

An analysis of the prevalence and distribution of stress in the construction industry

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Although, when compared to other industries, the construction sector has relatively low levels of reported work-related stress, it is still a topic of concern for the industry. HSE commissioned research to gain a greater understanding of the level, causes and extent of work-related stress within the construction industry.

The Health and Safety Laboratory conducted a postal survey of a sample of construction industry workers to investigate work-related stress. The postal survey design was informed by qualitative interviews with industry stakeholders at the start of the research. The survey findings were also discussed with industry stakeholders on completion of the survey.

In total, 1,732 questionnaires were returned, and the response rate was 35%. The methodology used meant that the sample was subject to certain biases such as an over-representation of large companies and certain job types, however, the results provide an interesting insight into the level and extent of reported work-related stress within the industry.

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EXECUTIVE SUMMARY

Although, when compared to other industries, the construction sector has relatively low levels of reported work-related stress, it is still a topic of concern for the industry. HSE commissioned research to gain a greater understanding of the level, causes and extent of work-related stress within the construction industry.

The Health and Safety Laboratory conducted a postal survey of a sample of construction industry workers to investigate work-related stress. The postal survey design was informed by qualitative interviews with industry stakeholders at the start of the research. The survey findings were also discussed with industry stakeholders on completion of the survey.

In total, 1,732 questionnaires were returned, and the response rate was 35%. The methodology used meant that the sample was subject to certain biases such as an over-representation of large companies and certain job types, however, the results provide an interesting insight into the level and extent of reported work-related stress within the industry.

Main findings

1. What is the extent of work-related stress?

Around 5% of those working in the sampled construction industry job roles are currently experiencing stress, depression or anxiety which they feel was caused by or made worse by their job or work done in the past. For comparison, 8% of the sample reported bone, joint or muscle problems.

Around 10% of the sample found their job very or extremely stressful.

2. What is causing stress?

The 'top five' most stressful aspects of work for respondents were:

- Having too much work to do in the time available
- Travelling or commuting
- Being responsible for the safety of others at work
- Working long hours
- Having a dangerous job

3. Who is most stressed?

In the present sample, management grade employees, along with road maintenance staff, designers and administration staff report more stress than other job roles, primarily construction labourers/operatives.

4. What can be done?

The findings suggest that work-related stress is an occupational health issue for the construction industry. HSE may wish to consider tackling stress along with other occupational health priorities, particularly with management grades. Ideas for tackling stress are summarised within the report.

1 INTRODUCTION

1.1 THE CONSTRUCTION INDUSTRY

Within the UK, construction is a large industry employing over two million people (HSE, 2005a). These individuals perform a vast array of jobs, including general site labourers, engineers, architects, and site and project managers, with a large breadth of project types and activities (Bomel, 2001). It is estimated that around 90% of businesses within the sector employ fewer than ten workers (DTI, 2005) and subcontracting is widespread. Operations can often be run on low margins and anecdotal evidence suggests there is unrelenting pressure to deliver on, if not ahead of, schedule and to the planned cost.

In terms of safety, construction is a high hazard sector. Between April 2004 and March 2005, 71 workers died and more than 7500 suffered injuries reported under RIDDOR as a result of construction work. The main causes of the fatal accidents were:

- falling through fragile roofs and rooflights
- falling from ladders, scaffolds and other work places
- being struck by excavators, lift trucks or dumpers
- being struck by falling loads and equipment
- being crushed by collapsing structures (HSE 2005b)

In terms of health, musculoskeletal conditions, the effects of noise and vibration and asbestos-related diseases are the dominant work-related health conditions in construction (HSE, 2006c).

1.2 HSE AND WORK-RELATED STRESS

The Health and Safety Commission (HSC) ten-year strategy 'Revitalising Health and Safety' (RHS) was launched by the Government and HSC in June 2000 and aimed to inject new impetus into managing health and safety so as to reduce the proportion of people harmed by their work. It contains a set of improvement targets for Great Britain, a ten-point strategy and 44 action points to improve health and safety. Two key targets are a 20% reduction in the rate of work-related ill health and a 30% reduction in working days lost, all to be achieved by 2010.

HSE has identified a number of priority industry and topic areas as part of Revitalising Health and Safety. Work-related stress is one of the topics: Around 12.8 million working days were lost in 2004/5 as a result of work-related stress, with each case of stress-related ill health leading to an average of 30.9 working days lost (HSE, 2006). These figures demonstrate the impact stress has on business in terms of sickness absence, however, studies have also indicated that there are 'hidden' costs of stress in terms of lowered productivity, sub-standard quality of work and increased recruitment and retraining costs (McHugh 1993 in Kelly, Sprigg and Sreenivasan 1998).

HSE defines work-related stress as *'The adverse reaction people have to excessive pressure or other types of demand placed on them'*. HSE has developed the Management Standards for work-related stress, as an approach to managing and therefore reducing work-related stress. The Management Standards use the traditional risk assessment process as a way of assessing the risks of work-related stress, and couple this with a number of work design factors which when not managed properly are likely to result in ill health. The Management Standards are a general approach to managing work-related stress that can be used by organisations in different industry sectors and companies of different sizes. HSE has developed an implementation plan for the Management Standards, based initially on the

industry sectors known to be at high risk of ill health resulting from work-related stress (HSE, 2005e). These sectors are:

- Health
- Central Government
- Local Government
- Education
- Finance

1.2.1 Stress and the construction industry

The construction industry is one of the priority industries targeted by RHS. HSE's Construction Division programme of work addresses the RHS targets, and is split into four primary portfolios: safety, health, Construction Design and Management duty holders and strategic stakeholders. In addition to the targets set by RHS, at the February 2001 Construction Summit, targets were set by the construction industry to reduce the incidence rate of cases of work-related ill health of employees by 50% by 2010, and to reduce the number of working days lost per 100,000 workers from work-related injury and ill health by 50% by 2010.

Research published in 2000 suggested there was perhaps more of a focus on safety hazards within the industry compared to health hazards, possibly due to the visible and immediate impact of safety-related issues. The management of occupational health within the sector was also thought to be weak (Entec, 2000). HSE has a programme of work directed at occupational health within the industry. HSE's 2004-5 health priorities for the construction industry were:

- Manual Handling
- Asbestos
- Hand Arm Vibration Syndrome and Noise
- Cement dermatitis (HSE, 2005c).

Compared to other industries, the construction industry is not a sector known to be at high risk of work-related stress. For example, the 2001/02 Self-reported Work-related Illness (SWI) survey, a large-scale representative survey of the UK population, found that construction workers' self-reported stress levels were lower in comparison to various other sectors, including manufacturing, transport, finance, education and health.

However, there is anecdotal evidence and recent survey research (e.g., Chartered Institute of Building, 2006) to suggest that stress may be a concern within the construction industry. HSE therefore commissioned research in order to gain a greater understanding of the level, causes and extent of stress within the construction industry.

1.3 PROJECT OBJECTIVES

1. To establish the level and extent of work-related stress within the construction industry
2. To identify the key causal factors of work-related stress
3. To rank the key factors taking into account the demographic information
4. To inform the construction priority programme

2 METHODOLOGY

2.1 OVERVIEW

The methodology used can be summarised thus:

1. Review of the literature
2. Consultation with stakeholders to further refine methodology and develop a picture of the industry
3. Development and pilot of a questionnaire
4. Distribution of the questionnaire
5. Analysis of data
6. Further consultation with stakeholders on research findings

The primary tool used to gather data was a questionnaire. In order for an accurate estimate to be made regarding the prevalence of stress, it is key that a good response rate is achieved to the survey. Given the large numbers of people employed in this industry and the transient nature of the workforce, it was recognised that achieving good response rates across the industry may be difficult. So, the study aimed to focus on those areas of the industry where stress was suggested to be particularly problematic. The ‘most stressed’ jobs in the industry were established through discussions with key industry stakeholders and a review of the literature. Further detail on this process is provided in the following sections.

2.2 CONSULTATION WITH STAKEHOLDERS – PRE-SURVEY

Interviews were conducted with key stakeholders and employers to discuss the extent of stress in the industry, how best to distribute the questionnaire and the most stressed job roles. See Appendix 1 for a copy of the interview schedule.

The five ‘most stressed’ jobs highlighted during the consultation phase along with three control jobs were:

- Business/project manager
- Site manager
- Business managers/company directors (of SMEs)
- Designers (e.g. Architects especially in SMEs or office based)
- Lane rental (i.e. highways/road workers)

These were used to target the questionnaire distribution. There were also three control groups selected that were also targeted in distribution. These were:

- General site operatives
- House building workers
- Demolition operatives

There is more information on how these groups were identified in the stakeholder consultation results section.

The questionnaire also considers some of the causes of stress in this industry. Whilst it is not the remit of this research to consider potential interventions for work-related stress for the construction industry, stakeholder opinions on this issue were sought and informed the discussion and recommendations of this report.

2.3 DEVELOPMENT AND PILOT OF QUESTIONNAIRE

Work-related stress is a concept that has been defined in a variety of ways, and the term is used to describe a whole breath of performance and health effects of differing severity. The present study has used HSE's definition of stress, namely:

“The adverse reaction people have to excessive pressure or other types of demand placed on them”

It was important that data on the prevalence of stress within the construction industry collected by this study could be compared as far as possible to other prevalence data gathered from the construction sector and other UK industries. The questionnaire therefore included items that were identical to those HSE had used in other prevalence studies (e.g., HSE's self-reported work related ill health (SWI) survey and Smith et al, 2000). HSE's Epidemiology and Medical Statistics Unit were consulted about the questionnaire to ensure it would provide useful comparable data. Further discussion of the measurement and definition of stress is provided in the Discussion section of this report.

It was less important to include identical questions for other elements of the present study. For example, it was decided that rigorous adherence to the HSE's Management Standards Indicator Tool for work-related stress would provide a broad indication of the main stressors in the construction industry, but was unlikely to identify the key causal factors relevant to this industry, such as those identified in the stakeholder interviews. It was also considered that the Indicator Tool question set was too long for the intended recipients of this questionnaire, particularly with the other questions to collect data about prevalence, and that its inclusion in this study would be detrimental to response rates. Therefore, questions assessing sources of stress were based on those issues stakeholders had raised in their interviews. However, through consultation with HSE, additional items were also included to ensure the six areas of work design identified by HSE as contributing to work-related stress in their Management Standards approach were covered by the questionnaire.

The initial questionnaire covered the following areas:

- Background details
- Levels of stress
- Sources of stress

2.3.1 Results of pilot

The questionnaire was piloted on a sample of construction workers who attended three HSE Construction Safety and Health Awareness Days (SHADs), which were part of the HSE's Working Well Together (WWT) ¹ campaign to access SMEs. The pilot was conducted to ensure the questions had face validity (i.e. that the questions appeared to be relevant) and that the questionnaire was easy to use.

¹ The WWT campaign aims to improve Health and Safety for workers in the construction industry. It is a campaign supported by the industry and Ministers. For more information see: <http://wwt.uk.com>

Analysis of the pilot data also allowed the questionnaire to be refined further, reducing the number of items in the questionnaire and simplifying the language used. The pilot process along with details of the statistical analyses undertaken is described in Appendix 2.

Electronic and paper questionnaires were produced. The questionnaire is presented in Appendix 3.

2.4 DISTRIBUTION OF THE QUESTIONNAIRE

2.4.1 Sample

The exact characteristics of the population under investigation (i.e. the UK construction industry) are not entirely known. For example, estimates of the size of the industry vary (see previous discussion), the types of work undertaken are diverse, and the composition of the workforce in terms of demographic characteristics is not clear. Drawing a representative sample from a population with ill-defined characteristics is, therefore, challenging. Random selection of a sample is practically very difficult, therefore, a stratified sample, whereby the researchers choose the sample size for each sub-group from a large population that will be compared with each other, was chosen.

Questionnaires were distributed to employees in the five ‘most stressed’ job roles and the chosen ‘control’ job roles. It had been estimated that three hundred and forty questionnaires would need to be distributed to each ‘at risk’ job type and control, with the aim of a 60% return rate. Although this sampling methodology will not produce statistically representative data for the construction industry as a whole, it will allow confidence to be placed in the data for those targeted groups that it is an accurate reflection of the level and extent of the stressors experienced in those job types.

2.5 METHOD OF DISTRIBUTION

The most effective method for distributing the questionnaires was via key contacts within organisations that employed workers with the job roles that this research aimed to focus on. The questionnaires were therefore distributed via employers, various industry bodies, HSE events and directly from HSL. Key people within each distributing organisation acted as the main contact point and conduit between questionnaire respondents and HSL. Unfortunately, despite the efforts of the HSL research team, it proved impossible to find a stakeholder to help distribute questionnaires to the demolition industry, therefore this sector was dropped as a control group from the study.

Several methods were applied to encourage as high a response rate as possible. The questionnaire was printed in colour, had a simple introduction, and was designed to be as clear to complete as possible. It was anonymous and in order to ensure this, paper questionnaires were returned via a FREEPOST envelope directly to HSL. The language of the questionnaire was limited to English only. For electronic versions of the questionnaire, although these could be returned via email direct to a special email address at HSL, respondents were assured that their name would not be written on the questionnaire and their questionnaires would be stored separately from the email system.

The contacts within each organisation used a variety of methods to distribute the questionnaire and encourage high response rates. These included:

- Distributing questionnaires at Safety Days, which resulted in a very high response rate of over 90%;
- Distributing questionnaires to targeted job roles accompanied by a letter from senior management encouraging employees to respond;
- Distributing questionnaires as an email attachment and asking recipients to complete and return the questionnaire electronically;
- Distributing questionnaires at training events and asking all trainees to complete and return the questionnaire.

This methodology meant that distributors were able to employ the methods they felt would encourage the highest response rate within their organisation. However, it also meant that a variety of methods were used to distribute the questionnaire, and that more than one response was received from each organisation. Receiving more than one questionnaire from each organisation potentially means that the sample is less representative in terms of the variety of working conditions experienced by the industry as a whole. As all questionnaires are anonymous, it is impossible to tell how many questionnaires were received back from each organisation. However, some distributors were able to send questionnaires to a large variety of organisations, and due to the diverse nature and work of the construction sector, it is likely that working conditions, even for those working in the same company, are quite distinct.

The questionnaires were distributed between November 2005 and January 2006.

Whilst the research team aimed to ensure that the questionnaires were distributed with a representative geographical spread, there was an overrepresentation of organisations assisting from the Midlands region, which had the potential to impact on the results. This was also the case in terms of the size of the company respondents worked in – distributors tended to work in or have access to larger companies, and therefore the sample contains a high proportion of respondents who worked in large organisations.

2.6 CONSULTATION WITH STAKEHOLDERS - POST-SURVEY

Interviews were conducted with stakeholders to discuss the findings of the research. These are described in a separate section at the end of the results section of this report.

3 LITERATURE REVIEW

3.1 SOURCES OF INFORMATION

There is little available literature, particularly scientific literature, relating to the issue of stress in the UK construction industry (Goldenhar, Swanson, Hurrell, Ruder and Deddens, 1998; Madine, 2000; Cremers, 2004). Some information provides anecdotal evidence about stress in the industry, such as articles in trade magazines. The majority of the more scientific or research-based information, apart from that collected by HSE, is either based on samples in other countries outside the UK, such as America or Australia, or is relatively old and therefore may not represent the current situation in the construction industry. Much of the research has focused on project and contract management jobs within the industry, as well as professional roles such as architects, engineers and quantity surveyors.

3.2 COMPARISONS BETWEEN STRESS IN THE GENERAL POPULATION AND THE CONSTRUCTION INDUSTRY

There are several surveys that have been commissioned by HSE which have identified prevalence levels of stress in the U.K. One of the most representative of these is the Self-Reported Work-related Illness (SWI 2003/04, HSE 2005e) survey which included individuals working in the construction industry. In total, the sample for the survey comprises approximately 60,000 households in Great Britain. It is estimated by the survey that 5.2% of people who have ever worked were suffering from an illness that was caused or made worse by work. The most common cause of illness was identified as musculo-skeletal disorders (MSDs), followed by stress, depression or anxiety. It was predicted from the sample that an estimated 1.3% of people in Great Britain who have ever worked believed that they were suffering from stress, depression or anxiety. It was also estimated that 12.8 million working days were lost due to stress, depression or anxiety. A previous SWI sample (2001/02) made comparisons between self-reported stress experienced in a variety of industries. This identified that construction workers' self-reported stress levels were lower in comparison to various other sectors, including manufacturing, transport, finance, education and health.

Earlier research by HSE (1995) compared the working conditions of various industrial sectors, including construction. The working conditions identified in the report in some instances relate to sources of stress, for example having too much or too little work to do. Findings from the construction sector included:

- A lower than average number of construction workers reported that they had too much work to do in their job compared to workers in other industrial sectors
- A higher than average number of construction workers reported that they had too little to do in their job compared to workers in other industrial sectors
- A lower than average number reported that they had to work to tight deadlines in their job
- A higher than average number reported that they were not able to choose or change the order of their tasks or method of working
- A higher than average number reported that they did not get enough help and support from people in charge at work

It would be misleading, however, to take these points purely at face value. For example, whilst a lower than average number of individuals in construction reported that they had too

much work to do in their job compared to other sectors, this still equated to 51% of construction industry respondents identifying that they had too much work to do in their job. Therefore, it can be argued that whilst the figure is below average, there are still a majority of construction workers within the sample who believed that this was an issue for them. In addition, working conditions since the study was conducted in 1995 may well have changed.

Another survey on occupational health which looked at work-related stress was the Bristol Stress and Health at Work Study (Smith, Brice, Collins, Matthews and McNamara, 2000). This survey of 17,000 individuals randomly selected from the Bristol electoral register, found that approximately 20% of respondents reported occupational stress levels as 'very' or 'extremely' stressful. The prevalence among construction workers within the sample was slightly lower at 16.5%.

There are also other sources of information on work-related mental ill-health and psychological disorders which will have some relevance to work-related stress. One example is The Health and Occupational Reporting network (THOR, HSE, 2006b). The figures reported here are based on voluntary information provided by specialist doctors based on work-related mental ill-health of patients. This data (HSE, 2006b) highlights that construction workers have a lower rate (per 100,000 workers) of mental ill-health than sectors such as manufacturing, transport, finance, education and health. Research on psychological disorder (HSE, 2003) has conversely identified mixed findings. This research highlights that whilst *construction trades* fall into the 'low' prevalence of psychological disorder category, *skilled construction trades* fall into the 'high' prevalence of psychological disorder category. This difference may indicate that skilled workers within the construction industry are under greater psychological strain than general construction workers, or that they are more likely to report their psychological disorder.

Due to the nature of the data collection method and the variations in occupational health specialists available to different industry sectors, there are some limitations with the data provided by THOR, and caution should be made when interpreting the findings. Also, the latter two sources of data are based on ill-health and psychological disorders, rather than stress. Whilst stress related issues may be captured here, there are also likely to be various other forms of mental ill-health and psychological disorder represented here which are not stress related. This must be borne in mind when interpreting the data.

3.3 LEVELS AND SOURCES OF STRESS IN THE CONSTRUCTION INDUSTRY

3.3.1 Levels of stress

The information from HSE presented above suggests that levels of stress within the construction sector may be relatively low when compared to other industry sectors. However, when focusing on the construction industry itself, there is a mixed picture regarding the extent and sources of stress. For example, articles in trade magazines suggest stress levels are rising (Anonymous, 2000a; Madine, 2000). This is supported by a recent survey within the construction industry which identified that 68.2% of respondents within their sample had suffered from stress, anxiety or depression (Chartered Institute of Building (CIOB), 2006). It was also noted that 5.9% of the sample had taken time off work due to stress.

However, there may be some question over whether 'stress' is recognised in the industry as a problem. For example, one construction sector inspector for the Health and Safety Executive (HSE) suggested stress is not perceived as an issue for the industry and was not considered a

priority (Mellor, Corbett, Smith and Lunt, 2004). In addition, the macho culture in the construction industry has been identified in other articles and studies as a barrier to both establishing the level of stress in the industry, as no-one wants to admit they feel under pressure, and therefore also to overcoming stress related problems (Anonymous, 2000a; Madine, 2000). Similarly, a study in Northern Ireland (Gunning and Cooke, 1996) found stress to be as much of a problem for the construction industry as almost any other profession, but noted that individuals in the industry felt that admitting to stress was a major sign of weakness.

