54	71.69
Mental health	1.179	1	0.278	75.89	74.75
Vitality	3.682	1	0.550	59.25	57.94
<i>Safety climate<sup>b</sup></i>					
Management commitment	41.053	1	<0.001***	6.98	7.31
Communication	54.514	1	<0.001***	6.93	7.32
Priority of safety	71.002	1	<0.001***	7.10	7.44
Safety rules and procedures	0.189	1	0.664	6.71	6.44
Supportive environment	35.914	1	<0.001***	7.45	7.55
Involvement	17.893	1	<0.001***	6.69	6.71
Personal priorities/need for safety	20.571	1	<0.001***	7.09	7.15
Personal appreciation of risk	38.155	1	<0.001***	6.81	6.91
Physical work environment	65.337	1	<0.001***	6.19	6.67
<i>Job attitudes</i>					
Organisational commitment <sup>c</sup>	8.217	1	0.004**	46.17	46.55
Job satisfaction <sup>d</sup>	12.517	1	<0.001***	5.29	5.48
Intention to quit <sup>e</sup>	0.911	1	0.340	2.95	2.87
Intrinsic job motivation <sup>f</sup>	1.810	1	0.179	35.50	35.04
<i>Performance measures</i>					
Overall performance <sup>g</sup>	0.168	1	0.682	8.0	8.09
Self-reported absence <sup>h</sup>	0.021	1	0.885	0.31	0.32
Self-reported work-related illness <sup>i</sup>	5.803	1	0.016*	0.33	0.34

Columns labelled YTBFE/Complier and Very Good represent the adjusted mean scores for 'YTBFE/complier' and 'very good' organisations.

\* Significant at  $p < 0.05$ .

\*\* Significant at  $p < 0.01$ .

\*\*\* Significant at  $p < 0.001$ .

<sup>a</sup> Range (0–100: 0 = worst possible health – 100 = best possible health).

<sup>b</sup> Range (2–10 higher scores = more positive safety culture).

<sup>c</sup> Range (9–63: higher scores = higher organisational commitment).

<sup>d</sup> Range (1–7: higher score = higher job satisfaction).

<sup>e</sup> Range (1–7: higher score = greater intention to leave one's job).

<sup>f</sup> Range (6–42: higher scores = higher intrinsic motivation).

<sup>g</sup> Range (0–10: 0 = worst performance – 10 = best performance).

<sup>h</sup> Number of days absence per staff head.

<sup>i</sup> Number of self-reported work-related illnesses per staff head.

in terms of their ability to work safely (supportive environment). However, mental health was also higher where individuals reported lower intrinsic job motivation and priority of safety. Seven out of 13 comparisons were significant for mental health. Vitality was also found to be associated with organisational attitudes and safety climate perceptions. Those employees reporting higher levels of vitality also reported higher job satisfaction, as well as more positive attitudes in terms of personal appreciation of risk and the physical work environment. However, as for mental health, vitality was negatively associated with intrinsic job motivation, with lower levels of vitality reported as job motivation increased. Four out of 13 comparisons were significant for vitality.

From the analyses outlined throughout this section, it is clear that in terms of both safety climate perceptions and organisational attitudes, being more 'proactive' in OSH management is associated with more positive attitudes towards safety and the organisation. However, in terms of health and well-being the association might be more complex. The results presented here found no significant effect for differences between health and well-being on the basis of OSH management. However, at an individual level, evidence was found for the effects of safety upon health outcomes, with those employees more 'engaged' in OSH issues reporting better

**Table 7**  
Regression analyses results for general health, mental health and vitality.

	General health <sup>a</sup>		Mental health <sup>b</sup>		Vitality <sup>c</sup>	
	$\beta$	<i>p</i>	$\beta$	<i>p</i>	<i>B</i>	<i>P</i>
<i>Job attitudes</i>						
Organisational commitment	−0.11	NS	.016	NS	0.19	NS
Job satisfaction	0.120	<0.01	0.319	<0.001	0.226	<0.001
Intention to quit	−0.021	NS	−0.98	<0.01	−0.28	NS
Intrinsic job motivation	0.00	NS	−0.063	<0.05	−0.066	<0.01
<i>Safety climate</i>						
Management commitment	0.040	NS	−0.62	NS	−0.034	NS
Communication	0.018	NS	0.042	NS	0.032	NS
Priority of safety	−0.013	NS	−0.81	<0.05	−0.016	NS
Safety rules and procedures	−0.016	NS	0.049	<0.05	0.019	NS
Supportive environment	−0.017	NS	0.105	<0.01	0.001	NS
Involvement	−0.031	NS	−0.018	NS	0.046	NS
Personal priorities/need for safety	0.017	NS	−0.023	NS	0.003	NS
Personal appreciation of risk	0.335	<0.001	0.217	<0.001	0.292	<0.001
Physical work environment	0.00	NS	0.036	NS	0.079	<0.01

$\beta$  – standardised beta weight.

