



Developing Construction Supply-Chain Management Standards (CSCMS) for Improving Occupational Stress Management and Productivity in Construction Projects

Summary Report
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Executive Summary

This research was funded by B&CE (a non-profit organisation providing products and benefits to workers in the construction sector).

Occupational stress is increasingly becoming an issue of major concern in the United Kingdom (UK). It's estimated that stress-related illness costs the British industry £5 billion each year, with the Health and Safety Executive (HSE) calculating that stress, depression or anxiety account for 44 per cent of all work-related ill health cases and more than half of all sick days in an average year. The COVID-19 pandemic and the resulting economic recession further compound these issues by creating additional unprecedented social and economic pressures on the mental health and well-being of many people.

People working in construction are particularly at risk. Previous empirical studies have identified occupational stress as one of the root causes of unsafe behaviours in construction. Other major social problems such as high absenteeism, alcoholism, drug abuse and suicide have also become increasingly reported as consequent to occupational stress in construction. To date, the efforts of both academic and practitioner communities have been mainly focussed on managing occupational stress, as opposed to preventing or reducing its occurrence. Therefore, this study was conducted to investigate the main sources of stress in construction projects and to develop supply-chain management strategies for preventing or reducing occupational stress. This is a timely study given that the UK regulations for managing occupational health have not been updated for many years in response to the rapid changes in the way we procure, design and deliver construction projects. The study adopted a multi-methods qualitative research approach comprising of a systematic literature review of thirty peer-reviewed articles ranging from 1996 to 2021, an in-depth analysis of a live case study, and a focus group with a sample of industry experts.

This study provides novel contributions to knowledge, with the potential of leading to serious implications for practice and policy. The main contributions include:

- Identifying seven main sources of stress in UK construction projects.
- Revealing 'work-flow' as the most significant source of stress in UK construction projects, and identifying the main causes of setbacks and disruptions to work-flow in construction projects
- Shedding empirical light on the inadequacies of the critical path method, which is extensively used in construction for project planning and control. This includes explaining how and why it is seen by subcontractors as stressful, onerous, and ineffective.
- Highlighting the importance of engaging specialist sub-contractors in construction planning and design.

- Identifying the most stressful and common 'commercial risks and contractual concerns' in construction projects
- Highlighting 'single-stage competitive tendering based on cheapest price and shortest programme' as a deeply rooted source of stress and value-loss in construction.
- Identifying the significance of the 'leadership style' in influencing occupational stress in construction.
- Identifying the main individual coping mechanisms and organisational strategies adopted for managing occupational stress in UK construction projects
- Developing proactive measures for preventing or reducing occupational stress in construction projects
- Identifying the main barriers to making improvements to occupational stress management in construction.
- Providing recommendations, in the form of construction supply-chain management (CSM) strategies, on how to apply the HSE's Management Standards at a construction project level.

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1. Introduction

Occupational stress is increasingly becoming a wide-spread issue of concern in the United Kingdom (UK). Research commissioned by the Health and Safety Executive (HSE) has indicated that up to 5 million people in the UK feel 'very' or 'extremely' stressed by their work. In 2017/18, it was found that mental health problems due to stress, depression and anxiety account for 15.4 million sick leave days in the UK. In 2018/19, the HSE stated that stress, depression or anxiety account for 44% of all work-related ill health cases and 54% of all working days lost due to ill health. Stress in itself is not an illness, but it can make you ill. The HSE defines work-related stress as "*the adverse reaction people have to excessive pressure or other types of demand placed on them*". Stress affects employees and their families and colleagues by impacting on their physical and psychological conditions, but it also impacts on employers with costs relating to increased sickness absence, lost productivity, human error leading to re-work, increased accidents, replacement of staff and poor performance within their organisations. Figure 1 illustrates how the level of stress can impact on the individual's performance at work.