3.3.2 Sources of stress

Four of the main factors identified in the CIOB survey (CIOB, 2006) as contributing to stress were: 'too much work' (reported by 64.1% of the sample), 'pressure' (reported by 59.9% of the sample) 'ambitious deadlines' (reported by 59.7% of the sample) and 'conflicting demands' (reported by 52.2% of the sample).

There are, however, some potential limitations in relation to this survey. These include:

- The sample was self selected, which is likely to result in the research suffering from response bias (i.e. that individuals suffering stress were over represented, with individuals suffering from stress more likely to respond)
- The sample was relatively narrow, mainly comprising construction managers
- The questionnaire was only accessible via the CIOB website
- The sample had a high proportion of participants from large organisations (between 42% and 59%)

Factors identified by other research as causing stress within the construction industry include deadlines getting shorter, working hours getting longer, short-term contracts and increasing competition, as well as stress caused by financial penalty clauses, confrontation within the industry, and constant initiatives to improve productivity (Madine, 2000). This increasing level of stress may present itself in the form of unsafe working practices, lower morale, higher turnover and poorer performance (Loosemore and Waters, 2004).

Long working hours and lack of support from others are reported as being sources of stress in one article (Anonymous, 2000a). A study of 36 construction site managers in the UK identified ten key stressors for construction managers using a stress audit in one company (Sutherland and Davidson, 1993). These were:

- Time pressures
- Working long hours
- Insufficient time to pursue leisure interests
- Volume of paperwork
- Insufficient time spent with family/home
- Travel to and from the job
- Lack of support from architects
- Inadequacy of communication flow
- Staff shortages
- Responsibility for situations not fully under my control

The paper raised a number of issues specific to construction managers that managers in other industries are less likely to have to deal with. These included levels of contract workers and poor working conditions, including working in portable offices or in dirty/dusty/noisy environments. The study also linked the key stressors to specific outcomes such as job dissatisfaction and poor mental health (including anxiety and depression), as well as highlighting that certain problems tended to be associated with certain grades of management, different forms of work contract and/or different age groups. One of the other main findings was that stress did not appear to be a problem for all managers; this led the authors to suggest that specific issues may be tackled using an integrated approach to stress management.

Love and Edwards (2005) also looked at project managers in the UK construction industry. The study used a questionnaire methodology sent to 250 contracting organisations throughout the UK, of which 100 questionnaires were returned. The study aimed to establish the effectiveness of the Job Strain Model (JSM) in predicting ill health and job dissatisfaction in this population; the study did not particularly focus on what causes stress or which elements are most important, but rather whether the most common causes of stress led to ill health or job dissatisfaction in construction project managers. However, the study did reveal job demands, such as not having enough time and conflicting demands, and job control, including the lack of ability to schedule rest breaks or choose holiday leave, to be a problem and to be a predictor of ill health and job dissatisfaction. In addition, the study found social support, particularly from the managers' home to be a significant predictor of psychological well being rather than a mediator of this effect, as found in other research. However, the authors noted that as the sample was only small the findings may not be generalisable to the wider population of construction project managers in the UK.

An American based telephone interview study of 408 construction labourers also identified a number of possible stressors and how they link to negative safety outcomes such as injuries and near-misses (Goldenhar, Williams and Swanson, 2003). The main stressors related to injuries and near-misses were:

- Job demands
- Job control
- Job certainty
- Training
- Safety climate
- Skill under-utilization
- Responsibility for the safety of others
- Safety compliance
- Exposure hours
- Job tenure

Gunning and Cooke (1996), in their Northern Ireland questionnaire study, also identified some specific stressors for two groups of construction professional:

1. People working within the industry at the time such as architects, engineers, quantity surveyors and construction managers and,
2. Those linked with the industry but now engaged in full-time lecturing on construction courses.

The study not only found contracting to be more stressful compared to those in local government or private practice, but also identified specific stressors for those engaged in the construction industry such as working to impossible deadlines, client demands, hiring/firing staff, working on multiple projects and conflict within the firm. Other problems included the fact that large projects involving multi-disciplined teams can only progress at the pace of the slowest member of the team. This, as well as delays in receiving information, increases the stress placed on individuals. The study identified a key stressor to be a lack of time. However,

conflict in the industry was also raised as a problem and sources of conflict came from issues such as roles imposed by contractual arrangements, and project problems such as achieving time, cost and quality standards.

3.3.3 Gender

Some articles have also identified that there may be different sources of stress for men and women. For example, women may suffer more from sex discrimination and balancing work and family demands (Anonymous, 2000b). In addition, an interview based study with 211 female construction labourers in America found increased psychological symptoms could arise from increased responsibility, sexual harassment and discrimination, skill under-utilization, and overcompensation, where women have to overcompensate in their work to prove their capabilities to their male co-workers and supervisors (Goldenhar et al, 1998). However, other studies have found no differences between sources of stress for men and women (Goldenhar et al, 2003). An Australian based survey, which investigated gender differences in sources of stress in the workplace, found that in both male and female construction workers long hours and too much work were the main source of stress. In addition, both genders found the pressurized and confrontational nature of the industry, the high levels of responsibility given to individuals and the diverse, fragmented and transient nature of the workforce, particularly stressful. However, aspects such as opportunities for development, pay, keeping up with new ideas, business travel, and the accumulative effect of minor tasks and factors not under their control, were greater sources of stress for women than for men, whilst factors relating to risk taking, disciplinary roles, implications of mistakes, and the threat of impending redundancy and changing jobs to progress their career were greater sources of stress for men than women.

In addition to the direct sources of stress for the construction industry, another longer-term source of stress may arise from the trauma of experiencing or witnessing an accident and the lack of support offered to construction workers (Pearson, 2004).

3.4 STRESS IN THE CONSTRUCTION INDUSTRY OUTSIDE THE UK

A review of literature on stress in the European construction industry has been conducted by Cremers (2004). Countries included in this review included Belgium, Denmark, France, Germany and Holland. The review identified the following as potential stressors:

- Work rates
- Lack of information and consultation on work issues
- Work/job security
- Too little organisational involvement
- Coordination problems (e.g. too many jobs to be completed in a shorter time)
- Capacity problems
- Lack of time for paperwork
- Pay
- Work quantity
- Emotional strain (i.e. from poor working relations)
- Mental strain (i.e. from a high degree of concentration or precision tasks)
- Legislation
- New technology
- Work autonomy
- Relations with colleagues
- Relations with management
- Time pressure/lack of time/tight planning/shorter production times
- Market pressures (faster; quality; better; cheaper; more flexible; competition)
- Lack of resource/workers 'cost control' (fewer people doing more work)

Particular job roles identified as being under stress included:

- Managerial personnel e.g. site managers
- Road workers (particularly due to night shifts)
- Installation workers
- Crane drivers
- Surveyors
- Foremen
- Work Planners
- Supervisor

In addition to identifying the physical and mental issues relating to stress, Cremers (2004) identifies the negative consequences that stress can have on construction organisations. These include repercussions on productivity, efficiency and general activities that are carried out. Other effects can include relatively high levels of sick leave and the intention of workforce members to move on.

The culture within the construction industry is noted to brush aside stress (Cremers, 2004). For example, workers with stress related problems who attempt to speak to management are often faced with remarks such as '*you must be having personal problems, aren't you?*' or '*It never killed anybody to work!*', whilst in Germany, the industry is described as the '*tough man's world*' (Cremers, 2004).

Whilst many negative aspects of working in the construction industry have been highlighted here, Cremers (2004) adds that some of aspects are also responsible for providing incentives and challenges to workers. These include problem solving, intellectual activity, imagination, planning and variation.

3.5 SUICIDES IN THE CONSTRUCTION INDUSTRY

Some statistics suggest that suicides appear to be at an alarming level within the construction industry. East Kent NHS (2002) revealed that 16% of male suicides from over a five-year period had occupations in the construction industry. Another article in the construction trade press suggested that the construction industry has a higher suicide rate than any other profession, with one construction worker committing suicide every two days (Broughton & Pearson, 2003).

Detailed analysis based on reliable data comes from the Office of National Statistics. Kelly and Bunting (1998) analysed suicide rates and occupational group between 1982 and 1996 in England and Wales. They identified a number of occupations with a higher risk of suicide, relative to other occupations. Looking at data from 1991-1996, these included dental practitioners, vets and farmers, and also two groups that may be relevant to the construction industry: builders and carpenters and joiners. Interestingly, amongst occupations which they found to be at a lower risk of suicide between 1991 and 1996, were labourers and unskilled workers (engineering and allied trades), managers in building and contracting, building and civil engineering labourers, and civil, municipal, mining engineers. An analysis of male suicide data from 1981-1999 in Scotland by Stark and colleagues (Stark, Belbin, Hopkins, Gibbs, Hay and Gunnell, 2006) suggested a higher proportion of young men working in jobs including labouring and unskilled work, building and civil engineering labourers and builders (so described) died from suicide than would be expected. These data suggest that some workers in some areas of the construction industry may be at higher risk of suicide compared to other occupations, however, there are confounding variables which are highlighted below.

Stark et al also suggest that comparatively high rates of suicide have been reported in the construction industry in the USA, and an article reported anonymously in the Australian Construction, Forestry, Mining, and Energy Union's (CFMEU) newsletter 'Hard Hat' (2002), reported on the high proportion of suicides within the industry. Statistics for the Brisbane region identified that 43% of sudden death claims on behalf of building workers were related to suicide.

3.5.1 Confounding factors

The data presented by the Office for National Statistics compares how much more or less likely a death in a given occupation is to be from suicide as opposed to other causes of death, than a death to someone of the same age and sex in England and Wales as a whole. However, the reports discuss in some detail how the figures should be treated with care as the proportion of deaths from suicide is affected by the relative frequency of other causes of death. Also, the reports highlight several other factors which may contribute to the raised risk of suicide in some occupations. For example:

- Access to methods of self harm
- Job characteristics which make it more likely that someone with mental health problems may work in the job
- Low pay and lack of job security, and deprivation.

Also, lack of holiday pay and poor job security are identified as potential contributing factors (Rye, cited in Broughton & Pearson, 2003).

This brief discussion highlights the complexity of this topic, and a thorough analysis is beyond the scope of this report.

3.6 SUMMARY OF THE LITERATURE

From the literature available on this subject it appears that whilst levels of stress within the construction industry are relatively low compared to other industries, stress is still a concern for the industry. However, little is known about the extent of the problem, possibly due to reluctance of those working in the industry to admit they are experiencing work-related stress. The CIOB (2006) research offers some indication that stress is a larger problem within the industry, however, it is important to remember the methodological limitations highlighted previously when interpreting these results. There is some suggestion that as pressures on the industry increase, so too do the levels of stress. The CIOB (2006) survey supports this notion to some degree by highlighting that 58% of respondents reported that they thought the industry had become more stressful in the past 5 years.

Furthermore, there are many potential sources of stress for construction industry workers highlighted in the literature, and, to a degree these may vary according to job role, gender, age and work contract. However, research to date would suggest that all six elements of the HSE's Management Standards for Stress, namely Demands, Control, Support, Relationships, Role and Change, may be a source of stress in the construction industry, with Demands, Control and Support being particularly problematic.

There is little comparison of stress levels and sources of stress for different jobs within the industry to date, so it is difficult to identify from the current research particular jobs that may be associated with higher levels of stress.

4 RESULTS: INITIAL STAKEHOLDER CONSULTATION

Industry stakeholders including HSE inspectors, trade unions and professional and trade bodies, employers or representatives of those working directly in the industry were consulted to seek their views on issues such as:

1. Whether stress is a recognised problem in the construction industry;
2. What the major stressors are in the construction industry and whether these stressors vary depending on job type or conditions of employment;
3. Whether the incidence of stress seems to be higher in particular jobs or which are the most stressed jobs within the industry;
4. What form of data collection methods would be the most appropriate in the construction industry, and how the success of these methods could be improved; and
5. Who are the key gate keepers /contacts in the industry that need to be contacted.

Twenty-five stakeholders were contacted in the construction industry. These included HSE construction inspectors, trade bodies/associations, trade magazines/newspapers, a Trade Union, a training body, a construction industry research organisation and 12 representatives of employers. To ensure consistency across the interviews, interview schedules were developed and applied (Appendix 1).

The stakeholders were contacted by telephone or email. Interviews were organised with key individuals within each of the organisations, most often with those having an interest in health and safety, or more specifically in stress. Generally the interviews lasted between one and two hours.

4.1 ANALYSIS

HSL staff took notes during the interview, which were then typed up. The qualitative data were thematically analysed: this is a process whereby the key themes from the data are extracted by the research team. The key themes from the data are presented below.

4.1.1 The industry

A conservative estimate of the size of the industry by stakeholders suggested figures of over 2 million people working in the construction sector. The structure of the industry was, however, somewhat less clear. Different stakeholders held different perceptions of how the industry could be classified. For example, some thought the industry could be divided into general construction and house building, whilst others offered further divisions into designers and contractors. The stakeholders did generally agree that the industry comprises a large variety of multi-disciplined workers (including carpenters, bricklayers, architects, project managers, roofers, decorators and quantity surveyors etc), making the industry highly complex and fragmented. The views of stakeholders regarding the general composition of the industry can be summarised into the following, fairly broad divisions:

- Electric, gas and water (utilities),
- Highways
- Rail
- Contract construction (e.g. Terminal 5, Wembley, offices and schools etc)

- House building
- Repair and maintenance

Subcontracting within the industry was thought to be prevalent. The construction industry was noted to be transient in nature, with some employees working away from home a great deal or spending a lot of time travelling. English skills (both literacy and fluency) were noted to be relatively weak in some. It was suggested that the construction industry has many immigrant workers, often working in geographically specific areas.

4.1.2 Stress in the construction industry

Themes arising from analysis of the qualitative data suggest that stress was perceived to be a relatively large problem, and has tended to be overlooked or ignored by the industry to date. One reason given for stress not being addressed was the male dominated ‘macho’ culture to ‘get the job done’. It was also thought that admitting to experiencing work-related stress was perceived as a weakness, and for this reason stress was not discussed or recognised. Those stakeholders who worked in occupational health within the industry said that they had encountered virtually no cases of stress or mental ill health. Some stakeholders also thought that many employers do not keep sickness absence records, which makes it difficult to assess the scale of the problem.

The stakeholders identified a wide range of stressors. These included:

- | | |
|--|---|
| • Lack of resources | • Injury risks |
| • Time spent away from home and travelling | • Financial deadlines |
| • Poor diet | • Managing ‘unknowns’ |
| • High risk nature of the job | • Pay |
| • Pressure from the weather | • Job insecurity |
| • Juggling many tasks | • Demanding clients |
| • Over regulation | • Lack of control of timescales and budgets |
| • Cash flow | • High expectations |
| • Public disorder (damage to sites and equipment etc.) | • Unpredictable income |
| • Skills shortage | • Weekend working |
| • Competition | • When things do not go to plan |
| • Hazards of dangerous job | • Workload |
| • Long hours | • Deadlines (financial and time) |
| • Bullying and ‘bullish’ characters | • Adversarial industry |
| • Transient nature of work | • Ruthless industry |
| • Macho culture | • Fatigue and tiredness |
| • Lack of employee involvement | • Email |
| • Violence | • Managing varying workload |
| • Hire and fire culture | |

Whilst the list of potential stressors identified by stakeholders is fairly extensive, it is important to highlight that several stakeholders also noted that many workers also find their work very rewarding.

Job roles likely to be under the greatest levels of stress were identified by the stakeholders. Generally the roles identified were associated with management and specialist trades. These included:

- Site foremen
- Site managers/project managers
- Business managers/company directors of SMEs
- Workers on very large sites
- Employers rather than employees
- Estimators
- Bid teams
- Quantity surveyors
- Designers
- Civil Engineers
- Structural Engineers
- Mechanical and Electrical Engineers
- Specialist tradesmen (e.g. riggers and tarpaulin specialists)
- Lane rental (i.e. highways/road workers)
- Planning supervisor
- Administration

Whilst most stakeholders identified a number of job roles thought to be exposed to relatively high levels of stress, some of the stakeholders suggested that *all* workers in the industry are exposed to stress, from the directors to the general operatives.

4.1.3 Methodology

A range of suggestions were made by the stakeholders for the collection of data. These included the use of questionnaires, face-to-face interviews, focus groups, telephone interviews, postal surveys and internet surveys. Due to the nature of the research, the application of questionnaires had the most benefits and fewest drawbacks in comparison to the other methods identified. Whilst face-to-face and telephone interviews could provide extremely interesting and detailed information, the remit of the project did not require such detail, and time constraints and the unpredictable nature of work within the industry could potentially make arranging and keeping interview dates very difficult for participants. Postal surveys are known to have relatively poor response rates and can also work out to be expensive (Hayes, 2000); whilst an internet survey would have severe limitations, as relatively few workers in the industry are office based. The most popular data collection advocated by stakeholders, however, was questionnaires. The stakeholders advocating the application of questionnaires suggested a variety of ways to access the required population. These included:

- Contacting large employers and asking if they would distribute questionnaires within their company
- Visiting large construction sites (with permission from the site manager) to distribute questionnaires to site workers
- Working as part of HSE's Working Well Together (WWT) campaign to access SMEs
- Distributing questionnaires through trade bodies/associations and/or Unions
- Enclosing copies of the questionnaire or promoting the research in copies of trade magazines/newspapers
- Including an incentive to encourage questionnaire completion.

Some of these potential methods for distributing questionnaires had a number of weaknesses. Past experience of one stakeholder distributing questionnaires through a trade body was noted to result in an extremely low response rate of 1.5%.

4.1.4 Key gatekeepers and assistance

The interviews with stakeholders proved extremely productive in identifying other key gatekeepers/stakeholders in the construction industry, including a number of specific employers who could prove beneficial to contact.

4.2 THE IDENTIFICATION OF THE FIVE 'MOST STRESSED' JOB ROLES AND THE CONTROL GROUPS

Following the interviews with the stakeholders, a peer review by the HSL project team was conducted on the data to identify which five job roles had been identified most commonly as the 'most stressed' by stakeholders. This process identified the following roles as the 'most stressed':

- Business/project manager*
- Site manager*
- Business managers/company directors (of SMEs)
- Designers (e.g. Architects especially in SMEs or office based)*
- Lane rental (i.e. highways/road workers)*

The selection of three other job roles was then required to form the control group of roles exposed to lower levels of stress. This was done by the HSL research team. The control jobs identified were:

- General site operatives
- House building workers
- Demolition operatives

These were selected from an exhaustive list of roles (see Appendix 4), which had generally not already been identified as stressful by the stakeholders or the literature review. Additionally, demolition operatives were selected, as they were perceived to work in a very hazardous job, similar to that of lane rental workers, whilst not being highlighted as a particularly stressful job role.

* Also identified in the literature review as stressful jobs

5 RESULTS: SURVEY FINDINGS

The responses to the questionnaire were analysed using both the Statistical Package for the Social Sciences (SPSS)² and Excel.

Results are reported, unless specified, for those who completed the relevant item in the questionnaire.

There were 4,913 questionnaires distributed. Of these, 1,732 questionnaires were returned that were viable and these make up the sample for the survey. There were another 4 questionnaires returned that were blank.

The response rate for the survey was 35%.

5.1 SAMPLE

5.1.1 Gender

The vast majority of the sample were male: 93.5% of those who responded to the question. The Census data for the construction sector (2001) reports that males represent the majority of the industry with 87.07% being male and females accounting for 12.93% of the industry. Therefore it would seem that females have been slightly under represented in this research, although anecdotal information suggests that most females within the construction industry work within office-based occupations which have not been specifically targeted by this research.

5.1.2 Age

The youngest person in the sample was 16 years old; the oldest was 67 years old. The mean age of sample respondents was 42 years. The most commonly reported age was 40 years old.