*p* – significance.

NS – non-significant result.

<sup>a</sup> Final step of regression with covariates accounted for 18% of the variance in general health.

<sup>b</sup> Final step of regression with covariates accounted for 30% of the variance in mental health.

<sup>c</sup> Final step of regression with covariates accounted for 28% of the variance in vitality.

general and mental health, and higher vitality levels. No significant effects were found for organisational level performance indicators.

#### 4. Discussion

The findings of this research offer some support the concept that a proactive approach to OSH management is associated with positive employee-level outcomes. The results showed that organisations with proactive OHS management had:

- higher profit margins and lower accident rates but the differences failed to reach significance,
- significantly more positive safety climate perceptions across eight out of the nine safety climate dimensions,
- improved employee organisational commitment and job satisfaction.

Finally the results showed that positive safety climate perceptions and organisational attitudes were associated with better self-reported physical and mental health.

No statistically significant differences were found between the approach to OSH management and organisational performance outcomes: profit, staff turnover, reportable accidents, non-reportable accidents, all accidents and days lost per head to accident or injury. It is possible that the lack of significance is due to the size of the organisational sample not having the statistical power to detect small differences between the CIC categories. Furthermore, given that performance outcomes such as profit, staff turnover, accidents and absence rates will be very closely linked to type of industry, size and sector, it is perhaps not surprising that

differences between the CIC categories were not established. Further research might explore the interplay between size, sector and approach to OSH management. Future research using the CIC model may reveal statistically significant differences with larger numbers of organisations providing performance data.

These results can be interpreted as supportive of research by Michael et al. (2006) where a positive approach to safety has been viewed in terms of Blau's (1964) social exchange theory, and perceived organisational support (Eisenberger et al., 1986). The research presented in this paper, although not directly testing the theory of social exchange can be argued to further support the idea that OSH management may be viewed as part of the psychological contract between organisations and their employees (Walker and Hutton, 2006).

The results presented in this paper underline the differences across private and public sectors, and organisational sizes in both organisational performance and more subjective employee level outcomes. This research has revealed some interesting differences in the study outcomes in terms of both size and sector. The finding that large organisations report more absence per employee at an organisational level, but less self-reported work-related illness is particularly interesting, as it appears to be contradictory. However, this may be due to the provision of sickness management procedures in large organisations that both manage ill-health and allow individuals to take paid time off. Clearly, not receiving remuneration for sick days is a big motivator for employees to work when ill. Therefore, in smaller organisations where sick pay is not provided, sickness absence rates may be reduced, but over the longer term this may create conditions where work-related illness is actually increased, due to an increased prevalence of employees working when unwell.

This research has further developed the CIC model as a tool for discriminating between organisations on the basis of their approach to OSH management. This maturation model identifies for organisations what is required to move to the next stage and thus provides a learning opportunity, through assessment, to encourage organisations to transition to more proactive OSH management and improve their health and safety performance. The results presented here found that through using the drivers and key indicators within the model, organisations could be categorised into 'yet to be fully engaged', 'complier' and 'very good' groups. From these groupings, across different industries, sectors and sizes, it was found that a proactive OSH approach was related to more positive safety climate perceptions. This adds to the evidence base for investing in health and safety which is may be useful in the OSH training. The findings suggest that where time, energy and resources are invested in OSH management, organisations may experience commensurate benefits in terms of improved safety climate and employee attitudes.

The findings also help to validate the CIC model by suggesting that it can reasonably discriminate between organisations on the basis of safety culture and demonstrable safety climate.