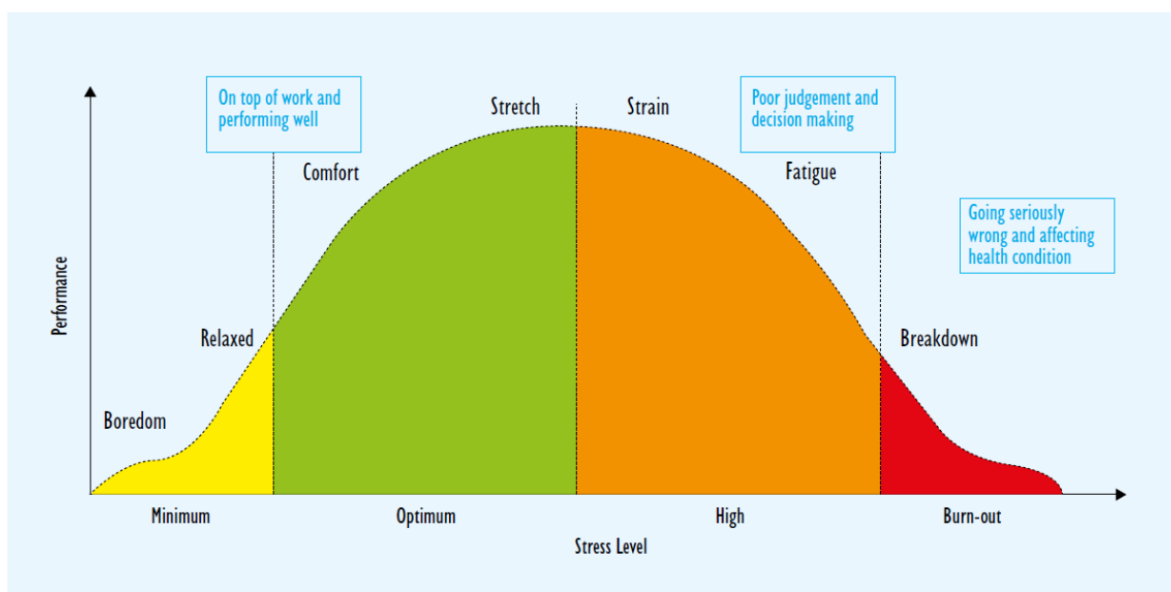


Figure 1: The influence of stress on the individual's performance at work
[Chart produced by Mates in Mind, as cited in CIOB (2020)]

People working in construction are particularly at risk (CITB, 2019). Although, the construction sector, when compared to other industries, has relatively low levels of 'reported' work-related stress, occupational stress and mental health are increasingly becoming critical issues of concern within the industry. There is anecdotal evidence and several previous research surveys (e.g., Chartered Institute of Building, 2006; HSE, 2007) that have suggested that stress is a growing concern within the construction industry. More recently, The Chartered Institute of Building (CIOB) undertook an extensive survey towards the end of 2019, to examine the state of mental health within the construction industry.

Several empirical studies have identified work-related stress as one of the root causes of unsafe behaviours in construction (for e.g., see Seo *et al.*, 2015; Leung *et al.*, 2016; Wu *et al.*, 2018). Other major social problems such as high absenteeism, alcoholism, drug abuse and suicide have also become increasingly reported as consequent to occupational stress in construction. For example, figures released in March 2017 by the Office of National Statistics (ONS) have revealed that the risk of suicide among low-skilled male labourers in construction is at least three times higher than the male national average. Other research from the Labour Force Survey 2016 showed that work-related stress, anxiety and depression account for around 20% of all cases of ill-health in construction, and that the construction industry loses around 422,000 working days each year because of them. Recently, research from insurer AXA, as part of its 2018 Stress Index, reported that employees in the ‘building and construction’ industry are working in the third-most-stressed sector in the UK, following those working in ‘accounting and financial services’ and ‘cleaning and domestic services’ industries (AXA, 2018, p.4).

As a response to these significant industry-wide concerns, the CIOB launched, in 2019, an extensive survey into mental health issues within the construction industry, with a focus on establishing the primary pressures on construction workers at different levels (e.g. director, site manager, site worker etc.). The survey ran for one month and received 2,081 responses, where 80% of the participants were from GB. The findings of the survey reported some alarming statistics to the UK construction sector, as shown in Figure 2. The CIOB’s (2020) report described mental ill-health as a silent crisis within the construction industry, with males three times more likely to commit suicide than those in other sectors.