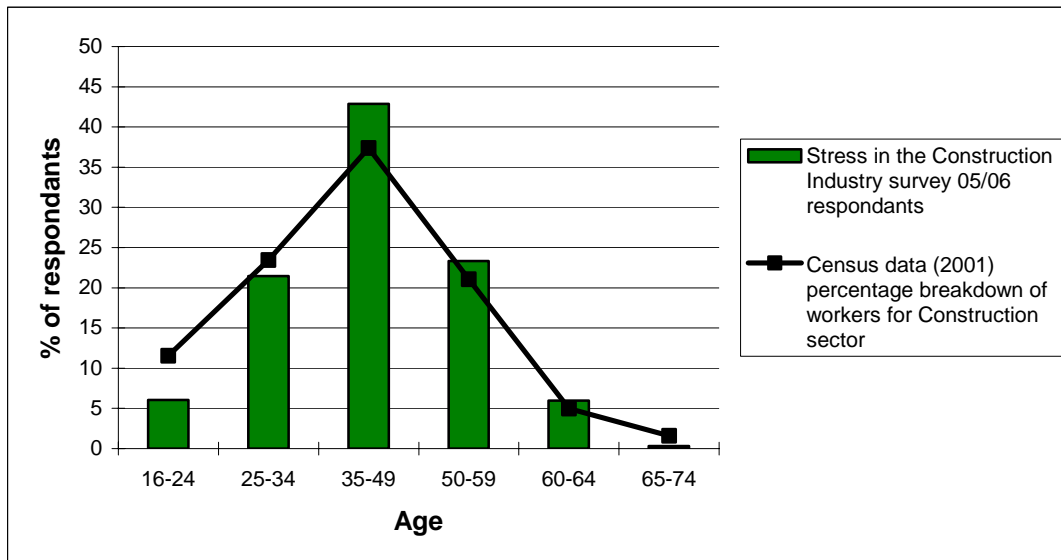


Figure 1: Percentage age of respondents for stress in construction survey compared to Census data (2001) breakdown of construction industry

² SPSS is a data entry and analysis tool for use specifically in the social sciences.

It would seem from figure 1 that the sample seems to be generally representative of each of the age groups reported in the Census data for construction workers (2001), with the exception of workers aged 16-24 who are under-represented by the current sample.

5.1.3 Main type of work undertaken

The main type of work that respondents were involved with is presented in figure 2:

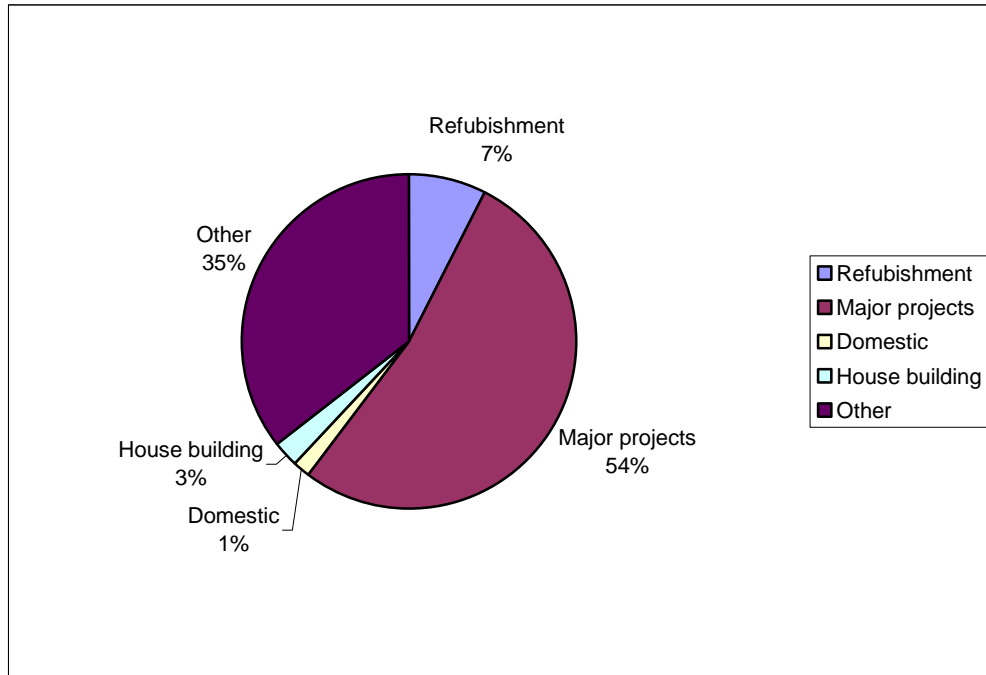


Figure 2: Area of work (%)

The types of work specified in the 'other' category were diverse. However, the most frequently reported types of work were:

- Highways/road maintenance
- Civil engineering
- General Construction work
- Contracting
- Office-based work

To assess how representative the current sample is in terms of types of construction work undertaken, we would need to compare the above results to existing data. However, there is no reliable breakdown available of the percentage of the UK construction sector involved in the above types of work highlighted in Figure 2 to compare the present results to. For example, the SIC categories (Standard Industrial Classification) used for many government statistics concentrate nearly all construction work under one number (45210), and do not differentiate between house refurbishment/major projects etc (personal communication, HSE 2006).

5.1.4 Size of company

Respondents were asked to report how many employees worked in their organisation. The majority of respondents worked in large companies (66.2% of the sample), as can be seen from figure 3 below. In the sample 3.8% worked in micro organisations, where there are less than ten

employees. Other data suggest that nearly 90% of the companies within the industry are very small organisations – between 0 – 7 employees (DTI, 2005), therefore the current sample is not representative in terms of company size of the industry as a whole.

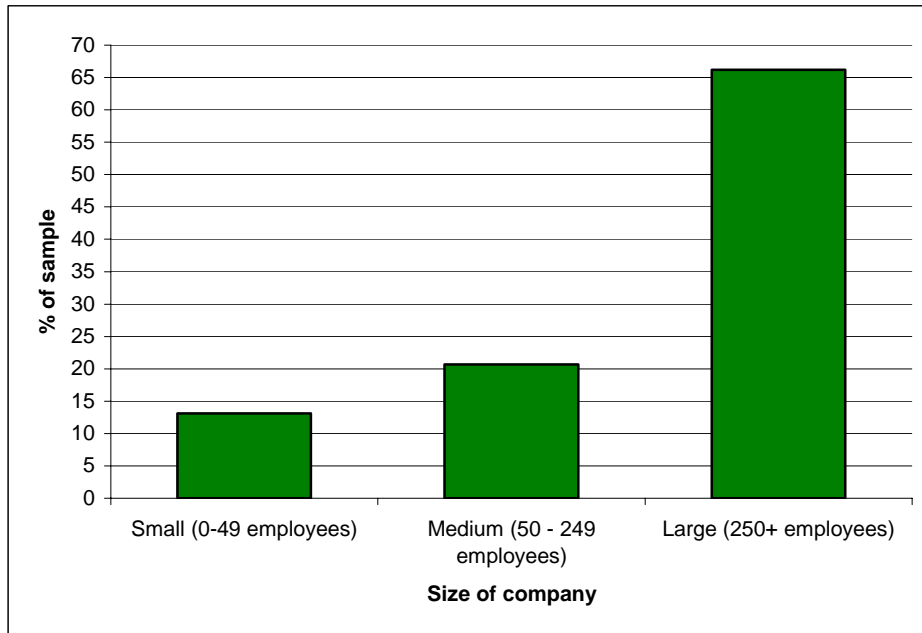


Figure 3: Size of company (%)

5.1.5 Regional spread

Respondents were asked which part of the UK they currently worked in. Questionnaires were returned from all regions in England, Scotland and Wales listed in the survey, with a high proportion being returned from the Midlands, and lower proportions from The East and London. These different numbers of responses are likely to be due to the method used to distribute the questionnaires, with more being distributed in the Midlands, and fewer in London and the East.

5.1.6 Type of employment contract

The vast majority of respondents had permanent contracts (94.8% of the sample). The next most popular contract was self-employed, with 3.7% of the sample reporting this. The other types of contract specified for the remaining 1.5% of the sample who answered the question included ‘contractor’, ‘none’, and ‘salaried’, amongst other answers.

It can be assumed that the large proportion of respondents on permanent contracts does not reflect the construction industry as a whole – for example, the DTI estimates that around 40% of the sector is self-employed (DTI, 2005), a far greater proportion than the 3.7% who were self-employed in the present sample.

5.1.7 Tenure

The average length of time worked in the industry was 20 years. The shortest period of time worked was one month; the longest time worked in the industry was 50 years.

5.1.8 Summary of demographic characteristics of sample

The characteristics of the present sample in terms of gender, age, main type of work undertaken, company size, region, and type of employment contract have been compared to the construction industry as a whole, where comparable data are available. The present sample contains slightly more males, younger workers, people working in large companies, and respondents from the Midlands region than would be expected from a truly representative sample.

5.1.9 Job title

Respondents reported a variety of jobs. Respondents who indicated ‘other’ from the list of job titles almost always specified their particular job. As a relatively large number of respondents fell into this category, a peer review of these extra job titles was undertaken by industry experts to ascertain if any could be included into the existing job categories. Table 1 below includes the job titles of survey respondents following the peer review. The remaining analysis is performed using these revised job categories.

Table 1: Breakdown of respondents by job title (re-categorised)

Job title	% of sample	N
General construction labourer/ Site Operative	25.0	408
Project manager	17.1	279
Designer/ Engineer (e.g. surveyor/ architect)	15.9	260
Supervisor/ foreman	11.2	183
Road maintenance labourer	10.2	166
Administration	6.7	109
Site Manager	5.1	83
Director/ Partner	3.6	59
Other management functions	2.0	33
Administration: Health & Safety	1.4	23
House building labourer/ site operative	1.1	18
Other	0.7	12

There were, however, 12 responses that still could not be categorised, as either there was no information to do so or without further knowledge of the individual they could not be easily re-categorised.

Further categories were suggested in the peer review, however the researchers took the final decision not to make these more drastic changes to the job title categorisation. It was felt that by doing so the integrity of the responses could be compromised as many respondents may have in fact placed themselves in these ‘new’ categories and therefore any further deviation from the groups outlined in table 1 would not be done.

As mentioned in the Methodology section, it was not possible to distribute questionnaires to the demolition sector, therefore for purposes of analysis, the control groups after re-categorisation were then considered to be those originally identified excluding demolition, i.e.:

- General construction labourer/ Site Operative
- House building labourer/ site operative

The experimental groups were then considered to be all the other re-categorised categories, i.e.:

- Project manager
- Designer (e.g. surveyor/ civil engineer)
- Site Manager
- Supervisor/ foreman
- Director/ Partner
- Road maintenance labourer
- Other management functions
- Administration
- Admin: H&S
- Other

5.1.10 Hours worked in past week

The average number of hours worked in the past 7 days was 47.6. The minimum was 0 hours, and the maximum was 115 hours (four respondents indicated they worked 168 hours or over in the past week, however these have been excluded from the analysis as working this or longer would be physically impossible). Figure 5 below summarises the data. However, it should be noted that the study was conducted between November 2005 and January 2006, and several respondents reported that they had taken time off work for seasonal holidays - 9.3% of the sample reported that their reported working hours were not typical.

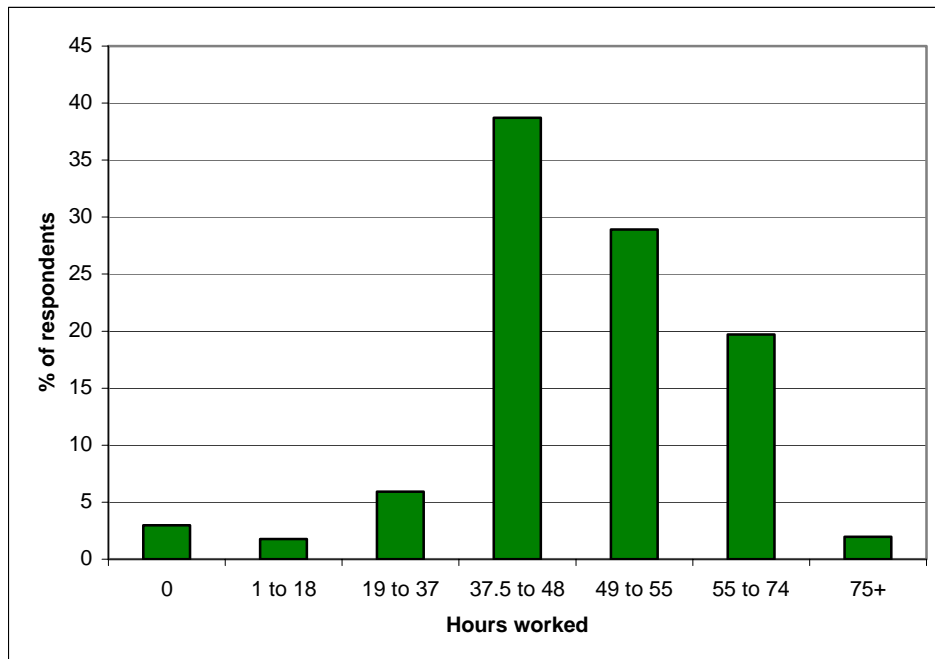


Figure 4: Hours worked in the past 7 days

The average hours worked for each job title were then calculated and are presented in table 5b below.

Table 2: Average hours worked in past 7 days by job title

Job Title	Average hours worked in past 7 days
Director/ Partner	52.8
Other management functions	51.6
Project manager	50.8
Site Manager	50.2
General construction labourer/ Site Operative	49.2
Supervisor/ foreman	48.3
Other	46
Administration: Health & Safety	45.7
Designer/ Engineer (e.g. surveyor/ architect)	44.4
House building labourer/ site operative	44.1
Road maintenance labourer	42.6
Administration	41.3

As can be seen in table 2 Administration staff reported working the least number of hours on average, in the last 7 days. Whereas Director/Partners reported working the most number of hours, on average.

The following job titles had worked, on average, more than 48 hours in the past week:

- General construction labourer/site operative
- Site Manager
- Other management function
- Supervisor/foreman
- Project manager
- Director/Partner

These data can be contrasted with other data on average weekly working hours within the construction sector. The Office for National Statistics (reported in DTI, 2005b) reports that in 2002 full time manual workers in the construction industry, whose pay was not affected by absence, worked an average of 45.7 hours a week, and non-manual workers worked an average of 41.4 hours a week (figures including overtime). The respondents in the present sample tended to work longer hours than these DTI data suggest. A further examination of working hours is provided in the discussion.

5.2 EXTENT OF ILL HEALTH

The extent or prevalence of work-related ill health was assessed using the self-reported work related ill health (SWI) question **“Within the past 12 months have you suffered from any illness, disability or other physical or mental problem that was caused or made worse by your job or work done in the past?”**. Respondents were then asked to describe the illness by ticking an appropriate box corresponding to a range of ill health conditions. This question is used by HSE in other surveys assessing the prevalence of ill health, although the methodology used within the HSE surveys and the present survey is different.

The majority of respondents had not suffered from any ill health, as can be seen in the figure 5 below.

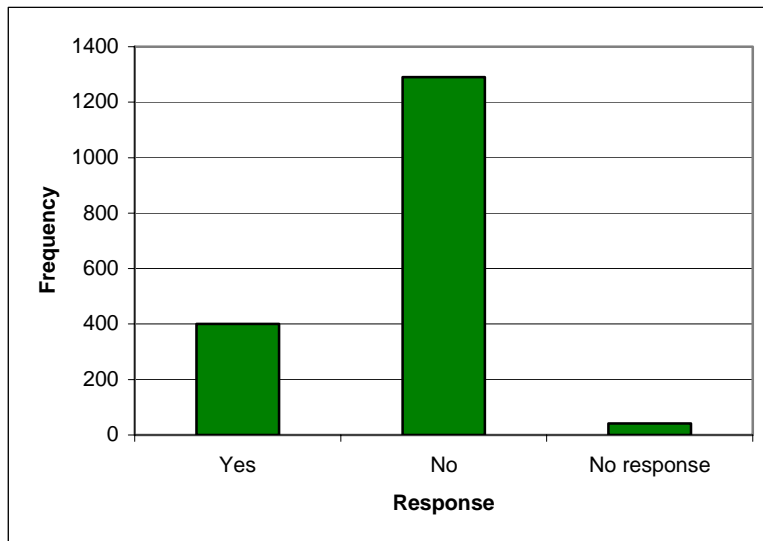


Figure 5: Suffered from any illness within the past 12 months caused or made worse by their job or work done in the past

- 401 respondents said they had experienced ill health caused by or made worse by work.
- 1290 said they had not experienced work-related ill health.

Approximately 23.2% (Lower Confidence Interval = 21.2%, Upper Confidence Interval = 25.1%) of the present sample reported that they have suffered with an illness caused by or made worse by their job or work done in the past.

This is a much greater percentage than some other estimates of ill health within the sector. For example, the estimate from the Self-reported Work-related illness (SWI) survey conducted in 03/04, suggests a prevalence rate of 4.4% for the construction sector (HSE, 2006c). This difference in rates is likely to be due to the different methodologies used to collect the data, and the samples used. See the Discussion for further information on this issue.

Those who had indicated they had experienced work-related ill health over the last 12 months were asked to describe their illness. A total of 291 respondents did this, however in addition another 33 respondents also detailed their illness. These respondents neglected to answer the initial question asking if they had suffered from ill health and therefore all responses are reported below.

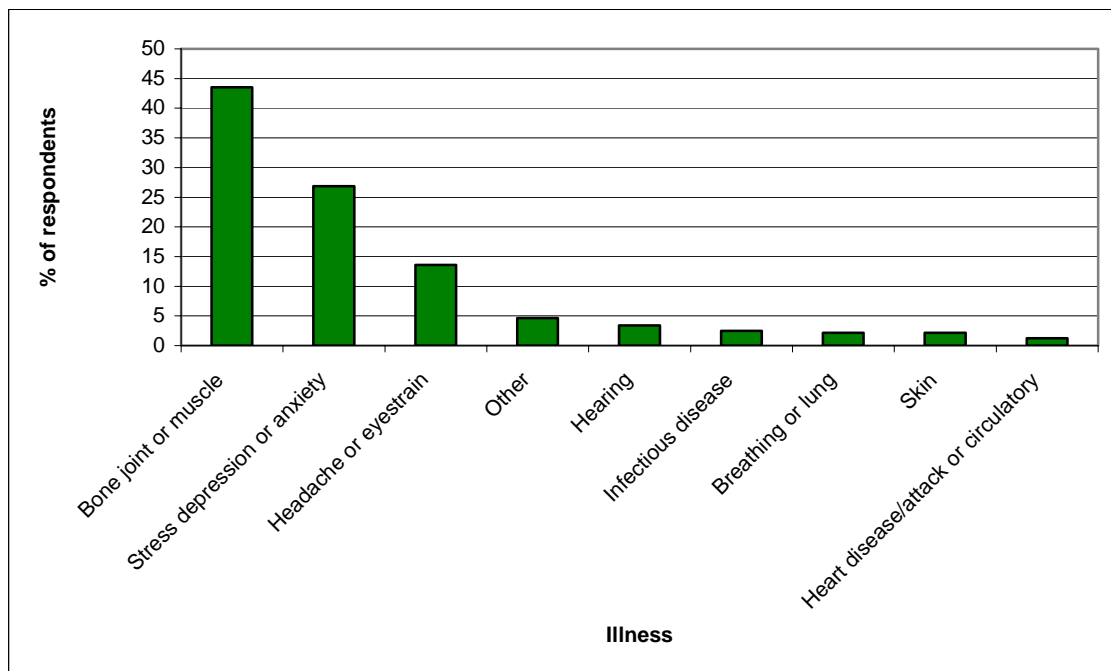


Figure 6: Which illness within the past 12 months caused or made worse by their job or work done in the past

Taking the three most prevalent work-related illnesses, the numbers of people reporting these illnesses in this sample are as follows:

Table 3: Three most commonly reported illnesses in respondents

Illness	N
Bone, joint or muscle problems	141
Stress, depression or anxiety	87
Headache and/or eyestrain	44

As in the SWI surveys administered annually, this sample has reported Musculoskeletal disorders as the most commonly reported illness and stress and/or its associated illnesses as the second most commonly reported illness. In contrast to other surveys the third most commonly reported illness was headache and/or eyestrain. Other illnesses reported included Irritable Bowel Syndrome (IBS), arthritis, difficulty sleeping and exhaustion.

5.3 WORK-RELATED STRESS

The extent of work-related stress was measured using two different questions – the SWI question and the Bristol question.

5.3.1 The SWI question

The SWI question read: ‘Within the past 12 months have you suffered from any illness, disability or other physical or mental problem that was caused or made worse by your job or work done in the past?’ Respondents were then asked to describe their illness by ticking an appropriate box corresponding to a range of occupational health conditions, of which one option was stress, depression and/or anxiety.

A total of 87 respondents described the illness they had suffered from as ‘work-related stress, depression and/ or anxiety’. This equates to approximately 5% of the present sample.