#### 5. Conclusions

The results presented in this report provide some support for the adoption of a proactive approach to OSH management. They support the premise that where organisations are proactive in OSH management, their employees may value this and view it as part of perceived organisational support. These effects may be felt more widely for the organisation, with established links in the literature between both organisational attitudes and safety climate and a number of indices which have 'bottom line' implications for employers such as sickness absence and work related injuries. Furthermore the assessment and evaluation of approach to safety

culture and OSH management can provide a valuable learning opportunity for organisations to develop proactive OSH management culture. Drawing on data spanning organisations of different sizes and sectors, proactive OSH management was found to be linked to positive outcomes irrespective of these differences, which underlines the importance of investment in health and safety.

## Acknowledgements

This research was funded by a grant from IOSH. The research team would like to thank the organisations who participated in the project.

## References

- Baril-Gingras, G., Bellemare, M., Brun, J., 2006. The contribution of qualitative analyses of occupational health and safety interventions: an example through a study of external advisory interventions. *Saf. Sci.* 44, 851–874. <http://dx.doi.org/10.1016/j.ssci.2006.05.003>.
- Blau, P.M., 1964. *Exchange and Power in Social Life*. Wiley, New York.
- Budworth, N., Khan, S., 2003. Climbing the occupational health and safety mountain – and taking your team with you. *Saf. Health Pract.* 21, 30–33.
- Cammann, C., Fichman, M., Jenkins, D., Klesh, J., 1979. The Michigan Organizational Assessment Questionnaire. Unpublished Manuscript, University of Michigan, Ann Arbor.
- Cook, J., Wall, T., 1980. New work attitude measures of trust, organizational commitment and personal need non-fulfilment. *J. Occup. Psychol.* 53, 39–52. <http://dx.doi.org/10.1111/j.2044-8325.1980.tb00005.x>.
- Cox, S., Cheyne, A.J., 1999. Assessing Safety Culture in Offshore Environments. HSE Offshore Research Report, Loughborough University, UK.
- Cox, S., Cheyne, A.J., 2000. Assessing safety culture in offshore environments. *Saf. Sci.* 34, 111–129. [http://dx.doi.org/10.1016/S0925-7535\(00\)00009-6](http://dx.doi.org/10.1016/S0925-7535(00)00009-6).
- Dorman, P., 2000. If safety pays, why don't employers invest in it? In: Frick, K., Jensen, P.L., Quinlan, M., Wilthagen, T. (Eds.), *Systematic Occupational Health and Safety Management. Perspectives on an Organizational Development*. Pergamon Press, Oxford.
- Drupsteen, L., Wybo, J.L., 2014. Assessing propensity to learn from safety-related events. *Saf. Sci.* 71, 28–38. <http://dx.doi.org/10.1016/j.ssci.2014.02.024>.
- Eisenberger, R., Huntington, R., Hutchison, S., Sowa, D., 1986. Perceived organizational support. *J. Appl. Psychol.* 71, 500–507. <http://dx.doi.org/10.1037/0021-9010.71.3.500>.
- Faragher, E.B., Cass, M., Cooper, C.L., 2005. The relationship between job satisfaction and health: a meta-analysis. *Occup. Environ. Med.* 62, 105–112. <http://dx.doi.org/10.1136/oem.2002.006734>.
- Ferguson, R.J., Robinson, A.B., Splaine, M., 2002. Use of the reliable change index to evaluate clinical significance in SF-36 outcomes. *Qual. Life Res.* 11, 509–516. <http://dx.doi.org/10.1023/A:1016350431190>.
- Haefeli, K., Haslam, C., Haslam, R.A., 2005. *Perceptions of the Costs of Health and Safety Failures*. HSE Books, Sudbury.
- Health and Safety Executive, 2006. *Health and Safety Statistics 2005/2006*. HSE Books, Sudbury.
- Health and Safety Executive, 2013. *Annual Statistics Report for Great Britain 2012/13*. HSE Books, Sudbury.
- IOSH, 2003a. *Guidance Report: Professionals in Partnership*. Institution of Occupational Safety and Health, Wigston.