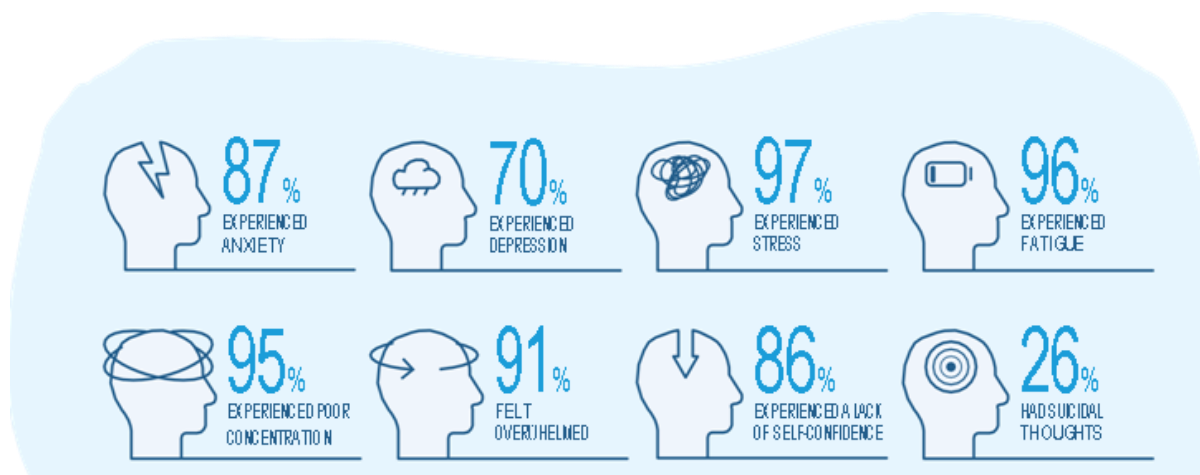


Figure 2: Findings of CIOB’s (2020) study on mental health in construction

1.1. HSE’s Management Standards

Every employer in the UK has a legal and moral duty to provide a safe workplace, assess risk at work and put steps in place to tackle those risks. There is a whole range of health, safety and welfare legislation that requires such action, particularly, The

Health and Safety at Work Act 1974 and The Management of Health and Safety at Work Regulations (1999). Further, the HSE Management Standards (2004) were launched as a guideline for effective stress management, by encouraging employers and employees to work together to address work-related stress in the organisation (Figure 3). They address six key areas of work design that, if not properly managed, can lead to poor health and wellbeing, lower productivity and increased sickness absence. These are: (1) Demands such as workload, (2) Control over work, (3) Support systems; (4) Role of the individual within the organisation; (5) Relationships; and (6) Organisational Change Management. Whilst the construction industry is globally recognised as being a fast moving and ever-changing industry (Global Construction Perspective and Oxford Economics, 2013; McKinsey Global Institute, 2017), it is of interest how some of these aforementioned UK occupational health related regulations, codes and standards have not been updated for many years in response to the rapid changes in the way we procure, design and deliver construction projects.



Figure 3: HSE's Management Standards

1.2. Why are People Working in Construction Particularly at Risk?

In general, there are a number of initiatives and schemes that have been set up to raise awareness and improve the health of the UK's construction industry workforce, such as Mates in Mind and Constructing Better Health (CBH), but it seems that attitudes and culture are still less than compassionate. So, it is crucial that construction employers ensure that they have effective arrangements in place, particularly for stress and mental health support. The challenge, however, is that most of the workforce in the construction industry are self-employed; getting regular and reliable work can be very challenging for them, and job insecurity can contribute significantly to their poor mental health. Further, these people may not be aware of or have any mechanism for reporting stress. Additionally, the majority of workers in construction are employed within Small and Medium Enterprises (SMEs), and it can be difficult for smaller companies, due to their limited budget and resource constraints, to put the right arrangements in place.

Furthermore, the construction project can be viewed as a “*temporary-organisation*” (Turner and Muller, 2003), where the project owner / construction buyer is seen as the ‘principal’, while the project suppliers take the role of the ‘agent’. This ‘principal-agent’ relationship highlights the role of power, control and demand that can take place in a construction project. This economic theory seeks to determine the most efficient contractual mechanism for governing the principle-agent relationship. For example, major contractors (as principals), through their systems of work, can to some extent control and influence the workload, work patterns and the work environment of operatives working for specialist subcontractors (the agents in this case), leading to increased or reduced levels of work-related stress. Similarly, a construction project can be regarded as existing within the boundary of a ‘*project-based organisation*’, thus it can be argued that knowledge-sharing and behaviours amongst the whole supply-chain can have an impact on stress levels and management practices within a project. Issues such as poor planning, late information and poor or lack of feedback can lead to increased stresses and anxiety. Construction workers of small subcontractors can perhaps learn and benefit from their involvement with main-contractors in large construction projects, and vice versa. These arguments and ideas could also suggest the need for having a collaborative approach to preventing and controlling the causes of work-related stress in a construction project context (Figure 4).