5.3.2 The ‘Bristol’ question

A further measure of job stress was calculated from respondents’ answers to the ‘Bristol’ question “*In general, how do you find your job?*”. All respondents, whether or not they had experienced ill health, were asked to indicate their answer on a 5-point Likert scale. Their responses are summarised in figure 7:

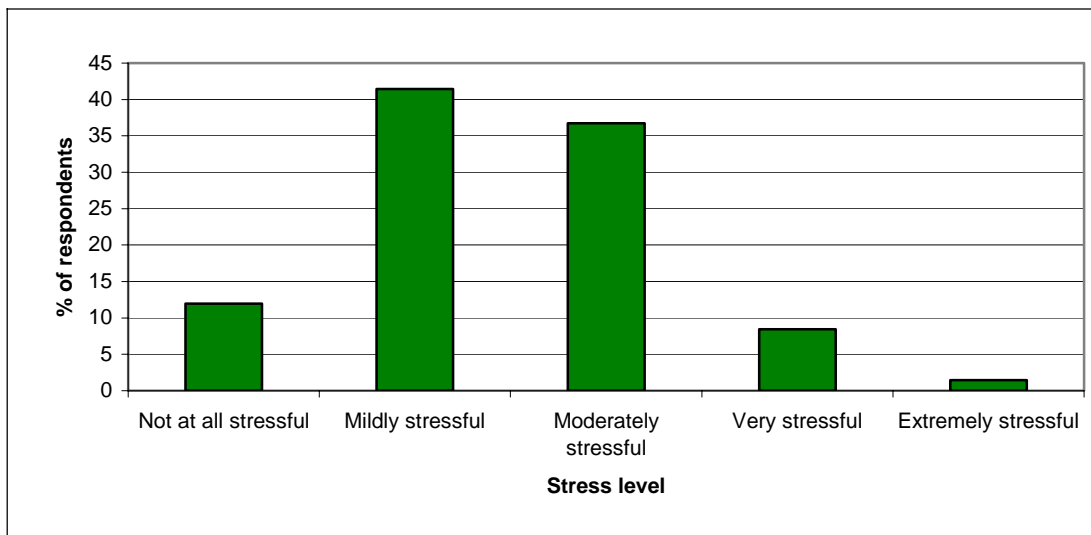


Figure 7: In general how do respondents find their job?

These results can be compared against two other studies that have included the same question. One study conducted by HSE (HSE, 2005f) asked the same question of its 1,693 respondents who were broadly representative of the general working population of Britain. Another study on the working population in Bristol (Smith et al, 2000), which measured stress at three successive points in time, used a sample of 4,044 respondents at Time 1. The results from these studies are summarised below.

Table 4: Comparisons of responses across surveys of in general how do respondents find their job?

	% of sample		
	HSE Psychosocial Working Conditions in Great Britain in 2005	Bristol Stress and Health at Work survey (Time 1)	Stress in the Construction Industry survey 2005/06
Not at all stressful	16.7	8.8	12
Mildly stressful	35.1	29.3	41.4
Moderately stressful	33.0	43.4	36.7
Very stressful	11.9	15.8	8.5
Extremely stressful	3.3	2.7	1.4
Very or extremely stressful	15.2%	18.5%	9.9%
		Construction workers sample 16.5%	

These data suggest that, for this single item measure of job stress, fewer people in the construction industry, as sampled by the current survey, report ‘high stress’ from their work, compared to the general working population, and construction workers sampled from the Bristol electoral register. However 88% of respondents report some level of stress.

5.3.3 Who reports most stress?

Analysis was done to see which job titles reported they were experiencing stress, depression and/or anxiety (the SWI question) or found their jobs very or extremely stressful (the Bristol question).

5.3.3.1 The SWI question

For all but two of the respondents reporting work-related stress and/or its associated illnesses, it was possible to identify their job roles (N=85). Table 5 summarises this:

Table 5: Job titles (re-categorised) reporting work related stress and/ or its associated illnesses

Job Title	% of job title reporting work related stress and/ or its associated illnesses	N of respondents in job title	N reporting work related stress and/ or its associated illnesses
Administration	13.8	109	15
<i>Admin: H&S</i>	8.7	23	2
<i>Other</i>	8.3	12	1
Project manager	7.2	279	20
Site Manager	7.2	83	6
Designer (e.g. surveyor/ civil engineer)	6.9	260	18
<i>Other management functions</i>	6.1	33	2
Director/ Partner	5.1	59	3
General construction labourer/ Site Operative	2.7	408	11
Supervisor/ foreman	2.7	183	5
Road maintenance labourer	1.2	166	2
<i>House building labourer/ site operative</i>	-	18	0

NB: Job titles in italics have <50 respondents overall, therefore caution should be taken when interpreting these results as low numbers could impact on the reliability of the findings

Table 5 shows that from our sample of respondents reporting stress, project managers are self-reporting most that they are suffering from stress and/ or its associated illnesses caused by work. However, administration has the highest reporting rate within their job title. It is important to highlight that the percentages in table 5 should be interpreted with caution, as sample sizes for some job roles are relatively small. For example, the 8.7% of administration: health and safety reporting stress is based on two people out of a sample of 23 reporting stress and/ or its associated illnesses.

5.3.3.2 The Bristol question

The responses to the question “*In general, how do you find your job?*” was then further investigated by job title. This investigation included the re-categorised job titles as previously discuss in section 5.1.9.

A full and detailed breakdown of generally how stressful respondents find their job for each job title can be found in Appendix 5. Below in table 6 is a summary of the most highly stressed job titles, which are those responding ‘very’ or ‘extremely stressful’. If the percentage of people reporting their jobs as highly stressful is compared to those who suggested they had experienced a stress-related illness in the past 12 months, it would appear that, although those respondents find their job highly stressful, they do not believe that it is at a point where it has caused them ill health. However, it may also be that people suffering ill health due to stress did not answer the question about whether they had suffered an illness in the past 12 months. This may be because they had not realised that stress was classified as an illness, and therefore continued to the next question.

Table 6: Most highly stressed job titles (re-categorised)

Job Title	% responding very or extremely stressful	% of job title reporting work related stress and/ or its associated illnesses
Director/ Partner	25.9	5.1
Site Manager	18.3	7.2
Project manager	16.5	7.2
Road maintenance labourer	12.1	1.2
Other management functions	10.3	6.1

Table 6 clearly shows which job titles are highest in reporting that in general their jobs are very or extremely stressful, and for this sample the highest response is for 'Director/ Partner' with a little over a quarter reporting in general the job is very or extremely stressful. Not all job titles are reported in this table; only those job titles where more than 10% of respondents reported high stress are shown above. For comparison, the percentage of each job title reporting they had experienced work-related stress and/or its associated illnesses (the SWI question) is also reported. Again, caution must be exercised when interpreting and generalising these results, as the numbers of sampled individuals working within some job roles are relatively low.

5.3.3.3 Comparison of groups

When the job titles were grouped according to the original control and regrouped experimental groups according to the questionnaire responses (see section 5.1.9) further statistical analysis identified associations between the experimental groups and the reporting of stress (for both measures).

A chi square analysis showed a statistically significant association between the experimental group and those reporting stress with the SWI question ($p < 0.01$). Those in the experimental group in this sample were 2.464 times more likely to report work-related stress (95% C.I. 1.295 to 4.688) than those in the control group.

Statistical analysis also showed a significant association between the experimental group and those reporting high stress in the Bristol question ($p < 0.01$). Those in the experimental group in this sample were 2.053 (95% C.I. 1.309 to 3.219) more likely to report high stress than those in the control group.

5.3.4 Gender and Stress

A total of 87 respondents reported work-related stress and/ or its associated illnesses in the stress and the construction industry survey, of those 14 (16.3%) were female and 72 (83.7%) were male (one respondent did not report their gender).

A total of 12.7% of all the female respondents in the stress in the construction industry survey reported work related stress whereas only 4.6% of the male sample did.

In addition 4.5% of females respondents reported high stress whereas 10.1% of males in the sample did.

However, the numbers of females in this sample are relatively small and therefore it is difficult to draw any significant conclusions.

5.3.5 Age and stress

The proportion of respondents in each of the age groups who reported work-related stress and/or its associated illnesses in the construction industry survey is shown in figure 8 below.

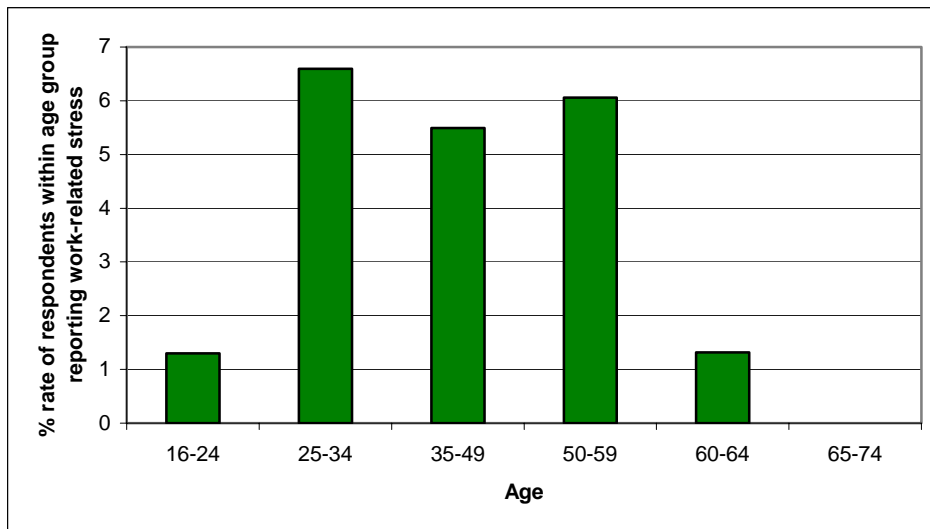


Figure 8: Rate of respondents reporting work-related stress in the construction industry survey by age

In this sample, respondents in the middle age groups (25-34, 35-49 and 50-59) accounted for the majority of those reporting work-related stress or associated illnesses (97%).

As can be seen in figure 8, the rate of reporting of work-related stress was also higher in the 25-34, 35-49 and 50-59 age categories (6.5%, 5.4% and 6.1% respectively). However, the rate for both 16-24 and 60-64 age categories was lower at 1.3%.

The proportion of respondents in each of the age groups who reported their job as being high stress in the construction industry survey is shown in the figure below.

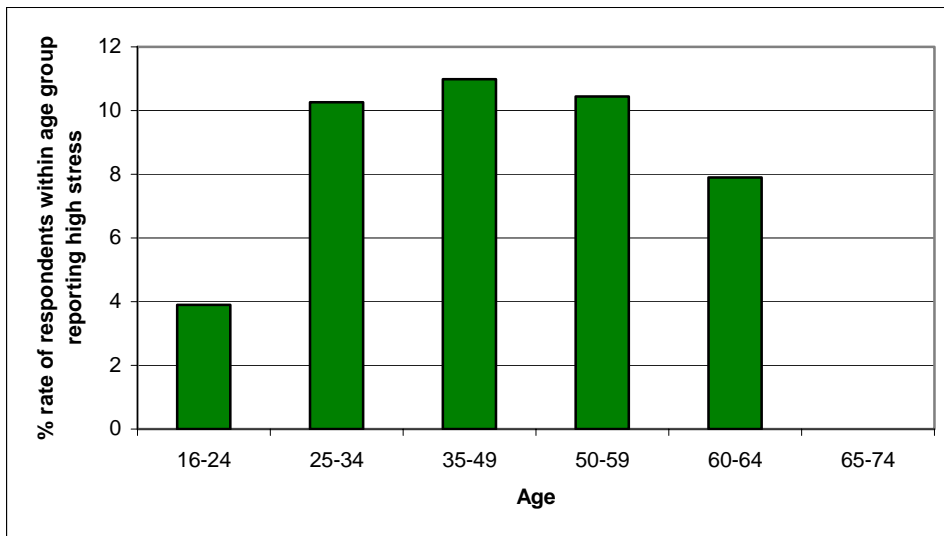


Figure 9: Rate of respondents reporting high stress in the construction industry survey by age

As can be seen in figure 9, the rate of reporting of high stress was in excess of 10% for the 25-34, 35-49, and 50-59 age groups whereas it was 7.9% for 60-64 year olds and 3.9% for 16-24 year olds.

5.3.6 Company size and stress

The size of the company where those respondents who reported work-related stress and/or its associated illnesses worked is shown in the table below for the construction industry survey.

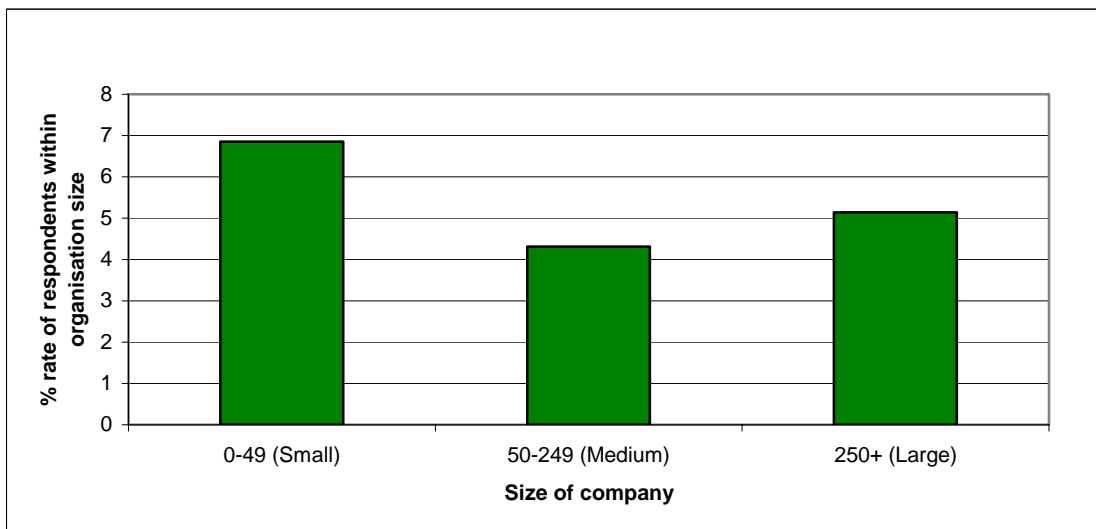


Figure 10: Rate of respondents reporting work-related stress in the construction industry survey by size of company

In the present sample respondents in large companies accounted for the majority of those reporting work-related stress or associated illnesses (66%).

However, as can be seen in figure 10, there is little variation in terms of the rate of respondents' reporting of work-related stress or associated illnesses across small, medium or large organisations (6.8%, 4.3% and 5.1% respectively). There was no statistically significant association between the company size and the self-reporting of work related stress as an illness ($p= 0.703$).

In addition, when looking at the question 'In general, how do you find your job?', there was also little variation in terms of the size of organisation respondents worked in and the rate for reported 'high stress'. In the present sample, there were fewer respondents reporting high stress who worked in small organisations (7.5%), compared to those working in medium or large organisations (11.6% and 10.2% respectively). Further statistical analysis does suggest that there is an association between company size and the reporting of high or low stress as measured by the 'Bristol' question ($p<0.01$).

5.3.6.1 Company size and sources of stress

The data was then further interrogated to investigate any differences between company size and the specific sources of stress.

Table 7: Size of company and key sources of stress

Most stressful aspect	Size of company
1. <i>I have too much work to do in the time available</i> 2. <i>I travel or commute</i> 3. <i>I have to juggle tasks and/or resources</i>	0-49 employees (small)
1. <i>I have too much work to do in the time available</i> 2. <i>I travel or commute</i> 3. <i>I am responsible for the safety of others at work</i>	50 – 249 employees (medium)
1. <i>I have too much work to do in the time available</i> 2. <i>I travel or commute</i> 3. <i>I am responsible for the safety of others at work</i>	250 + employees (large)

Therefore, the main difference between sources of stress and company size appears to related to their third most reported source of stress. Employees in medium and large companies are more concerned about their responsibilities for the safety of others at work, whilst employees in smaller companies are more concerned about having to juggle tasks and resources.

5.3.7 Hours worked and Stress

The hours worked by those reporting stress compared to the sample overall can be seen below in figure 11:

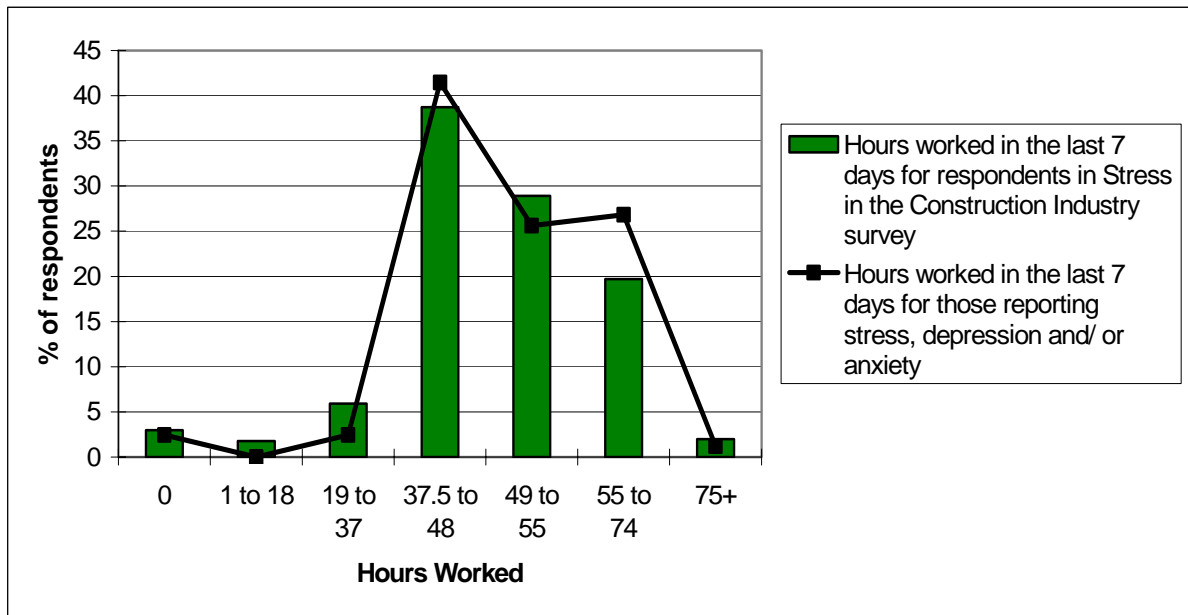


Figure 11: Hours worked for all respondents and those reporting stress

As can be seen in figure 11 the percentage breakdown of hours for those reporting stress is broadly similar to the stress in the construction industry sample as a whole.

5.3.8 Time taken off work due to work-related stress

Those respondents who had reported experiencing stress, depression or anxiety related to work (N= 87) were asked how much time they had taken off work due to stress and on how many separate occasions over the last 12 months. Of those reporting stress, 60 people responded to both questions relating to days and times off, with a minimum of 0 days and a maximum of 90 days. Of those answering the two questions (N= 60), 38% of respondents reporting taking no time off for stress, and 35% reported taking time off more than once. When those who took no time off were excluded, those who reported taking time off for work-related stress (N= 37) took an average of 5.2 days off per episode.

However, some of the respondents who did not report suffering stress, depression or anxiety also answered both questions about how much time they had taken off work due to stress and on how many separate occasions over the last 12 months. Of these others, respondents who reported they had not taken any time off were excluded from further analysis. Of the additional respondents who had reported having taken times off for work-related stress (N= 28), the average number of days taken off per episode was 6.2, with a minimum of 1 day and a maximum of 90 days being reported.

The results show a difference of, on average, one day per episode between those who reported work-related stress and those who did not report the illness. However when all respondents who reported taking any time off for work-related stress (N= 65) are taken into account, the average days off per episode was 5.6.

5.4 STRESSORS

Of the 23 sources of stress, respondents were asked which they found most stressful. A little over half the respondents replied to this question (N=908). The 'top five' most stressful aspects are reported below in table 8.

Table 8: Most stressful aspect for respondents

Source of Stress	% of respondents	N
<i>I have too much work to do in the time available</i>	27.6	251
<i>I travel or commute</i>	12.3	112
<i>I am responsible for the safety of others at work</i>	10.8	98
<i>I work long hours</i>	8.9	81
<i>My job is dangerous</i>	5.1	46

The table above shows that “*I have too much work to do in the time available*” is clearly the most stressful aspect with over a quarter of respondents reporting.

The most stressful aspect “*I have too much work to do in the time available*” was also identified by 25% of those who reported stress related ill-health.