- IOSH, 2003b. *Guidance Report: Systems in Focus*. Institution of Occupational Safety and Health, Wigston.
- IOSH, 2005. *Research Report: What Practitioners Do*. Institution of Occupational Safety and Health, Wigston.
- Jenkinson, C., Stewart-Brown, S., Petersen, S., Paice, C., 1999. Assessment of the SF-36 version 2 in the United Kingdom. *J. Epidemiol. Community Health* 53, 46–50. <http://dx.doi.org/10.1136/jech.53.1.46>.
- Kessler, R.C., Barber, C., Beck, A., Berglund, P., Cleary, P.D., McKenas, D., Pronk, N., Simon, G., Stang, P., Ustun, T.B., Wang, P., 2003. The World Health Organization Health and Work Performance Questionnaire (HPQ). *J. Occup. Environ. Med.* 45, 156–174. <http://dx.doi.org/10.1097/01.jom.0000052967.43131.51>.
- King, N., 2004. Using templates in the thematic analysis of text. In: Cassell, C., Symons, G. (Eds.), *Essential Guide to Qualitative Methods in Organizational Research*. Sage Publications, London.
- Marsden, S., Wright, M., Shaw, J., Beardwell, C., 2004. *The Development of a Health and Safety Management Index for use by Business, Investors, Employees, the Regulator and Other Stakeholders*. HSE Books, Sudbury.
- Marson, G.K., 2001. The “value case” for investment in occupational health. *Occup. Med. (Chic. Ill)* 51, 496–500. <http://dx.doi.org/10.1093/occmed/51.8.496>.
- Michael, J.H., Evans, D.D., Jansen, K.J., Haight, J.M., 2005. Management commitment to safety as organizational support: relationships with non-safety outcomes in wood manufacturing employees. *J. Saf. Res.* 36, 171–179. <http://dx.doi.org/10.1016/j.jsr.2005.03.002>.
- Michael, J.H., Guo, Z.G., Wiedenbeck, J.K., Ray, C.D., 2006. Production supervisor impacts on subordinates' safety outcomes: an investigation of leader-member exchange and safety communication. *J. Saf. Res.* 37, 469–477. <http://dx.doi.org/10.1016/j.jsr.2006.06.004>.
- Miller, P., Haslam, C., 2009. Why employers spend money on employee health: interviews with occupational health and safety professionals from British Industry. *Saf. Sci.* 47, 163–169. <http://dx.doi.org/10.1016/j.ssci.2008.04.001>.
- Miller, P., Murphy, S., 2006. Demonstrating the economic value of investments in health at work: not just a measurement problem. *Occup. Med. (Lond.)* 56, 3–5. <http://dx.doi.org/10.1093/occmed/kqi170>.
- Parker, D., Lawrie, M., Hudson, P., 2006. A framework for understanding the development of organisational safety culture. *Saf. Sci.* 44, 551–562. <http://dx.doi.org/10.1016/j.ssci.2005.10.004>.
- Reason, J., 1997. *Managing the Risks of Organisational Accidents*. Ashgate, Aldershot.
- Tomba, E., Dolinschi, R., de Oliveira, C., Irvin, E., 2009. A systematic review of occupational health and safety interventions with economic analyses. *J. Occup. Environ. Med.* 51, 1004–1023. <http://dx.doi.org/10.1097/JOM.0b013e3181b34f60>.
- Walker, A., Hutton, D.M., 2006. The application of the psychological contract to workplace safety. *J. Saf. Res.* 37, 433–441. <http://dx.doi.org/10.1016/j.jsr.2006.06.001>.
- Ware, J.E., Sherbourne, C.D., 1992. The MOS 36-item short-form health survey (SF-36). *Med. Care* 30, 473–483. <http://dx.doi.org/10.1097/00005650-199206000-00002>.
- Warr, P., Cook, J., Wall, T., 1979. Scales for the measurement of some work attitudes and aspects of psychological well-being. *J. Occup. Psychol.* 52, 129–148. <http://dx.doi.org/10.1111/j.2044-8325.1979.tb00448.x>.
- Westrum, R., 1993. Cultures with requisite imagination. In: Wise, J., Stager, P., Hopkin, J. (Eds.), *Verification and Validation in Complex Man-Machine Systems*. Springer, New York.
- Whysall, Z.J., Haslam, C.O., Haslam, R.A., 2005. *A Staged Approach to reducing Musculoskeletal Disorders (MSDs) in the Workplace*. HSE Books, Sudbury.
- Zanko, M., Dawson, P., 2012. Occupational health and safety management in organizations: a review. *Int. J. Manage. Rev.* 14, 328–344. <http://dx.doi.org/10.1111/j.1468-2370.2011.00319.x>.