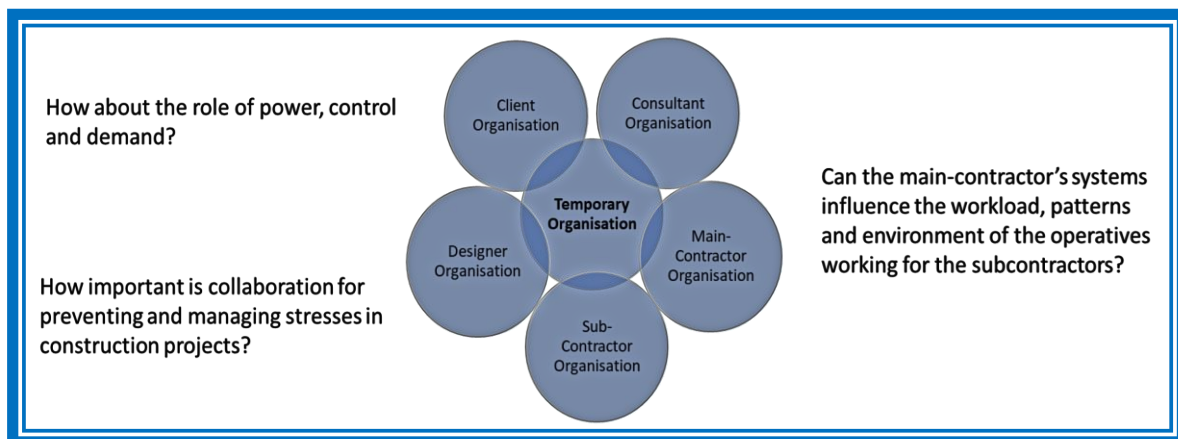


Figure 4: The Temporary and transient nature of a construction project

Moreover, the structure of the construction industry does little to reduce occupational stress. There are various systemic and inherited problems in the construction industry, such as its risk-averse and blaming culture, cut-throat price competition, traditional macho culture, long and fragmented supply chains, late payments, slim profit margins, tight deadlines and challenging working conditions, skills shortage and job insecurities, which all contribute towards increasing stress and anxiety in construction projects.

1.3. Research Gap / Problem

Little research has been conducted into occupational stress in the construction industry, particularly when compared to research that has focussed mainly on safety-

related issues in design and construction. Additionally, most of the research conducted on work-stress in construction has been based on the use of quantitative research approaches using surveys and deductive approaches to data analysis. Therefore, it is suggested that a qualitative inductive approach is needed to allow researchers to get close to the social phenomena under investigation, and thus help us gain an in-depth understanding of the subject and the meanings embedded in people’s experiences rather than just testing predictions.

There is also very limited research, if any, that has sought to investigate the impact of construction project procurement and supply-chain management strategies on occupational stress in construction projects. Furthermore, each of the six elements of the HSE’s Management Standards may be considered a source of stress in the construction industry. However, there are hardly any studies that have sought, yet, to investigate the relevance of the HSE Management Standards to construction and how it could be adopted for tackling causes of stress in a temporary organisation such as a construction project.

1.4 Research Aim and Objectives

The primary aim of this research is to identify the main stresses and stressors on construction workers at different levels, and to propose supply-chain management (SCM) standards and strategies for improving stress management in UK construction projects. To achieve this aim, the following objectives have been formulated (Table 1):

Table 1: Research objectives and methods

No.	Research Objective (RO)	Research Method
RO1	Critically review the concept of stress in construction as currently understood in literature	A qualitative systematic literature review
RO2	Investigate the main sources of stress in UK construction projects	Case study Interviews + Focus Group
RO3	Identify the main coping mechanisms and organisational strategies adopted for managing occupational stress in UK construction projects	Case study Interviews + Focus Group
RO4	Develop recommendations for improving stress management and productivity in UK construction projects	Case study Interviews + Focus Group

2. Research Methodology

The study adopted a qualitative multi-methods research approach, comprising the use of a systemic literature review, case study interviews, and a focus group. It utilised an integrated deductive-inductive approach for theory building. The following research steps have been followed in a sequential but iterative way (Figure 5).