Due to the requirements of further statistical tests of association, not being met, additional analyses were not conducted on these data.

5.4.1 Sources of stress for ‘stressed’ respondents

Whilst the above table summarises what most respondents reported as being the most stressful aspect of their job, it is interesting to examine what those individuals reporting stress found to be particularly stressful. A chi square test was used to look at the association between how respondents completed the questionnaire and whether they reported stress. Details of the statistics are provided in Appendix 6 and 7.

Respondents were asked whether they agreed or disagreed with statements about their work that have been suggested to be associated with stress (see the Development of the Questionnaire section). There was evidence of an association whereby stressed respondents (as measured by both the SWI question and the Bristol question) were significantly more likely to agree with these statements than disagree with them ($p < 0.01$), which is what would be expected – stressed respondents agree with statements considered to reflect work situations that are associated with stress. However, there were several statements where there was no evidence of an association, i.e. ‘stressed’ respondents (in both measures of stress) were not significantly more likely to agree with the statements. These were:

- I work weekends and nights
- I travel or commute
- I am responsible for the safety of others at work
- My job is dangerous

This is interesting as ‘I travel or commute’, ‘My job is dangerous’ and ‘ I am responsible for the safety of others at work’ are reported to be one of the most stressful aspects of respondents’ jobs, as described in section 5.4 above.

There was no evidence of an association for an additional two statements, i.e. that ‘stressed’ respondents (measured by the SWI question) were not significantly more likely to agree with these statements. These were:

- I work away from my family/home
- I have to deal with public disorder

If respondents agreed with the statements about their work they were asked to rate, on a five point scale, how much stress the work situation caused them. An analysis of the association between the reporting of stress and level of stress the work statement caused them produced mixed findings, further details can be found in Appendix 6 and 7.

5.4.2 Most stressful aspects by job title

The responses to which of the job aspects was considered to be most stressful was then further investigated by job title. A full and detailed percentage breakdown of the most stressful elements for each job title can be found in Appendix 5. Below in table 9 is a summary of the most stressful aspects by job title.

Table 9: Most stressful aspect for respondents across job titles (re-categorised)

Most stressful aspect	Job Title
<i>I have too much work to do in the time available</i>	Project manager Designer (e.g. surveyor/ civil engineer) Administration Director/ Partner Other management functions Other
<i>I am responsible for the safety of others at work</i>	Supervisor/ foreman Site Manager
<i>My job is dangerous</i>	General construction labourer/ Site Operative Road maintenance labourer
<i>I don't get enough support from my boss</i>	Administration: Health & Safety
<i>I don't have job security</i>	House building labourer/ site operative

If table 9 is compared with table 8 it is clear that many of the job titles share the same top stressor as the sample overall. However several of the job titles reported other aspects as top stressors.

Both ‘Road maintenance labourer’ and ‘General construction labourer/ Site Operative’ reported “*My job is dangerous*” as the more stressful aspect for their job titles. Whereas “*I am responsible for the safety of others at work*” was reported by both ‘Site Manager’ and ‘Supervisor/ foreman’ job titles as the most stressful aspect.

Two of the job titles, ‘House building labourer/ site operative’ and ‘Administration: Health and Safety’, reported top aspects that were not in the top five aspects for the sample overall.

“*I don't have job security*” was reported as the most stressful aspect for ‘House building labourer/ site operative’. Whereas ‘Administration: Health and Safety’ reported “*I don't get enough support from my boss*” as the most stressful aspect, which has also been reported as an aspect that is stressful within the other job titles.

Other notable aspects of interest were the reporting of “*I don't get enough training*” by those in the administration job title as one of the most stressful aspects. In addition both Director/ Partner and House building labourer/ site operative job titles reported “*I have to juggle tasks or resources*” as one of their top stressors.

The table and discussion above provides summary information on what aspects of work the different job titles find the most stressful. In the following sections of the report, further detail is provided on what is causing stress for a selection of job titles.

Table 10: ‘Top three’ stressors for selected job titles

Most stressful aspect	Job title
<ol style="list-style-type: none"> 1. <i>I have too much work to do in the time available</i> 2. <i>I am responsible for the safety of others at work</i> 3. <i>I work long hours</i> 	Project manager
<ol style="list-style-type: none"> 1. <i>I am responsible for the safety of others at work</i> 2. <i>I have too much work to do in the time available</i> 3. <i>I work long hours/I travel or commute</i> 	Site manager
<ol style="list-style-type: none"> 1. <i>I am responsible for the safety of others at work</i> 2. <i>I travel or commute</i> 3. <i>I have too much work to do in the time available</i> 	Supervisor/foreman
<ol style="list-style-type: none"> 1. <i>I have too much work to do in the time available</i> 2. <i>I travel or commute</i> 3. <i>I have to juggle tasks and resources</i> 	Director/Partner
<ol style="list-style-type: none"> 1. <i>I have too much work to do in the time available</i> 2. <i>I travel or commute</i> 3. <i>I work long hours</i> 	Designer
<ol style="list-style-type: none"> 1. <i>My job is dangerous</i> 2. <i>I have too much work to do in the time available</i> 3. <i>I travel or commute/I work long hours/I am not told about change at work</i> 	Road maintenance labourer
<ol style="list-style-type: none"> 1. <i>I have too much work to do in the time available</i> 2. <i>I travel or commute</i> 3. <i>I don't get enough training</i> 	Administration

Due to the requirements of further statistical tests not being met, additional analyses were not conducted on these data. However, from the categories highlighted above the majority of the top sources of stress for each role reflected those in the top five most stressful aspects of the job across the whole industry, with slight variations in the order of how stressful they are considered depending on the role.

5.4.3 Management Standards

Although the questions from the Indicator Tool from the Management Standards were not used in this survey, the first pass questions were used and reworded after advice from stakeholders and in conjunction with advice from the Epidemiology and Medical Statistics Unit of HSE³.

For these questions relating to the six key areas, respondents were asked if they agreed or disagreed with each of the statements and if they agreed how much stress did it cause them. For each of the statements between 95 – 96% of the entire sample responded. The following results are reported for interest.

5.4.3.1 Demand

From the sample 1,663 responded to the question “*I have too much work to do in the time available – Agree or Disagree*” (question 16). Of those who responded 58% agreed with the statement. Figure 12 below shows for those who agreed how stressful they felt it was.

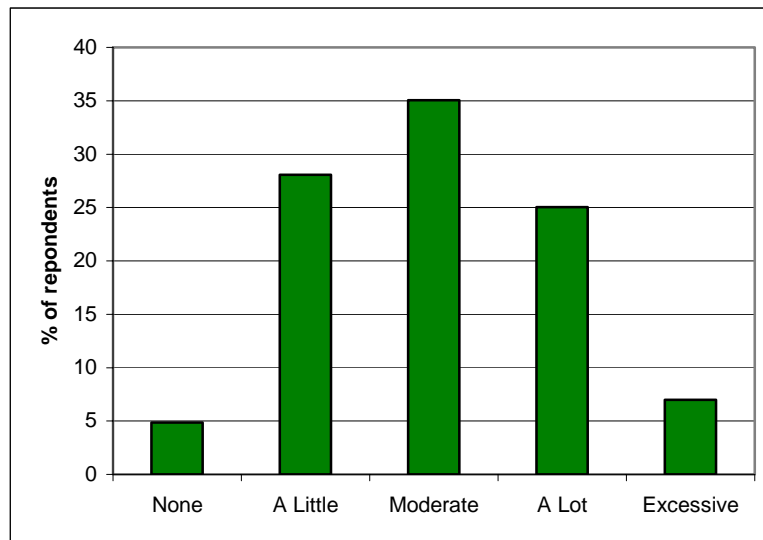


Figure 12: How much stress does “*I have too much work to do in the time available*” cause?

Figure 12 shows that over 95% of the respondents felt that having too much work to do in the available time caused them some level of stress with 7% reporting an excessive amount.

5.4.3.2 Control

From the sample 1,651 responded to the question “*I can’t control how I do my work – Agree or Disagree*” (question 21). Of those who responded 13% agreed with the statement. Figure 13 below shows for those who agreed how stressful they felt it was.

³ NB The first pass question for relationships in the Management Standards is “*I am subject to bullying*”. However following stakeholder discussions there was to be no bullying question included in this survey, as the majority of stakeholders did not perceive this to be an issue. The exploratory factor analysis performed during the refinement of the questionnaire also suggested its removal – see Appendix 3 for details.

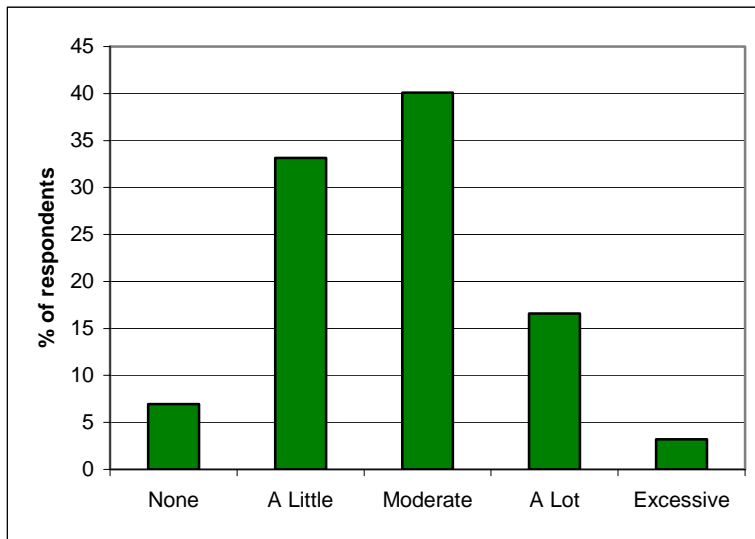


Figure 13: How much stress does “*I can’t control how I do my work*” cause?

Figure 13 shows, for those who agreed, how much stress they felt it caused. 40% of the respondents felt that this caused them moderate stress.

5.4.3.3 Support

From the sample 1,657 responded to the question “*I don’t get enough support from my boss – Agree or Disagree*” (question 1). Of those who responded, 29% agreed with the statement. Figure 14 below shows for those who agreed how stressful they felt it was.

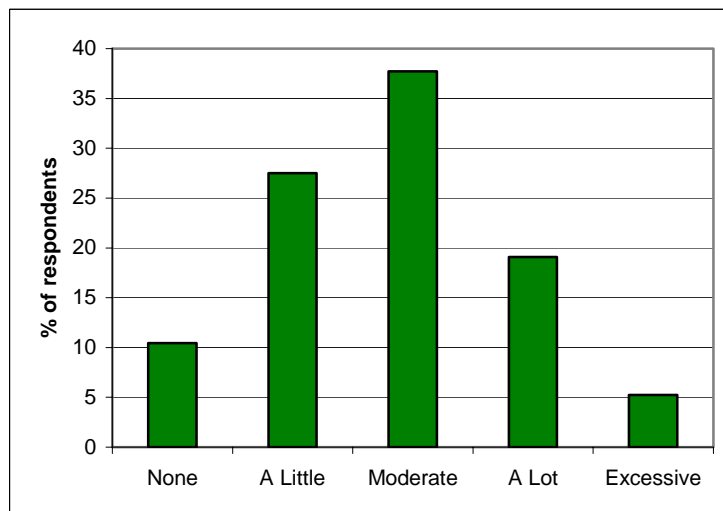


Figure 14: How much stress does “*I don’t get enough support from my boss*” cause?

Figure 14 shows, for those who agreed, how much stress they felt it caused. Approximately 10% of the respondents felt that this caused them no stress.

5.4.3.4 Relationship

From the sample 1,647 responded to the question “*There are poor relations with co-workers – Agree or Disagree*” (question 5). Of those who responded 17% agreed with the statement. Figure 15 below shows for those who agreed how stressful they felt it was.

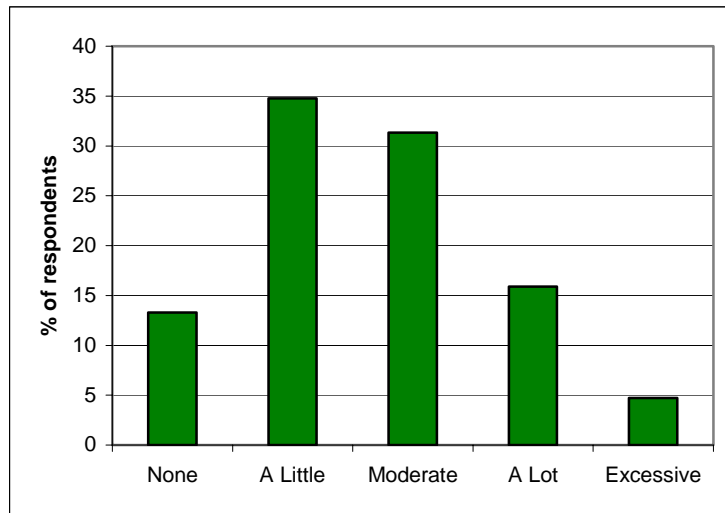


Figure 15: How much stress does “*There are poor relations with co-workers*” cause?

Figure 15 shows of that two thirds of respondents felt that poor relations with co-workers caused a little or moderate stress.

5.4.3.5 Role

From the sample 1,645 responded to the question “*I don’t understand my duties and responsibilities – Agree or Disagree*” (question 3). Of those who responded 10% agreed with the statement. Figure 16 below shows for those who agreed how stressful they felt it was.

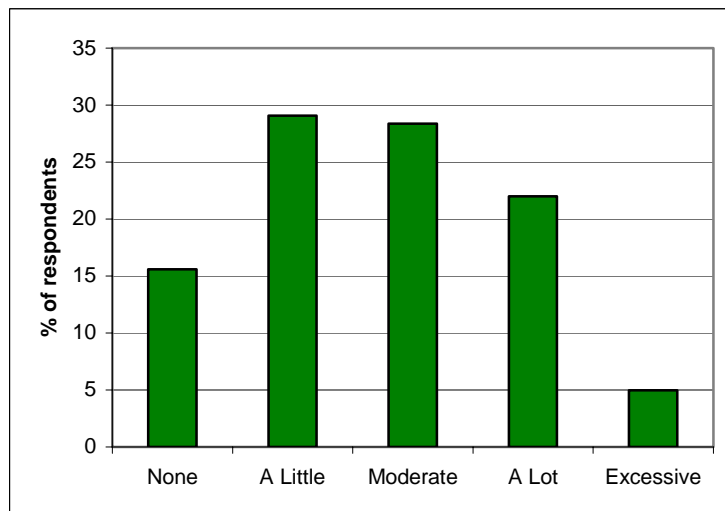


Figure 16: How much stress does “*I don’t understand my duties and responsibilities*” cause?

Figure 16 shows that approximately 15% of respondents felt a lack of understanding of their role caused no stress.

5.4.3.6 Change

From the sample 1,639 responded to the question “*I am not told about change at work- Agree or Disagree*”(question 23). Of those who responded 23% agreed with the statement. Figure 17 below shows for those who agreed how stressful they felt it was.

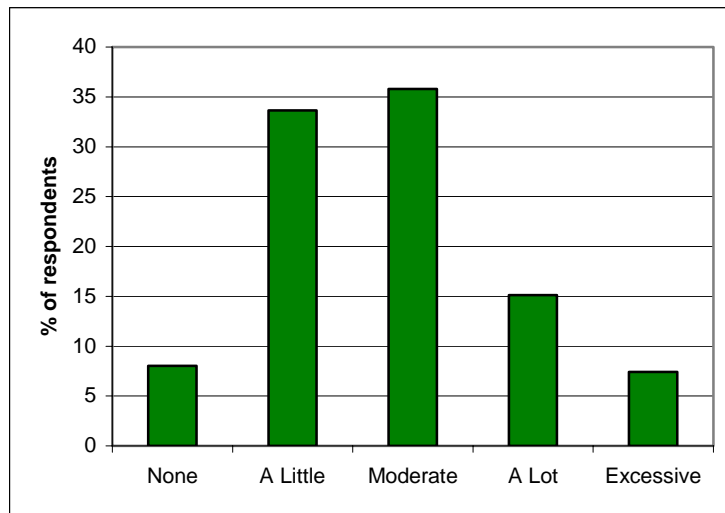


Figure 17: Summary of responses to agreeing with the statement “*I am not told about change at work*”

Figure 17 shows of that over 90% % of respondents felt that not being told about change at work caused some stress.

6 RESULTS: POST-SURVEY STAKEHOLDER INTERVIEWS

A total of 12 interviews were held with stakeholders, including employers, HSE inspectors and other industry representatives after the collection and analysis of the survey data to discuss the findings of the questionnaire.

Interviewees were presented with a summary of the key findings from the research, and asked for their comments on the findings. As for the pre-survey interviews, notes were taken by the HSL researcher conducting the interview and typed up to provide a summary of the interview. The data were then analysed to identify and draw out the key themes. Themes where there was a consensus amongst the interviewees are presented below.

The interviews were conducted either over the telephone or in face-to-face discussions.

6.1 REPRESENTATION OF INDUSTRY

Age: Whilst some of the interviewees felt that the average age of the sample of 42 seemed a little high, most believed this was probably about right considering that much of the sample were project and site managers, and the ageing workforce in the construction industry.

Gender: The majority of the interviewees commented that they were not surprised that most of the respondents were male. A couple of interviewees noted that women tend to work more in design and administration or in the offices or skilled job functions within the industry.

6.2 COMPANY SIZE

There was a mix of views from stakeholders regarding how the bias towards large organisations in the study sample could impact on results. Most people, however, supported the proposal that the sample could produce an **underestimation** of stress within the industry. Some stakeholders suggested that smaller organisations tended to be worse in terms of health and safety and welfare, which can impact on health and levels of stress. They felt that larger organisations were more likely to have systems to deal with stress, for example swapping job roles or having site management assistance. They have more support and more job security, as well as being more likely to support stress initiatives and may have Employee Assistance Programmes (EAPs).

Another theme to emerge was that the size of the company was *unlikely* to impact on the results. This was felt to be because there was a high degree of interaction between larger and smaller organisations, for example as subcontractors, or because although the pressures on small and large organisations are different they would balance each other out in the end.

6.3 WORKING HOURS

Most stakeholders thought that the average working hours found in this study were accurate, although it was suggested that the hours reported might be an underestimation. This was felt to be for a number of reasons, including:

- The survey being conducted in the winter where fewer hours of daylight inhibit working.
- Respondents not including travelling time in their calculation of working hours.

6.4 PREVALENCE OF ILL HEALTH

There was a mix of views regarding whether the prevalence of ill health found by the present study accurately reflected the industry, with most people suggesting it was a fairly accurate estimate or an **underestimation**.

Some interviewees felt that the prevalence of ill health found in the sample was accurate, with one suggesting that the method (anonymous questionnaires) adopted in the present study meant that respondents might have been more likely to report ill health, and thus provide a more accurate picture than other surveys, and another feeling that there was an increased awareness about ill health now compared to when other surveys were done, or an increase in 'blaming and claiming' culture. However, one interviewee disagreed with this, thinking that people were still not used to talking about ill health and stress, and thus the estimate of ill health prevalence was an underestimate. Another interviewee also suggested the 'real' figure may actually be higher than reported in the present study as many people may be unaware of the ill health problems they have. It was also suggested that the high number of males in the industry may result in fewer people admitting to these problems.

One of the interviewees suggested that the higher reporting rates for ill health may be due to the time of the year. They suggested that individuals may say they have an illness in winter to avoid them having to work. One interviewee, however, suggested that the higher figures of ill health may relate to the present survey being targeted on more stressed job roles.

Stakeholders were asked whether they were surprised that stress was the second most commonly reported illness. Most interviewees were not surprised by this, although a couple suggested that there could be some response bias, where only those people with a particular issue (i.e. stress) responded.

It was also suggested that stress can be linked to headaches and eyestrain. Alternatively, the headaches and eyestrain may be due to computer screen use in office staff, noise levels for site workers or age-related deterioration in sight. One interviewee suggested that bone, joint and muscle problems and stress might have been so high on the list as they encompass a lot of other problems, for example, slips and trips and repetitive strain injuries for the bone category and headaches, eyestrain etc under the stress category.

Other stakeholders thought that the composition of the sample may have affected results, whereby management were more likely to report high levels of stress and labourers more likely to report musculoskeletal disorders.

6.5 PREVALENCE OF STRESS

In general, stakeholders felt that the prevalence of stress as reported by the present survey was an accurate picture. However, there were some differing views, which are discussed below.