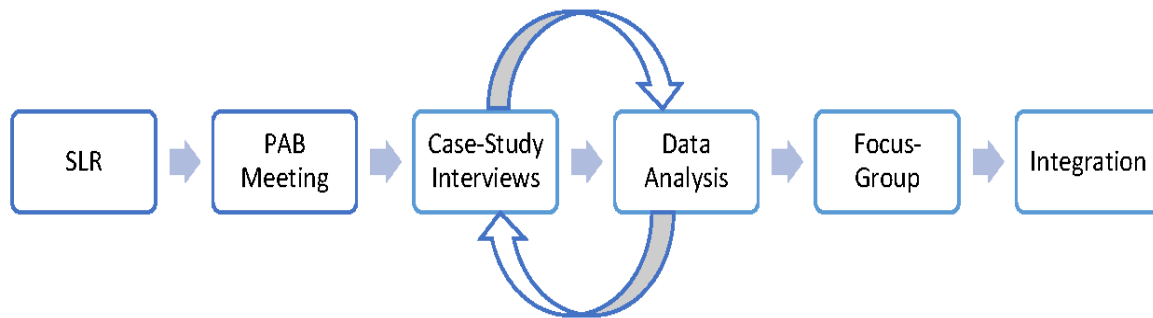


Figure 5: Research Strategy

2.1. Systematic literature review (SLR)

The study adopted a qualitative systematic approach to literature review (SLR). This approach allowed the study to collect, critically evaluate and synthesise the findings of all relevant, high-quality studies that fitted pre-specified eligibility criteria. The aim of this systematic review was to enable the study to generate a robust, empirically derived answer to one or more research questions, and to provide a comprehensive and reliable overview of the subject under investigation. For example, this SLR enabled the study to focus on the findings of published peer-reviewed empirical studies, from which the study was able to identify a list of stresses and stressors on construction workers (a deductive approach). The identified factors were then used as 'guiding propositions' to the researcher when collecting qualitative data from the field, rather than being used as hypotheses for testing. The use of induction following a deductive approach has helped to provide a guiding focus for the research, whilst keeping the scope open for generating unexpected findings and potentially new hypotheses.

2.2. Initial consultation meetings with a professional advisory board (PAB)

These meetings were conducted with our existing Professional Advisory Board (PAB) comprising prominent senior professionals from the built environment industry. Our PAB supports our CIOB-accredited programmes in Construction Science and Management at the University of Lincoln. It includes representatives from a number of local and national built environment organisations. The aim of these meetings was to carry out general discussion about the topic of occupational health and stress management in construction, in order to elicit perceptions and information about real challenges that construction companies are currently facing. This has been useful as

it helped to provide the research team with guidance and focus. These discussions have also allowed the research team to receive feedback, at an early stage, from members of the PAB on the study's proposed strategy for data collection, in terms of their practicality and effectiveness.

2.3. Case-Study Interviews

Empirical data was collected from a case-study through site observations and iterative interviews. A case study was adopted to allow the study to get a deeper understanding of the factors stressing construction workers within a project environment, including the difficulties and coping strategies that the workers go through. It also enabled the study and to investigate and trace the links between the sources and consequences of these identified stresses. Semi-structured interviews were conducted with a sample of construction workers at different levels (e.g. forepersons, supervisors, site workers, project Managers, site Managers) and representing the various parties of the project supply-chain (e.g. client, contractor, and subcontractor) The selection of the case-study project and access to the sample of interviewees was supported by our Estates Department at the University of Lincoln.

2.4. Methods of Data Analysis

Data analysis in qualitative research entails systematically organising and making sense of raw data that is collected by the researcher to gain a better understanding of the phenomenon or subject under investigation. The process of analysing qualitative data basically involves coding large amounts of interview transcripts, observational notes or other non-textual material (e.g. pictures and videos), followed by searching for significant patterns in the data, and subsequently identifying themes and developing saturated categories. In this study, data collected was stored, managed and analysed using advanced computer assisted qualitative data analysis software (CAQDAS). In particular, this research study used NVivo software following Strauss and Corbin's (1998) formal procedures for data coding and analysis –an approach that aims to inhibit bias during data collection and analysis, while acknowledging the researcher's role in concept or theory construction. It also requires data collection and analysis to proceed simultaneously, as one important data analysis strategy.

2.5 Focus Group

A Focus group exercise was carried out that involved the participation of representatives from prominent industry stakeholders including Mates in Mind, Civil Engineering Contractors Association, a distinguished academic professor and a sample of construction project and site managers. The aim of this focus group was to evaluate the findings of the case-study and assess the extent to which these findings could be generalised.

3. Systematic Literature Review: Summary of Main Findings

A qualitative systematic literature review was conducted using NVivo, following the processes explained by Sarhan and Manu (2021). The literature review sample comprised an in-depth review and analysis of 30 articles ranging from 1996 to 2021. A summary of the main findings is listed below:

- Many studies have focussed on identifying the causes of stress (i.e. stressors) at individual, task and organisational levels. However, very few, if any studies, explicitly focus on investigating the project-organisational stressors.
- Quantitative workload seems to be one of the main factors stressing construction workers and professionals. However, there has been much less focus on exploring qualitative workload, which is created by a lack of knowledge, skill and experience necessary to complete the task.
- Both industry and academic efforts have mainly focussed on managing occupational stress, as opposed to preventing or reducing its occurrence.
- Most studies have been conducted using questionnaire surveys, which limits the ability to get an in-depth understanding of the experiences of construction workers with occupational stress. This has led to a superficial knowledge that is being tested amongst different contexts in a recursive manner.
- There are criticism and doubts about the relevance of the HSE's (2007) Management Standards to the construction industry.

These findings provide significant empirical evidence to support the main objective of this research project – to identify the root-causes of stress in construction projects, using qualitative research methodologies, and to develop construction supply-chain management standards for improving occupational stress management. The findings presented in this systematic review are based on an in-depth analysis of 30 high-quality studies that fitted pre-specified eligibility criteria. This has enabled the study to capture the overall picture of occupational stress in construction as reported in literature, and to identify existing gaps in knowledge. In the next section, the empirical findings of this study are provided.

4. Case Study and Focus Group: Methods and Findings

A case-study was selected to allow the study to investigate the sources of occupational stresses, within a design and build project, through a holistic supply-chain perspective. The main characteristics of the case-study project and sample are outlined in Figure 6 and Table 2.

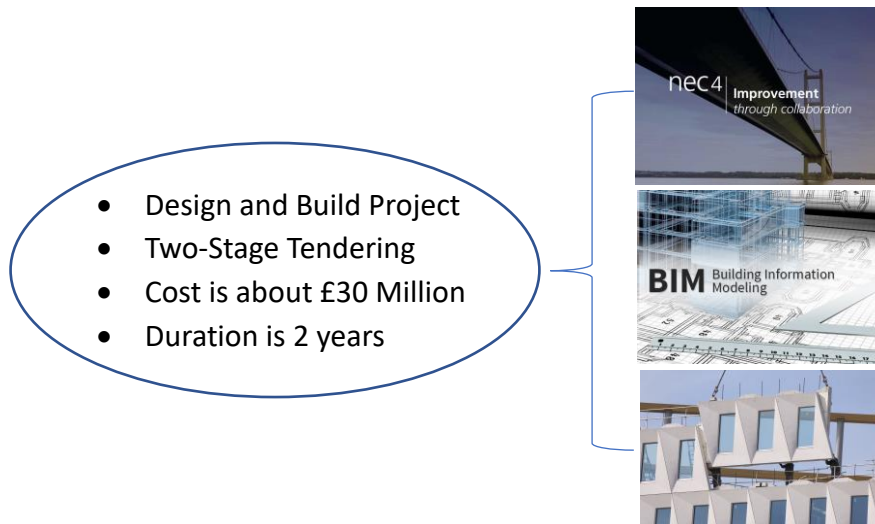


Figure 6: Case Study Information

The primary method for data collection was semi-structured interviews with a well-rounded sample of project participants (Table 2.). This included conducting several site visits and reflections on observations over a year from Dec 2019 to April 2021. The collected data was then analysed using a deductive-inductive analysis approach (Sarhan and Manu, 2021).

Table 2: Characteristics of the Interview Sample

Sub-contractor(s)	Main Contractor	Clients Reps and Consultants
Mechanical Engineer	Construction Manager	Project Manager
Electrical Supervisor	Site Manager	Deputy Project Manager
Groundworks Supervisor	Building Services Manager	Quantity Surveyor (QS)
Curtain Walling Supervisor	Assistant Site Manager	Environmental manager
Drylining Site Manager	Construction Planner	
Scaffolding Supervisor	Design Coordinator	
Joinery Contract Manager	Senior Quantity Surveyor	
Brickwork Foreman		

Following this, a focus group was conducted to evaluate the main findings of the case-study, collect feedback from industry experts, and assess the extent to which the case-study findings could be generalised. The sample of the focus group was purposively selected to ensure that all participants have broad and significant experience in the construction industry (see Table 3).

Table 3: Focus Group Sample

No.	Job title of participants of the focus group	Years of experience
1	Consultant and fellow member of the Institute of civil engineer (FICE)	30+
2	National Civil Engineering Director at Civil Engineering Contractors Association	30+
3	Engineering Manager at a British County Council	20-30
4	Business Development Manager at a Charitable Trust	10-20
5	Growth Development Manager at a leading UK charity	10-20
6	Group Director Health & Safety at a main contractor	10-20
7	Business Development Manager at a subcontractor	20-30
8	Production and Performance Manager at a global consulting, engineering and construction management company	10-20
9	Health & Safety Programme Manager at a leading global construction company	10-20
10	Professor of Sustainable Construction	30+
11	Professor of Lean Project Management	30+
12	Operational Change Manager at a consultancy company	20-30

The focus group lasted for 1.5 hours and was structured as shown in Table 4.