One theme to emerge was how the different definitions that respondents may have of work-related stress could impact on prevalence levels. For example, one interviewee suggested that often when people report stress they are not actually suffering with stress but have other problems such as a grudge against their manager. Another interviewee suggested that they were surprised that the stress levels were so high for the sample, as the construction industry has a macho culture. It was identified that this culture often results in individuals not normally admitting to conditions such as stress. It was again mentioned that this may be because some individuals within the industry perceive stress as a weakness, and some individuals may not want to admit to suffering stress, as they believe this will prevent them from progressing within an organisation.

Another theme to emerge was that the higher prevalence rate than that found in other surveys may be due to the sample targeted (ie, several 'high stress' job roles, and particularly management functions) and the postal format of the questionnaire, whereby respondents felt more comfortable in admitting to stress.

Finally, one interviewee thought that a 'healthy worker' effect may be in operation: only those individuals who could cope with the demands of working within the construction industry, specifically in a management role, actually survive and continue to work within the industry.

6.6 WHO IS MOST STRESSED?

Almost all stakeholders were not surprised by the list of the 'most stressed' jobs in the construction industry and confirmed that the list reflected their experience of the industry. Many were surprised, however, at the appearance of administrative staff on the list of 'most stressed', and formulated hypotheses as to what may be causing this group stress. These are discussed in the relevant section below.

6.7 SOURCES OF STRESS

6.7.1 Site Managers

Most interviewees were not surprised to see site managers high on the most stressed job roles list. A number of interviewees suggested reasons why, including

- Site managers being the central point for most projects and therefore under a lot of pressure,
- The job of site manager being so critical. In addition, if there is an accident, HSE will investigate through this person, and
- Site managers tending to be the first on the site and the last to leave at night, so some of their stress may arise from working long hours.

A couple of interviewees suggested site managers may have reported *being responsible for the safety of others* as being particularly stressful as it was a HSE questionnaire they were responding to, and therefore respondents may have felt it was important to highlight it as an issue for HSE. However, one interviewee noted that site managers can sometimes have a disproportionate fear of safety for others, and can blame themselves for everything. One interviewee suggested that the problems for this group may stem from changes in safety regulations, which have led to a greater degree of subjective interpretation on the part of site managers.

6.7.2 Project Managers

Again, most interviewees were not surprised to see this group high on the most stressed list. Reasons why included:

- The need to develop detailed planning and method statements, which results in long working hours, as well as needing to know lots of people and the way they work.
- Some project managers also have lots of responsibility but no authority.

- Pressure from the client, for example, the need to get orders from clients, having clients constantly wanting information about progress, the deadlines they impose or the client making changes which have to be managed within the existing timescales.
- Pressure from their own company to get the job completed on time and without financial penalties, juggle jobs and tasks and keep everyone happy.

6.7.3 Administration staff

Some interviewees were surprised that this group was high on the list of most stressed job roles. Some interviewees suggested that administrative staff may work within a culture where admitting to work-related stress was more accepted, hence the higher rate of stress for this group. Other reasons given for the relatively high stress experienced by the administration staff in the present sample included:

- The need to cope with different administration tasks for different site managers, and having to perform tasks that are not part of their job, with changing priorities and lots of deadlines.
- The reduction in the number of administration roles leading to high demands placed on the remaining staff.
- The set times administrative staff have to be in the office mean less flexibility over their travel, and could contribute to travel-related stress.

6.7.4 Designers

There were not many comments about this group, but one interviewee did note that they tend to work long hours and have to work to deadlines, similar to project managers.

6.7.5 Directors/Partners

Again, most interviewees could see why this group of workers reported relatively high stress. Reasons included:

- The need to get jobs done to time and cost, and the constant need to get new work in and respond quickly to tenders.
- Having lots of meetings with major contractors that someone senior needs to attend
- The need to multi-task, i.e. be concerned with safety, wages, tax etc.
- Stress may be particularly acute for Directors of smaller companies, although possibly this was common across all industries.

6.7.6 Road maintenance

Stakeholders suggested a number of reasons as to why road maintenance labourers may report relatively high stress levels:

- The danger of drivers on the roads.
- High pressure to finish the job from the organisation running the contract, which is passed down from management to the operatives.

- Have too much to do in the time available reflected their experience of this industry
- The unsocial hours some road maintenance operatives work can lead to work-life balance problems, which can be stressful. This group of workers sometimes have to live in caravans, which can lead to a poor diet and associated ill health.

7 DISCUSSION

7.1 REPRESENTATION OF INDUSTRY

This research provides detailed information about the extent and sources of stress for a sample of construction industry members, particularly those in managerial grades and construction site operatives/labourers. However, due to the methodology used, the sample is subject to certain biases that mean that generalising the findings to the whole of the industry is problematic. These are discussed further below.

7.1.1 Response rate

This report presents results from a survey of 1,732 members of the construction industry. This is, as far as the authors are aware, one of the largest samples of UK construction industry employees surveyed in detail about their experience of work-related stress to date. The response rate of 35% for the survey is good for a postal questionnaire when compared to the figure of 20 – 30%, which is noted by Hayes (2000) to be average for such a methodology. This means we can be reasonably confident that the survey findings represent the experiences of a good proportion of those employees undertaking our sampled job roles. The large sample also increases confidence in the findings.

However, there could be a non-response bias – employees that did not complete the questionnaire could be more or less stressed than those that did complete the questionnaire, thus meaning the findings do not accurately reflect the industry. One hypothesis is that those individuals who are experiencing stress and want to tell someone (particularly HSE) about it will be more likely to complete a questionnaire. The questionnaire introduction page stated that the findings from this work would be shared with HSE, which may have encouraged people suffering from stress to complete the questionnaire, and provide ‘socially desirable’ answers. If this is true, the findings may exaggerate the prevalence of stress within the industry. An alternative hypothesis is that individuals who are experiencing stress are, in fact, too busy or pressured to complete a questionnaire, therefore meaning that the survey findings under-represent the degree of stress within the industry. Unfortunately, the methodology used in the study prevents us from assessing non-responders experiences. However, the consultation with stakeholders about the study results provides a degree of additional validation of the findings, and the question of how representative the sample is was discussed in the interviews, with many stakeholders feeling that it was a fair representation of their experience of the industry.

7.1.2 Methodological limitations

The method used in the study to distribute questionnaires and encourage responses meant that more than one individual from one organisation may have returned a questionnaire. This ‘clustering’ of respondents means that technically those respondents from the same organisation should be treated as one data-point. However, the nature of the industry is such that the working environments for individuals in one organisation can be considered to be very different (respondents work on different sites and different contracts). We use this argument to justify the use of individuals as single data-points, thus allowing us a more useful sample size.

In addition, whether an individual experiences work-related stress is dependent on how they perceive their work environment and their ability to cope. Therefore, even if individuals from the same company returned questionnaires and worked in the same environments their experience and perceptions of those environments and demands placed on them would be different. Their ability to cope with those pressures at that particular time will impact on whether they then experience work-related stress.

Therefore we could assume the findings are perhaps more representative of our sampled job roles across the industry than a strict interpretation of a clustered sampled might suggest.

7.1.3 Demographic factors

In terms of the age and gender profile, comparison with 2001 construction industry census data suggests the present sample is generally representative of the industry as a whole, with females and younger workers being slightly under-represented.

- **In terms of age and gender, the sample was generally representative of the construction industry as a whole.**

7.1.4 Company size

The area where the survey is perhaps the least representative is in terms of the company size. 3.8% of the sample worked in micro organisations (0-9 employees), however other data suggests around 90% of the companies within the construction industry are micro-organisations. The bias in the present sample towards large companies is due to the methodology used, and reflects the types of job that were highlighted through stakeholder consultation as being particularly stressed. Whilst it is extremely important to investigate the experiences of all of the industry, experience has suggested that individuals working in small and micro organisations are extremely difficult to access, and very low response rates were likely with many survey methodologies. An alternative method using qualitative interviews for example, may have yielded higher responses, however, the time consuming nature of this type of data collection technique meant that it was not a feasible way to collect the prevalence data required by the study.

How does the bias in the present sample towards large organisations affect the findings? It is possible that employee's experiences of work in larger and small/micro organisations are significantly different. Reports of stress can be influenced by:

- whether the job or work environment itself is stressing the individual, and
- whether the individual perceives and reports it as stress.

Both aspects could be influenced by the size of an organisation, assuming the way a job and work is designed and cultures of reporting are different depending on organisation size. Assuming there is a difference between organisation size, there are two main hypotheses as to how this may affect results:

1. Large organisations, particularly those who are keen to get involved in an HSE sponsored survey, may be more likely to have occupational health and safety management provision. This means they may be more likely to have occupational health support systems in place (for example, access to Employee Assistance Programmes or counselling), carry out company surveys assessing employee well-being, and take a proactive approach to health and safety management. The permanent nature of employee contracts, the larger company support networks and the way workload is planned, sourced, managed and delegated may be more structured compared to what happens in small or micro organisations. In contrast, smaller and micro organisations may not have such a structured approach to health and safety, have less reliable workload, and fewer permanent contracts for staff. If this is the case, it may be that stress is less likely in larger organisations, and more likely in smaller or micro-organisations. Therefore it can be hypothesised that results from the present study **underestimate** levels of stress in the industry as a whole.

2. Smaller organisations may benefit from closer support networks between employees, greater control over workload, and smaller commuting distances than employees in larger organisations. These aspects of work could reduce the likelihood of individuals experiencing stress, and, therefore, if this is the case, it may be that stress is less likely in smaller organisations, and more likely in larger organisations. Therefore it can be hypothesised that the results from the present study **overestimate** levels of stress in the industry as a whole.

Unfortunately, there is no definitive way to prove which hypothesis is true. The stakeholders tended to suggest that hypothesis 1 was more likely, i.e. that the survey was likely to have underestimated levels of stress in the industry as a whole. The survey findings suggest there was little difference in whether those individuals who reported stress worked in small, medium or large organisations. Interestingly, HSE is focusing the implementation of the Management Standards in the industry sectors where there is most stress-related ill health. These sectors, health, education, central and local government and financial services, tend to comprise larger organisations.

Whilst the sample was not representative of the industry in terms of the proportion of small companies, it may be more representative in terms of the actual proportion of workforce working within large companies. For example, if nine companies employ 10 people and one company employs 110 people, 90% of the companies are still small, but 55% of the workforce work for a large company. In this way, the present sample may be more representative of the industry workforce, and hence the findings may provide a more accurate picture of stress in the construction industry than previously discussed.

- **The sample was not representative of the industry in terms of company size: there was a much larger proportion of large organisations in the sample than is true of the industry. It is possible that this will have affected the findings of the survey, possibly leading to an underestimation of prevalence of stress.**

7.1.5 Employment contract

The vast majority of the present sample had permanent contracts. This is another area in which the survey does not accurately reflect the construction industry as a whole, as it is likely many construction industry workers do not have permanent contracts. Indeed, the DTI (DTI, 2005) estimates around 40% of the industry are self-employed. This should be borne in mind when interpreting the survey findings, for example, it is possible that workers not on permanent contracts may work longer hours than those on contracts, take less time off work for ill health as they will not receive sick pay, or experience lower job security which can be associated with work-related stress.

- **The sample was not fully representative of the industry in terms of employment contract. The majority of respondents in this sample had permanent contracts. This may have affected results on working hours or time off sick.**

7.1.6 Working hours

The average number of hours worked in the past week was 47.6 hours. This is considerably longer than the 'standard' working week of 37 hours, and is almost identical to the maximum weekly working hours of 48 suggested by the Working Time Directive (DTI, 2006).

Long hours working can be defined as working over 48 hours per week (Beswick and White, 2002). Around 50% of the present sample worked 49 hours per week or over. This finding can be contrasted with other data on working hours. For example, the Workplace Employee

Relations Survey, 1998 (reported in DTI, 2003), based on 3,000 interviews and around 30,000 questionnaires with excellent response rates, found that around 12% of the sample of the general working population worked 49 hours over (including overtime and extra hours). Other data suggests 25% of the UK workforce in full time employment work in excess of 48 hours per week (Spring 2001 Labour Force Survey, cited in DTI, 2003).

The 1999 UK Labour Force Survey (again cited in DTI, 2003) breaks down working hours data for different industry sectors, and found that around 27% of the survey sample who worked in construction worked over 48 hours per week. Their analysis of the British Household Panel Survey data, with a sample of 3,743 interviews conducted in 1997/8, suggested 35% of those working in the construction sector worked more than 48 hours per week. After examining data from a number of sources, the DTI authors conclude that construction sector is among those sectors with a particularly high incidence of long hours working.

It can be concluded that those individuals sampled in the present survey work, on average, longer hours than the average UK worker. The data also confirms other research that suggests construction sector workers have a particularly high incidence of long hours working.

Respondents who worked in management roles tended to work over 48 hours on average in the seven days before the survey, although so did general construction operatives.

- **The construction industry, as sampled by this study, tends to work long hours compared to the average UK worker.**

7.1.7 Job title

The survey sampled those ‘high stress’ job titles identified through stakeholder interviews. Most job titles were well represented by the sample, with the exception of Director/Partners. Regarding ‘control’ groups, as has previously been discussed, the demolition industry was not included as a control group as it was difficult to encourage participation from this group in this survey. General construction operatives are well represented, but house-building operatives are not so well represented.

Of interest is the large number of individuals who chose to classify themselves in the ‘other’ job category. Respondents described a wide variety of jobs titles. The initial interviews with stakeholders highlighted that many job titles were not standard within the industry (for example, a project manager in one company may perform a different role to a project manager in another company), and this was confirmed by the responses to the questionnaire.

- **The sample contains a variety of job titles, most at sufficient numbers to allow fairly robust conclusions to be drawn from the data regarding the relative stress levels of the groups in the sample. However, there is a lack of consistency of job title terminology within the industry, and individuals perform a large variety of tasks.**

7.2 EXTENT OF ILL HEALTH

7.2.1 Self-report measures

Self-report measures of ill health necessarily depend on the respondent’s perception of medical illness, and therefore reflect an individual’s perception of ill health, rather than being an objective assessment of ill health. HSE recognises this:

'[Self report measures] cannot be taken directly as an indicator of the 'true' extent of work-related illness. People's beliefs may be mistaken: they may ascribe the cause of illness to their work when there is no such link; and may fail to recognise a link with working conditions when there is one.' (HSE, 2006).

However, individual's perceptions of their ill health are of interest in their own right, and as long as the limitations of self-report methods are borne in mind, provide a useful indication of levels of ill health within an industry.

7.2.2 Ill health

The extent of ill health was measured using the same question as had been used in the SWI 2003/04 survey. It should be noted that in the SWI survey, stress as ill health is mentioned, unprompted, by the respondent. However in the present survey the respondent already knows they are being asked about stress, and therefore may be more likely to report it.

The vast majority of respondents had not experienced ill health, with around 23% of the sample reporting they had experienced work-related ill health within the last 12 months.

This level of ill health for the present sample of the construction industry is greater than that of the general working population as measured by other surveys such as the SWI surveys. The higher level of reported ill health found in the present survey is likely to be due to a number of methodological reasons already discussed, for example, responder bias and the survey instrument and distribution method (the questionnaire dealing exclusively with ill health and stress, respondents potentially feeling more comfortable with reporting their ill health anonymously etc), and the survey targeting certain job roles.

The three most commonly reported illnesses were musculoskeletal disorders (MSDs), stress, and headaches or eyestrain. Other surveys (e.g., SWI 2003/4) found that MSDs and stress are the top two most commonly reported illnesses for the general working population. In this respect, in terms of work-related ill health outcomes, the present sample of construction industry workers can be said to be similar to UK industry as a whole. Headaches or eyestrain could be a symptom of stress, or be associated with those job roles where close computer work is required, or where there is a high level of/prolonged exposure to noise. 'Other' illnesses reported by respondents such as Irritable Bowel Syndrome and difficulty sleeping may also be symptoms of stress.

Intelligence on levels of ill health within the construction industry (HSE, 2004a) suggests that the following illnesses are of significance within the construction sector:

- Musculoskeletal disorders
- Asbestos-related diseases
- Vibration-related disorders
- Skin disease
- Work-related hearing loss

These HSE data suggest that the construction sector experiences below-average rates for stress, depression and anxiety and occupational infections, and around average rates for occupational asthma.

The results of the present study provide further evidence that musculoskeletal disorders are perhaps the most pressing occupational health issue within the industry. However, they also suggest that stress, depression and anxiety may also be a health concern for the industry sampled by the present study. Further discussion of this issue is provided in subsequent parts of this discussion.

- **The prevalence of ill health in the construction industry found in the present study was higher than reported by other studies. This is likely to be due to differences in sampling methods. Musculoskeletal disorders, stress and headaches/eyestrain were the top three reported ill health outcomes. This is similar to patterns of ill health found in other industries, but not necessarily the construction industry.**

7.3 THE EXTENT OF STRESS

7.3.1 Definition of stress

Work-related stress is a concept that has been defined in a variety of ways, and the term is used to describe a wide range of performance and health effects of differing severity. The present study has used HSE's definition of stress, namely:

“The adverse reaction people have to excessive pressure or other types of demand placed on them”

MacKay et al (2004) provide a thorough discussion of the theoretical underpinnings of HSE's definition and concept of work-related stress. However, the key points to draw out of the definition are that:

- Stress represents the 'adverse reaction' an individual has that can ultimately lead to ill health, both physical and mental. Depression and anxiety are 'medical' mental ill health outcomes that can be related to stress.
- The demands of a situation exceed the individual's perceived ability to cope – there is an imbalance.
- 'Normal' pressure can be beneficial, keeping us motivated. It is when it becomes excessive that it can lead to stress, and ultimately ill health or other negative performance outcomes.

The individual's perception of a situation and their ability to cope is fundamental to the concept of stress, and therefore self-report measures of work-related stress are particularly useful. The terms anxiety and depression are also used by the 'lay person', but also refer to mental ill health as diagnosed by a medical professional.

7.3.2 The measurement of stress

HSE's definition of stress was included on the front page of the questionnaire.

The extent of stress was measured by the question below:

- Within the past 12 months have you suffered from any illness, disability or other physical or mental problem that was caused by or made worse by your job or work done in the past? How would you describe this illness [stress, depression or anxiety]. *The SWI survey question.*

An additional question was also used to assess job stress:

- In general, how do you find your job? [not at all stressful – extremely stressful]. *The Bristol survey question.*

The SWI question frames stress in the context of an ill health outcome. The Bristol question, presented after the list of job-related sources of stress, frames stress in a work-design context.

Including two methods of assessing stress in the questionnaire helps to cross-check and validate the findings. In addition, providing a definition of stress and specifying that the survey was interested in work-related stress may have helped to ensure participants were all ‘talking about the same thing’, therefore adding to the validity of the questionnaire. Nevertheless, both are single item measures of stress, which have inherent weaknesses. However, HSE (2004b) reports that using the Bristol single item measure, increased reporting of stressfulness was found to be associated with poor mental health as measured by other multiple-item measures of mental health. Therefore, the single item measure does provide some indication of stress.

It must also be noted that the survey may not have captured work-related stress for some members of the construction industry, as they may not be familiar with the concept and language used to describe work-related stress, for example, classifying stressors such as commuting and living away from home as home-related stressors rather than work-related. This was mentioned by some of the industry stakeholders during the interviews.

In conclusion, the methods used to assess the extent of stress within the study may suffer from methodological weaknesses, however, given that the experience of work-related stress depends to a large extent on individual perceptions, the results still provide a useful picture of the extent of stress for those sampled.

7.3.2.1 The SWI question⁴

Around 5% of the present sample of construction industry workers are experiencing stress, depression or anxiety that they believe is caused by or made worse by work. This is a greater prevalence of stress than other surveys estimate occurs in the UK working population as a whole, and also in the construction industry. This difference is likely to be due to the sample and methodological limitations discussed previously. For example, the present survey may have overestimated the prevalence of stress in comparison to the SWI, as the present survey was introduced as a ‘stress’ questionnaire, whilst the SWI survey was introduced as a ‘general illness’ survey. Therefore:

1. Respondents to the present survey may have been primed by the introduction to focus on stress as an issue, or;
2. Those people suffering from stress and/ or related illnesses may have been more likely to respond to the questionnaire than other individuals.

In addition, given the response rate of the survey and the possibility of non-response bias, it could be that the figure of 5% represents an overestimation of stress levels.