Table 4: Focus Group Agenda

Agenda	Duration
Welcoming and introducing the participants	10 mins
Presentation on summary of findings	20 mins
Interactive Poll / Survey using Poll Everywhere	30 mins
Group discussion on how to apply the UK's HSE Management Standards at a project / supply-chain level in construction	20 mins
Reflections, concluding remarks and takeaways	10 mins

4.1. The Main Sources of Stress in UK Construction projects

Based on the findings of the case study, the participants of the focus group were asked to select the stressors that they believe are common to many construction projects in the UK. The results are shown in Figure 7.

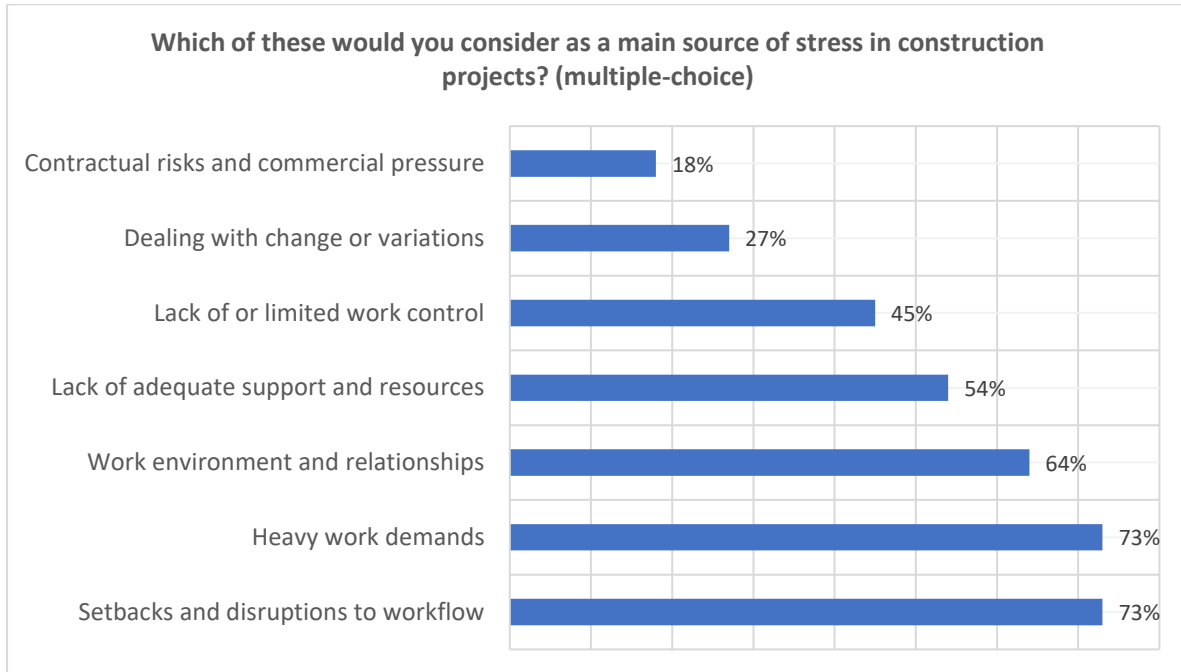


Figure 7: The main sources of occupational stress in construction projects

Following this, the participants were asked to identify the main factors influencing each of the main stressors identified in this study, as presented in Figures 8-14. The participants were also provided with the opportunity to suggest any other factors and to provide any additional comments to support their answers.