However the potential limitations may not be so severe as the interviews with the stakeholders tended to suggest that the present survey offers a relatively accurate picture of the levels of

⁴ *The SWI question read: ‘Within the past 12 months have you suffered from any illness, disability or other physical or mental problem that was caused or made worse by your job or work done in the past?’*

stress in the industry, and respondents may have felt able to answer more honestly due to the anonymity of the questionnaire.

The data also suggest that females are more likely to report stress than males. This may be because females are more likely to report work-related stress in general, or due to other pressures or demands that are unique to the female working in a male-dominated industry. Alternatively, it may reflect the nature of the work that the women in the present sample did.

7.3.2.2 The Bristol question⁵

It is the convention to combine respondents who answered that they found their job ‘very’ or ‘extremely’ stressful into one category, which is defined as ‘high stress’. This suggests that for those respondents in the present sample, around 10% are experiencing their jobs as highly stressful.

This is twice the prevalence rate for stress for the sample as measured by the SWI question (which suggests a prevalence figure of 5%). This variation is probably due to the difference in how the two items measure stress. The SWI questions frames stress in an ill health context, and the Bristol question frames stress in a job demands context. Considering stress in terms of ill health, along with conditions such as ‘heart disease/attack’, ‘breathing or lung problems’, and ‘infectious disease’ as highlighted on the questionnaire, it is likely that respondents perceived stress to be a relatively serious individual health problem and thus may have been less likely to classify themselves as stressed compared to perceiving their job as stressful. This hypothesis would account for the higher prevalence as measured by the Bristol question.

Also of interest are percentages of respondents who rated their job from not at all stressful (12%, around 1 in 10 of the sample), which is similar to other surveys, and the approximately 40% who reported their job as mildly stressful, which is slightly higher than other surveys. Combined with the approximately 37% who rate their job as moderately stressful, it could be concluded that the vast majority of the sample experience relatively ‘normal’ levels of stress or no stress. However, the high percentage (10%) of individuals rating their work as either very or extremely stressful (i.e., demonstrating ‘high stress’) may be a cause for concern: These individuals may have the potential to experience stress-related ill health if this level of stress is maintained. The ability to cope with pressure can vary depending on other demands, so if any of these individual’s ability to cope changed, they may become ill. These individuals suffering from ‘high stress’ therefore present additional high-risk individuals, who, without interventions to reduce stress, could lead to increased prevalence rates for the industry in the future.

- **The present survey suggests the prevalence of stress for the sampled job roles in the construction industry is around 5%. Approximately 10% find their job very or extremely stressful.**

7.3.3 Time taken off work due to stress

Of those individuals who reported work-related stress, the average number of days taken off due to stress was 5.2. Around one third of the ‘stressed’ respondents did not take any time off work, and around one third had more than one episode of absence. Some respondents reported how long they had taken off work but did not classify themselves as experiencing stress. For these individuals, the average number of days taken off per episode was 6.2.

⁵ The Bristol question read: ‘In general, how do you find your job?’ The options for answering this question were: ‘not at all stressful’, ‘mildly stressful’, ‘moderately stressful’, ‘very stressful’ and ‘extremely stressful’.

Taking these two results together, members of the construction industry take approximately one working week off work due to stress. Other data (HSE, 2005g) suggests that there is an average of 29 days taken off work per stress episode for the UK working population. Looking at the construction sector, the CIOB report (CIOB 2006) note that of the 6% of those who had experienced occupational stress in their sample, 50% had taken a week of work, 16% had taken a month off and 10% had taken longer than a month. Those in the construction industry, as sampled in the present survey, and the CIOB survey take considerably less time off work, or no time at all off work, due to work-related stress.

This could be due to employment contracts that may not support paid sick leave, the 'macho' culture within the industry which prevents people admitting to stress and taking time off, or the perception that there is too great a demand on individuals to allow time to be taken off work.

- **Individuals within the construction industry as sampled in the present survey take far less time off work due to work-related stress than the general working population.**

7.4 WHO IS MOST STRESSED?

A large percentage of the sample completed the Bristol question, and therefore analysing who was reporting their jobs as 'highly stressful' from this measure of stress provides a fairly robust picture of who may be most stressed within the industry roles sampled, although caution must be taken not to over-generalise these results due to the sampling biases already highlighted. To this end, the following jobs reported highest stress:

- Director/partner
- Site Manager
- Project Manager
- Road maintenance labourer
- Other management functions

These results confirm the evidence gathered during the initial stakeholder consultation phase of this research: stakeholders felt that management grades experience more stress than the more manual job roles. The exception to this is the appearance of the road maintenance labourer in the 'most stressed' list, although stakeholders had suggested individuals working in this role may be stressed due to the dangerous nature of the job and unsocial working hours.

Analysis of the SWI question in terms of job roles provides less reliable evidence of who may be most stressed within the industry, as there are smaller numbers of respondents involved. However, what is interesting from this analysis is that it confirms that project managers are experiencing stress, along with designers and administrative staff.

Again, these results confirm, to a large extent, what was found during the initial stakeholder consultation. However, of some surprise is the finding that administrative staff report stress that is making them ill, with around 14% of administrative staff in the present sample reporting stress.

Interestingly, the other control groups (house building and general construction operatives/labourers) did not appear on the most stressed list.

When the original control groups were compared with the original and regrouped experimental groups, the experimental groups were over two times more likely to report stress both on the SWI and the Bristol questions than the control groups in this sample. Again, this confirms the stakeholders' most stressed job roles list.

- **Management grade employees, along with road maintenance staff, designers and administration staff report more stress than other job roles, primarily construction labourers/operatives, within the present sample.**

7.5 SOURCES OF STRESS

By far the most stressful aspect of work for almost all job roles was having too much to do in the time available. This confirms findings from the initial stakeholder interviews, who painted a picture of a fast-paced industry where there were great pressures to win and deliver work as cheaply and quickly as possible in a very competitive marketplace. Other key sources of stress reported by survey respondents mostly confirmed the experience of stakeholders consulted in earlier stages of the project, and were generally not a surprise to stakeholders who were consulted about the results of the survey.

The main sources of stress found in the present survey reflect those found in the literature review. For example, Sutherland and Davidson (1993) identified that time pressures, working long hours, travel to and from the job, and responsibility for situations not fully in their own control as key stressors, amongst others for construction site managers.

When the sources of stress were analysed by company size, the two top sources were the same for all sizes of company, namely:

- I have too much work to do in the time available
- I travel or commute

This again reflects the stakeholders' comments. However, smaller businesses found having tasks or resources to juggle the third main source of stress, compared to having responsibility for the safety of others at work which was the third source for medium and large companies. This may reflect the slight difference in the type of work/role presented by the different sized companies.

The sources of stress were analysed for the respondents who reported being 'stressed' (as measured by both the SWI and Bristol questions). It was found that there were significant associations for those who agreed with the statements on sources of stress and those who reported stress. The exception to this was for the statements:

- I work weekends and nights
- I travel or commute
- I am responsible for the safety of others at work
- My job is dangerous

For these statements, there were no significant associations. It is interesting that, particularly the last three, do not have significant associations, despite being reported as significant

stressors for the construction industry respondents in this sample. It is not clear why this might be the case.

When looking at sources of stress for the different job titles for the original experimental group they generally reflected the top five sources of stress across the industry for this sample as a whole, with slight variations for each role. This is likely to reflect the different responsibilities for each role.

- **A large stressor for many members of the construction industry is having too much to do in the available time. In addition, for some management grades, being responsible for the safety of others was found to be particularly stressful. Road maintenance operatives/labourers found the dangerous nature of their job to be stressful.**

7.5.1 The Management Standards

HSE's Management Standards for work-related stress identify six areas of work design, which, if not managed appropriately, can lead to work-related stress and stress-related ill health. An analysis of those items within the present survey that focused on the six Management Standard areas suggests that most survey respondents:

- ✓ feel they can control how they do their work
- ✓ get enough support from their boss
- ✓ experience good relations with co-workers
- ✓ understand their duties and responsibilities
- ✓ are told about change at work
- ✗ have too much work to do in the time available

This confirms the results from the analysis of other questionnaire items.

However, it is important to note that the first pass question for the relationships element of the Management Standards was not used in the survey.

8 RECOMMENDATIONS

The primary objectives of this project were to assess the prevalence and distribution of work-related stress in the construction industry. The data suggest that around 5% of those sampled by the present research are experiencing stress, depression or anxiety at a level they believe is making them ill, with up to 10% of the sample finding their jobs very or extremely stressful. These findings suggest stress is an occupational health topic the industry may need to address.

This research is, as far as the authors are aware, the one of the largest samples of UK construction industry employees surveyed about their experience of work-related stress to date. However, the findings of this research are subject to some weaknesses due to the methodology used – primarily an under-representation of small businesses in the sample, and a fairly low response rate.

The recommendations focus on three areas:

- Ideas for further research
- Ideas for HSE
- Specific interventions suggested by stakeholders

8.1 IDEAS FOR FURTHER RESEARCH

As this is the first large-scale investigation of work-related stress in the industry, further research would enable a more complete picture of stress prevalence and distribution within the construction industry. The following suggestions could be considered:

1. Ask a sample of small to medium sized enterprises (SMEs) in the construction industry how they feel about the present study's findings and how representative they are of their experience. It may be beneficial to use qualitative techniques such as interviews, focus groups or workshops.
2. This research has focused on five jobs that stakeholders suggested were more likely to experience stress, along with two control groups. Further research would benefit from focusing on other job roles within the industry who are not considered as stressed in order to gain a more complete picture of the prevalence and distribution of stress within the construction industry.
3. In order to encourage higher response rates in further research consider utilising incentives to assess the prevalence and distribution of stress within the industry.
4. This research has focused on assessing the prevalence and distribution of stress, but not potential solutions. Therefore, consider further research to explore and consult the industry about potential and realistic solutions to the problem of stress in the industry.

8.2 IDEAS FOR HSE

Findings suggest stress is an occupational health issue for the industry.

5. Consider tackling work-related stress along with other occupational health priorities within the industry.
6. Encourage construction employers to keep and use records of occupational ill health, including cases of work-related stress.
7. Consider focusing efforts on those job titles identified by this research as being particularly stressed.
8. The issue of workforce engagement can play an important role, and features in HSE's health and safety priorities for the construction sector. Worker consultation has been found to improve health and safety performance⁶. HSE's Management Standards approach to tackling work-related stress emphasises the importance of worker consultation, and could be considered as a useful approach for the construction industry to address stress.
9. Consider raising awareness of work-related stress in conjunction with other existing health or wider culture change initiatives, such as Working Well Together (WWT) road shows.
10. Consider further research to investigate the impact of stress on performance and accident risk within the industry.

8.3 SPECIFIC INTERVENTIONS SUGGESTED BY STAKEHOLDERS

HSE's Management Standards approach to tackling work-related stress emphasises that organisations should work in partnership with their employees to develop ways to tackle stress in their organisations. The stakeholders interviewed for this research suggested specific solutions that may help to reduce levels of work-related stress, and a selection of these are summarised below. However, it was noted by many stakeholders that some aspects of the culture of the industry, such as long working hours and the 'macho' nature of the industry, might take some time to change.

The interventions suggested below are independent of HSE and are based solely on stakeholder comments.

Strategic interventions suggested by stakeholders

- Provide industry-specific case studies to demonstrate what stress is and how it can be tackled in a simple manner, along with best practice examples (e.g. similar to the 'Real People, Real Solutions' information).
- Develop and share examples of the business case for tackling work-related stress.
- Provide employees with a formal dedicated stress 'helpline', or Employee Assistance Programmes they can call to discuss work-related stress.
- Consider whether goal-setting schemes that focus on reducing accidents on sites can also be used to address health issues.
- Consider proactive health checks to help identify work-related stress problems and solutions.
- Include the requirement for contractors to have robust occupational health management in tenders.

⁶ <http://www.hse.gov.uk/construction/program/engage.pdf>

- Consider how the Construction Design and Management Regulations could be used to minimise workload or to encourage clients to be more realistic with regard to their timescales. A study to help develop realistic timescales for types of project may help with this.

Workload interventions suggested by stakeholders

- Organisations may like to consider how they can help managers manage their workload, e.g. through training on time management. Training workforces on more than one skill may also help organisations be more flexible in their use of resources, relieving pressure as demands change.
- Consider systems that allow for working long hours during periods of high demand but then allow time off in lieu when demands are less.
- Regarding travelling and commuting, consider providing services, such as dedicated bus services, to get workers to site on larger projects. For management roles that require individuals to travel on their own or at different times to a number of sites, use of technology such as mobile phones and wireless internet connections may help to reduce the need to visit sites or help solve some problems from a distance.

Other interventions suggested by stakeholders

- Encourage all workers to be responsible for their own health and safety, and not assume it is solely a management responsibility. This could relieve some of the pressure on managers.
- Encourage greater communication within organisations. For example, use a 'suggestion box' scheme and ensure suggestions are acted on.

9 APPENDICES

9.1 APPENDIX 1: INTERVIEW SCHEDULES

9.1.1 Interview Schedule for key stakeholders

Thank you for agreeing to assist us with this research.
You will remain completely anonymous - no names will be attributed to any of the information that you give us.

General aim: To get a background understanding of stress in the construction industry from a number of experts in the field.

Stress

Is stress an issue/problem that is recognised in the construction industry?
Why/why not? Has it always been recognised?

Do you think that stress is an issue/problem in the construction industry?

What are the main sources of stress for workers in the construction industry?

Are you aware if certain jobs/roles/positions within the construction industry are under the greater stress/pressure than others?

Is there a demographic pattern to stress in the construction industry?

Are you aware of any reports/information/statistics on stress in the construction industry?

Are there any other issues that we have not covered relating to stress in the construction industry that you think would be useful for us to know about?

Questionnaire & Distribution

Do you think that questionnaires are an appropriate way to collect information from workers in the construction industry?

Will construction workers fill out a questionnaire? Would it be a waste of time? Would you recommend an alternative method?

Do you think that the use of questionnaires could be made more successful?

How do you think questionnaires should be distributed?

Handed out on building sites by project team? By managers? Are there certain days/times that would be more appropriate? Should there be promotion in Trade magazines, Newspapers etc?

Industry

What level of involvement do Unions have in the construction industry?

Could the Unions assist us? Which ones? In what way/s do you think they could help?

Are there any other contacts/gatekeepers within or outside of HSE who would be useful for us to contact?

Do people refer to stress/pressure within the construction industry or are other terms used?

Does the culture within the construction industry have an impact on whether workers report stress?

Is this a macho culture?

Are there any language issues that we should consider?

Will all construction workers be able to read a questionnaire? Literacy skills? Migrant workers?

Should the questionnaire be available in more than one language?

Health & safety issues

Are there any issues we should be aware of regarding the safety of the project team when visiting construction sites?

General H&S? Gender of researcher? Lone working?

Would you be happy for us to contact you again in the future for further advice or assistance?

Telephone number: _____

Email address: _____

Do you have any questions or is there anything else you wish to add?

Close

9.1.2 Interview Schedule for employers

Thank you for agreeing to assist us with this research.

You will remain completely anonymous - no names will be attributed to any of the information that you give us.

General aim: To get a background understanding of stress in the construction industry and our data collection method from a number of employers.

Stress

Is stress an issue/problem that is recognised in the construction industry?

Why/why not? Has it always been recognised?

Do you think that stress is an issue/problem in for you, your colleagues or other employees?

Do you agree with our list of primary stressors in the industry? And, are there any missing from the list?

Do you agree with our list of 'most stressed' job roles within the construction industry? And, Do you agree with our list of controls, i.e. are they likely to be under less pressure/stress.

Is there a demographic pattern to stress in the construction industry?

Are you aware of any reports/information/statistics on stress in the construction industry?

Are there any other issues that we have not covered relating to stress in the construction industry that you think would be useful for us to know about?

Questionnaire & Distribution

Could we distribute questionnaires to employees in your company? Or, would it be possible for us to contact sub-contractors that you employ?

If yes:

What would be the most appropriate way for us to distribute our questionnaires?

Handed out on building sites by project team? By managers? An online survey? Are there certain days/times that would be more appropriate? Should there be promotion in Trade magazines, Newspapers etc?

Do you think the questionnaire is simple/easy to follow? Could the format or questioning be improved for employees in your organisation?

Do you think that employees will fill out a questionnaire?

Do you think that the use of questionnaires could be made more successful?

Would an incentive be needed, if so what could this be?

What type of construction work do you do? e.g. major construction, house building.

How many employees do you have in each of our 'most stressed' job roles or controls?

What regions of the country do you operate in?

Industry

Are there any other contacts/gatekeepers who would be useful for us to contact?

Do people refer to stress/pressure within the construction industry or are other terms used?

Does the culture within the construction industry have an impact on whether workers report stress?

Is this a macho culture?

Are there any language issues that we should consider?

Will all construction workers be able to read a questionnaire? Literacy skills? Migrant workers? Should the questionnaire be available in more than one language?

Health & safety issues

Are there any issues we should be aware of regarding the safety of the project team when visiting construction sites?

General H&S? Gender of researcher? Lone working?

Would you be happy for us to contact you again in the future for further advice or assistance?

Telephone number: _____

Email address: _____

Do you have any questions or is there anything else you wish to add?

Close

9.2 APPENDIX 2: QUESTIONNAIRE PILOT

Three slightly different versions of the questionnaire were produced, each containing the same basic items. Space was provided in the questionnaire for participants to comment on the questionnaire itself.

The questionnaire was piloted at three HSE Construction Safety and Health Awareness Days (SHADs). Delegates at SHADs attend presentations and demonstrations relating to health and safety at work. The questionnaires were distributed on delegate's seats at one SHAD, and in delegate packs at the two remaining SHADs. Delegates were told about the study by a HSE or HSL representative and asked to complete the questionnaire, returning it either directly to the HSE/L representative or in the post.

Approximately 490 questionnaires were distributed. Forty-eight individuals responded, with the majority returning the questionnaire by post. This represents a 9.8% response rate.

Feedback from stakeholders suggested the questionnaire needed to be as short as possible. To achieve this, exploratory factor analyses were conducted on the 'sources of stress' item pool to reduce the number of items to only those representing a consistent and clear theme in the questionnaire. The process also helps to determine scales for each chief underlying dimension of the variables. The reliability of the resulting sets of items or scales was then assessed by a correlation co-efficient. The details of these analyses are presented below.

Analysis of pilot data

Checks were made on the data to ensure they were suitable for analysis. Where necessary, appropriate statistical techniques were used to improve the suitability of the data for analysis. An exploratory factor analysis was conducted. Items were removed from the analysis if they were significantly related to two or more factors. After items were removed, the factor analysis was rerun, until no items were found to relate to more than one factor.

Five factors were determined and labelled by the research team. The reliability of the scales were calculated and all were found to be reliable. The reliability statistics are shown in the following table.

Table 7.1 Reliability statistics for the questionnaire scales.

Scale	Number of items	Reliability
Working with others	6	0.863
Work and home life	5	0.784
Responsibilities	4	0.746
Demands of the job	2	0.720
Other sources of stress	4	0.542

Refinement of items

Stakeholders, employers and pilot respondents had suggested additional sources of stress that the questionnaire should explore. The research team reviewed these and found that the majority of the sources of stress had already been covered in the refined items with the exception of the following:

- Clients give me inflexible deadlines (included in 'demands of the job' scale)
- I can't talk to my boss about my work (included in 'working with others' scale)

Item 'I am not told about change at work' was moved from the 'working with others' scale, to the 'other sources of stress' scale as it was felt to fit more naturally there.

The items were reviewed for clarity and simplicity of language, and some items were modified accordingly.

Other minor changes were also made to the questionnaire, for example the final version was produced in colour to improve the presentation style.

9.3 APPENDIX 3: THE QUESTIONNAIRE

Please see following page.



WE NEED YOUR HELP!

Why we need your help

The Health and Safety Executive (HSE) have very little information about stress in the construction industry. This questionnaire will help us gather more information about work-related stress and its causes.

What will happen to my answers?

Your questionnaire will be **anonymous**. We do not need your name or the name of your company. Your answers will be combined with other people's answers. We will then analyse the data and share the findings with HSE and the construction industry.

How do I fill in the questionnaire?

Please tick the boxes that best describe how you feel or what you do. Please follow the instructions throughout the questionnaire.

Please return the questionnaire in the envelope provided **by January 31st**. You do **not** need to use a stamp.

If you have any questions about the questionnaire please contact:

Ed Corbett

HSE's definition of stress:

“The adverse reaction people have to excessive pressure or other types of demand placed on them”

Please return the completed questionnaire by 31st January 2006 to
Ed Corbett,
Freepost RLXX-CTZE-HJBE,
Health and Safety Laboratory, Harpur Hill, BUXTON, SK17 9JN

Section A – Your health

<p>1. Within the past 12 months have you suffered from any illness, disability or other physical or mental problem that was caused or made worse by your job or work done in the past?</p>		<input type="checkbox"/> Yes If 'yes', please answer question 2 <input type="checkbox"/> No If 'no', please go to section B
<p>2. How would you describe this illness?</p> <p><i>Please tick only one box. If you suffer from more than one illness, please select only the most serious.</i></p>	<input type="checkbox"/> Bone, joint or muscle problems <input type="checkbox"/> Breathing or lung problems <input type="checkbox"/> Skin problems <input type="checkbox"/> Hearing problems <input type="checkbox"/> Stress, depression or anxiety (<i>please answer questions 3&4</i>) <input type="checkbox"/> Headache and/or eyestrain <input type="checkbox"/> Heart disease/attack, other circulatory system <input type="checkbox"/> Infectious disease (virus, bacteria) <input type="checkbox"/> Other (<i>please state below</i>)	
<p><i>If you have ticked 'stress, depression or anxiety' above, please answer questions 3 and 4. If not, please go to section B.</i></p>		
<p>3. In the last 12 months, how many days (approx.) in total have you had off work due to work-related stress?</p>	_____ days	
<p>4. In the last 12 months, how many separate times have you had time off work due to work-related stress?</p>	_____ times	

Section B – Sources of stress, depression or anxiety in your job

A number of statements about work are printed below. Please tick in the blue box whether you agree 'A' or disagree 'D' with the statement. If you have answered 'Agree' please tick **one** of the other coloured boxes.

Do you agree 'A' or disagree 'D' with the following statements about your work?

<u>Working with others</u>	A D		If 'Agree', how much stress does it cause you? (Please tick one)				
	A	D	None	A little	Moderate	A lot	Excessive
1. I don't get enough support from my boss	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. My boss doesn't give me feedback on my work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. I don't understand my duties and responsibilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. I don't get enough support from my co-workers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. There are poor relations with co-workers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I can't talk to my boss about my work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Do you agree 'A' or disagree 'D' with the following statements about your work?

<u>Work and home life</u>
7. I work weekends and/or nights
8. I travel or commute
9. I work away from my family/home
10. I don't have job security
11. I work long hours

A	D
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

If 'Agree', how much stress does it cause you? (Please tick one)				
None	A little	Moderate	A lot	Excessive
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<u>Responsibilities</u>
12. I am responsible for the safety of others at work
13. I find it difficult to comply with all of the rules
14. I have to deal with public disorder e.g., theft, vandalism, antisocial behaviour
15. My site has a labour/skills shortage

A	D
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

If 'Agree', how much stress does it cause you? (Please tick one)				
None	A little	Moderate	A lot	Excessive
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<u>Demands of the job</u>
16. I have too much work to do in the time available
17. I have to juggle tasks and resources
18. Clients give me inflexible deadlines

A	D
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

If 'Agree', how much stress does it cause you? (Please tick one)				
None	A little	Moderate	A lot	Excessive
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<u>Other sources of stress</u>
19. My job is dangerous
20. I don't get enough training
21. I can't control how I do my work
22. I can't control what I do at work
23. I am not told about change at work

A	D
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

If 'Agree', how much stress does it cause you? (Please tick one)				
None	A little	Moderate	A lot	Excessive
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

24. Out of all of the aspects of your job listed above, which do you find most stressful?

25. In general, how do you find your job?	Not at all stressful <input type="checkbox"/>	Mildly Stressful <input type="checkbox"/>	Moderately Stressful <input type="checkbox"/>	Very Stressful <input type="checkbox"/>	Extremely Stressful <input type="checkbox"/>
---	--	--	--	--	---

Please continue over the page

9.4 APPENDIX 4: LIST OF CONSTRUCTION INDUSTRY JOB ROLES

Wood occupations

Bench joiner
Carpenter and joiner
Formworker
Shopfitter
Wood machinist

Roofing occupations

Built up felt roofer
Lead sheeter
Liquid waterproofing systems operative
Mastic asphalter
Roof sheeter and cladder
Roof slater and tiler
Single ply roofer

Trowel occupations

Bricklayer
General construction operative
Stonemason

Interiors and finishing occupations

Ceiling fixer
Dryliner (fixed and finisher)
Floor layer
Glazier
Painter and decorator
Partitioner
Plasterer

Plant occupations

Plant-hire controller
Plant mechanic
Plant operator
Plant sales people

Demolition, scaffolding and steeple jacking occupations

Demolition operative
Plumber
Scaffolder
Steel erector
Steeplejack

Technical support occupations

Buyer
CAD operative
Estimator
Site engineer
Surveying technical support

Design, engineering, finance, planning and management occupations

Architect
Architectural technologist
Building control surveyor
Building services engineer
Building surveyor
Civil engineer
Civil engineer designer
Construction manager
Facilities manager
General practice surveyor
Geomatics surveyor
Geospatial modeller
Hydrographic surveyor
Land surveyor
Project manager
Quantity surveyor
Structural engineer
Town planner

9.5 APPENDIX 5: PERCENTAGE BREAKDOWN OF MOST STRESSFUL ASPECTS RESPONDENTS REPORTED FOR EACH JOB TITLE

	General construction labourer/ Site Operative	Site Manager	Administration: Health & Safety	Other management functions	House building labourer/ site operative
I don't get enough support from my boss	1.57	5.26	27.27	3.85	0.00
My boss doesn't give me feedback on my work	0.00	0.00	0.00	0.00	0.00
I don't understand my duties and responsibilities	0.00	0.00	0.00	0.00	0.00
I don't get enough support from my co-workers	0.00	0.00	0.00	0.00	0.00
There are poor relations with my co-workers	1.57	0.00	0.00	0.00	11.11
I can't talk to my boss about work	0.79	1.75	0.00	0.00	0.00
I work weekends and/or nights	3.94	1.75	0.00	0.00	0.00
I travel or commute	15.75	10.53	18.18	7.69	0.00
I work away from my family/home	7.09	1.75	0.00	3.85	0.00
I don't have job security	0.79	1.75	9.09	3.85	22.22
I work long hours	7.87	10.53	0.00	11.54	11.11
I am responsible for the safety of others at work	7.87	24.56	18.18	11.54	0.00
I find it difficult to comply with all of the rules	1.57	5.26	0.00	7.69	0.00
I have to deal with public disorder	0.79	1.75	0.00	0.00	0.00
My site has a labour/skills shortage	2.36	5.26	0.00	11.54	11.11
I have too much work to do in the time available	15.75	17.54	18.18	30.77	22.22
I have to juggle tasks and resources	2.36	1.75	0.00	0.00	11.11
Clients give me inflexible deadlines	0.00	1.75	9.09	3.85	0.00
My job is dangerous	21.26	0.00	0.00	0.00	0.00
I don't get enough training	2.36	1.75	0.00	0.00	0.00
I can't control how I do my work	3.15	3.51	0.00	0.00	0.00
I can't control what I do at work	0.79	1.75	0.00	0.00	11.11
I am not told about change at work	2.36	1.75	0.00	3.85	0.00

	Road maintenance labourer	Designer (e.g. surveyor/ civil engineer)	Supervisor/ foreman	Project manager
I don't get enough support from my boss	2.38	1.66	2.13	2.88
My boss doesn't give me feedback on my work	0.00	0.55	1.06	0.00
I don't understand my duties and responsibilities	0.00	0.00	0.00	0.00
I don't get enough support from my co-workers	2.38	2.76	2.13	2.88
There are poor relations with my co-workers	0.00	1.10	0.00	0.00
I can't talk to my boss about work	0.00	0.00	0.00	0.00
I work weekends and/or nights	0.00	0.00	1.06	0.96
I travel or commute	9.52	12.15	17.02	9.13
I work away from my family/home	0.00	1.10	6.38	6.25
I don't have job security	0.00	1.10	1.06	0.96
I work long hours	9.52	8.84	9.57	11.06
I am responsible for the safety of others at work	7.14	3.31	19.15	16.35
I find it difficult to comply with all of the rules	0.00	2.21	5.32	5.29
I have to deal with public disorder	2.38	0.00	3.19	0.48
My site has a labour/skills shortage	4.76	4.97	3.19	5.77
I have too much work to do in the time available	11.90	44.20	14.89	27.88
I have to juggle tasks and resources	7.14	5.52	4.26	4.81
Clients give me inflexible deadlines	0.00	1.66	1.06	3.37
My job is dangerous	23.81	0.55	6.38	0.00
I don't get enough training	7.14	2.76	0.00	0.00
I can't control how I do my work	0.00	1.10	0.00	0.48
I can't control what I do at work	2.38	1.66	1.06	0.00
I am not told about change at work	9.52	2.76	1.06	1.44

	Director/ Partner	Administration	Other	No Information for Job Title	Total
I don't get enough support from my boss	4.55	3.13	20.00	0.00	2.97
My boss doesn't give me feedback on my work	0.00	0.00	0.00	0.00	0.22
I don't understand my duties and responsibilities	0.00	3.13	0.00	0.00	0.22
I don't get enough support from my co-workers	4.55	4.69	0.00	5.71	2.31
There are poor relations with my co-workers	0.00	3.13	0.00	0.00	0.77
I can't talk to my boss about work	2.27	0.00	0.00	0.00	0.33
I work weekends and/or nights	0.00	0.00	10.00	0.00	1.10
I travel or commute	11.36	15.63	20.00	11.43	12.33
I work away from my family/home	6.82	0.00	0.00	5.71	4.07
I don't have job security	0.00	3.13	0.00	5.71	1.65
I work long hours	9.09	1.56	10.00	8.57	8.92
I am responsible for the safety of others at work	6.82	3.13	0.00	8.57	10.79
I find it difficult to comply with all of the rules	2.27	3.13	0.00	5.71	3.52
I have to deal with public disorder	0.00	0.00	0.00	0.00	0.77
My site has a labour/skills shortage	2.27	0.00	0.00	2.86	4.19
I have too much work to do in the time available	31.82	42.19	30.00	22.86	27.64
I have to juggle tasks and resources	11.36	0.00	0.00	11.43	4.52
Clients give me inflexible deadlines	2.27	1.56	0.00	0.00	1.76
My job is dangerous	0.00	0.00	10.00	2.86	5.07
I don't get enough training	0.00	9.38	0.00	2.86	2.09
I can't control how I do my work	2.27	0.00	0.00	0.00	1.10
I can't control what I do at work	0.00	3.13	0.00	0.00	1.10
I am not told about change at work	2.27	3.13	0.00	5.71	2.53

9.6 APPENDIX 6: RESULTS OF TESTS OF ASSOCIATION BETWEEN SWI QUESTION AND FACTORS

Statements about work	Disagree/ Agree with Statements about work						If present, level of stress it causes					
	Chi Square	P value	df	% of those reporting High Stress Disagree	% of those reporting High Stress Agree	Odds ratio (95% C. I.)	Chi Square	P value	df	Linear by linear Chi Square	P value	df
1. I don't get enough support from my boss	41.553	< 0.001	1	2.7%	10.3%	4.094 (2.587–6.479)	22.678	< 0.001	4	17.363	< 0.001	1
2. My boss doesn't give me feedback on my work	28.052	< 0.001	1	3.0%	9.1%	3.246 (2.054–5.128)	14.366	= 0.006	4	11.664	= 0.001	1
3. I don't understand my duties and responsibilities	10.813	= 0.001	1	4.3%	10%	2.490 (1.421–4.364)	Does not meet assumptions of chi square					
4. I don't get enough support from my co-workers	30.724	< 0.001	1	3.3%	10.3%	3.369 (2.144–5.295)	5.675	= 0.225	4	3.308	= 0.069	1
5. There are poor relations with co-workers	21.163	< 0.001	1	3.7%	10.2%	2.950 (1.824–4.771)	14.857	= 0.005	4	11.766	= 0.001	1
6. I can't talk to my boss about my work	37.754	< 0.001	1	3.5%	12.9%	4.087 (2.525–6.614)	3.581	= 0.466	4	2.974	= 0.085	1
7. I work weekends and/or nights	0.363	= 0.547	1				26.144	< 0.001	4	21.487	< 0.001	1
8. I travel or commute	0.159	= 0.690	1				12.266	= 0.015	4	6.012	= 0.014	1
9. I work away from my family/home	0.415	= 0.520	1				7.605	= 0.107	4	0.867	= 0.352	1
10. I don't have job security	4.316	= 0.038	1	4.4%	7.1%	1.668 (1.025–2.714)	Does not meet assumptions of chi square					
11. I work long hours	13.765	< 0.001	1	2.3%	6.5%	2.965 (1.627–5.404)	14.581	= 0.006	4	7.185	= 0.007	1
12. I am responsible for the safety of others at work	0.822	= 0.365	1				10.919	= 0.027	4	8.171	= 0.004	1
13. I find it difficult to comply with all of the rules	4.669	= 0.031	1	3.9%	6.3%	1.630 (1.043–2.550)	18.804	= 0.001	4	15.152	< 0.001	1

Statements about work	Disagree/ Agree with Statements about work						If present, level of stress it causes					
	Chi Square	P value	df	% of those reporting High Stress Disagree	% of those reporting High Stress Agree	Odds ratio (95% C. I.)	Chi Square	P value	df	Linear by linear Chi Square	P value	df
14. I have to deal with public disorder e.g., theft, vandalism, antisocial behaviour	0.421	= 0.516	1				Does not meet assumptions of chi square					
15. My site has a labour/skills shortage	7.993	= 0.005	1	3.6%	6.6%	1.907 (1.211–3.004)	4.551	= 0.337	4	2.981	= 0.084	1
16. I have too much work to do in the time available	14.759	< 0.001	1	2.6%	6.7%	2.732 (1.605–4.653)	36.675	< 0.001	4	35.284	< 0.001	1
17. I have to juggle tasks and resources	15.582	< 0.001	1	1.8%	6.4%	3.742 (1.857–7.540)	39.463	< 0.001	4	36.797	< 0.001	1
18. Clients give me inflexible deadlines	22.689	< 0.001	1	2.4%	7.4%	3.259 (19.55–5.435)	10.947	= 0.027	4	8.087	= 0.004	1
19. My job is dangerous	3.519	= 0.061	1				Does not meet assumptions of chi square					
20. I don't get enough training	19.199	< 0.001	1	3.8%	9.7%	2.723 (1.711–4.331)	Does not meet assumptions of chi square					
21. I can't control how I do my work	30.967	< 0.001	1	3.7%	12.4%	3.681 (2.261–5.993)	Does not meet assumptions of chi square					
22. I can't control what I do at work	11.741	= 0.001	1	4.0%	9.0%	2.333 (1.419–3.835)	Does not meet assumptions of chi square					
23. I am not told about change at work	12.591	< 0.001	1	3.8%	8.3%	2.283 (1.431–3.642)	Does not meet assumptions of chi square					

9.7 APPENDIX 7: RESULTS OF TESTS OF ASSOCIATION BETWEEN BRISTOL QUESTION AND FACTORS

Statements about work	Disagree/ Agree with Statements about work						If present, level of stress it causes					
	Chi Square	P value	df	% of those reporting High Stress Disagree	% of those reporting High Stress Agree	Odds ratio (95% C. I.)	Chi Square	P value	df	Linear by linear Chi Square	P value	df
1. I don't get enough support from my boss	89.911	< 0.001	1	5.2%	20.7%	4.744 (3.359–6.700)	71.082	< 0.001	4	67.109	< 0.001	1
2. My boss doesn't give me feedback on my work	53.146	< 0.001	1	6.1%	17.8%	3.356 (2.388–4.716)	69.185	< 0.001	4	60.979	< 0.001	1
3. I don't understand my duties and responsibilities	17.622	< 0.001	1	8.6%	18.8%	2.461 (1.597–3.793)	27.054	< 0.001	4	18.739	< 0.001	1
4. I don't get enough support from my co-workers	83.129	< 0.001	1	6.1%	22.2%	4.409 (3.139–6.194)	37.759	< 0.001	4	35.417	< 0.001	1
5. There are poor relations with co-workers	25.861	< 0.001	1	8%	18%	2.548 (1.759–3.691)	36.204	< 0.001	4	34.543	< 0.001	1
6. I can't talk to my boss about my work	44.508	< 0.001	1	7.7%	22%	3.402 (2.333–4.960)	49.366	< 0.001	4	41.107	< 0.001	1
7. I work weekends and/or nights	4.486	= 0.34	1				137.493	< 0.001	4	112.624	< 0.001	1
8. I travel or commute	2.725	= 0.099	1				112.529	< 0.001	4	91.186	< 0.001	1
9. I work away from my family/home	6.831	= 0.009	1	8.4%	12.6%	1.577 (1.118–2.224)	53.817	< 0.001	4	38.247	< 0.001	1
10. I don't have job security	19.592	< 0.001	1	8.1%	16.3%	2.190 (1.537–3.120)	22.729	< 0.001	4	17.742	< 0.001	1
11. I work long hours	41.380	< 0.001	1	3.3%	13.5%	4.570 (2.766–7.551)	242.169	< 0.001	4	175.176	< 0.001	1
12. I am responsible for the safety of others at work	4.089	= 0.043	1				121.435	< 0.001	4	107.328	< 0.001	1

Statements about work	Disagree/ Agree with Statements about work						If present, level of stress it causes					
	Chi Square	P value	df	% of those reporting High Stress Disagree	% of those reporting High Stress Agree	Odds ratio (95% C. I.)	Chi Square	P value	df	Linear by linear Chi Square	P value	df
13. I find it difficult to comply with all of the rules	27.928	< 0.001	1	6.7%	14.7%	2.412 (1.727–3.369)	64.942	< 0.001	4	60.900	< 0.001	1
14. I have to deal with public disorder e.g., theft, vandalism, antisocial behaviour	24.180	< 0.001	1	7.5%	15.8%	2.291 (1.635–3.211)	43.649	< 0.001	4	34.041	< 0.001	1
15. My site has a labour/skills shortage	51.723	< 0.001	1	5.6%	16.6%	3.374 (2.386–4.771)	54.188	< 0.001	4	42.623	< 0.001	1
16. I have too much work to do in the time available	65.617	< 0.001	1	2.8%	15%	6.120 (3.748–9.993)	207.233	< 0.001	4	169.700	< 0.001	1
17. I have to juggle tasks and resources	33.140	< 0.001	1	3.3%	12.7%	4.224 (2.490–7.166)	226.265	< 0.001	4	176.955	< 0.001	1
18. Clients give me inflexible deadlines	44.662	< 0.001	1	5.2%	15.3%	3.277 (2.278–4.714)	105.364	< 0.001	4	87.910	< 0.001	1
19. My job is dangerous	0.396	= 0.543	1				62.927	< 0.001	4	48.761	< 0.001	1
20. I don't get enough training	36.123	< 0.001	1	7.6%	18.8%	2.841 (1.998–4.040)	48.269	< 0.001	4	40.887	< 0.001	1
21. I can't control how I do my work	44.890	< 0.001	1	8.0%	22.9%	3.406 (2.339–4.961)		Does not meet the assumptions of Chi square				
22. I can't control what I do at work	20.783	< 0.001	1	8.3%	17.5%	2.348 (1.613–3.419)		Does not meet the assumptions of Chi square				
23. I am not told about change at work	13.244	< 0.001	1	8.2%	14.6%	1.920 (1.345–2.741)	37.107	< 0.001	4	35.105	< 0.001	1

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An analysis of the prevalence and distribution of stress in the construction industry

Although, when compared to other industries, the construction sector has relatively low levels of reported work-related stress, it is still a topic of concern for the industry. HSE commissioned research to gain a greater understanding of the level, causes and extent of work-related stress within the construction industry.

The Health and Safety Laboratory conducted a postal survey of a sample of construction industry workers to investigate work-related stress. The postal survey design was informed by qualitative interviews with industry stakeholders at the start of the research. The survey findings were also discussed with industry stakeholders on completion of the survey.

In total, 1,732 questionnaires were returned, and the response rate was 35%. The methodology used meant that the sample was subject to certain biases such as an over-representation of large companies and certain job types, however, the results provide an interesting insight into the level and extent of reported work-related stress within the industry.

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