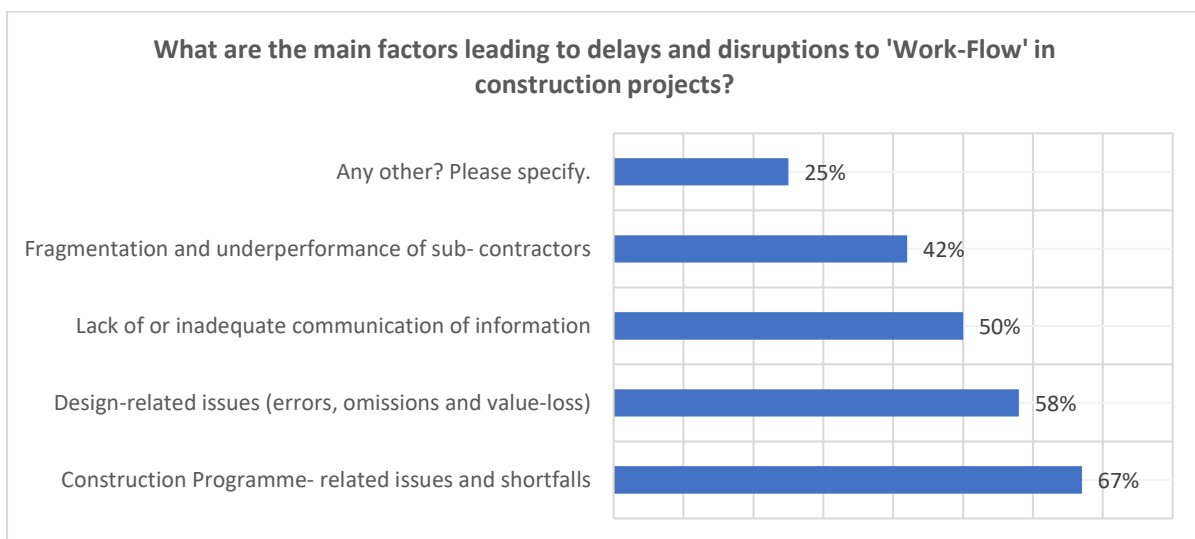


Figure 8: Main factors leading to delays and disruptions to workflow in construction projects

Other factors and comments in relation to 'workflow' are:

- *“It reflects the culture in construction not a particular site”.*
- *“Lack of building the right team culture to support the collaboration required”*
- *“Over promising on unclear expectations. Pressure then cascades to the team”*
- *“The complexity of the construction supply chain”*
- *“The uncertainty created by weather, conditions we didn't know about”*
- *“Contractor commitments to multiple projects. It places an increased demand for 'over communication' and 'agility”*

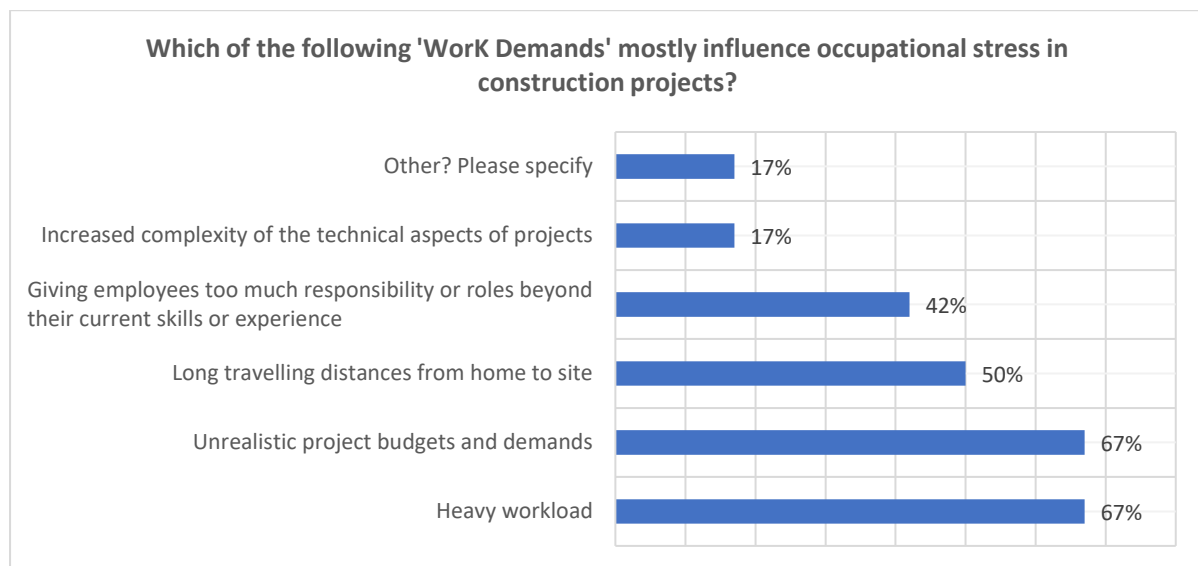


Figure 9: Work-demands influencing occupational stress in construction projects

Other factors comments in relation to 'work demand' are:

- *“Lack of collaborative planning and risk management”.*
- *“I think it is changes / interfaces between people / plant / products / processes - when it works, it works well; but if one thing gets out of step, there is a butterfly effect and it may not always be obvious or immediate”.*
- *Working in construction is without doubt the most difficult industry to be in, the profit levels are really low, winning work is really difficult.*
- *“Construction projects can seem to attract people who appear to thrive on heavy demands. Although that might not suit everyone on the team”.*

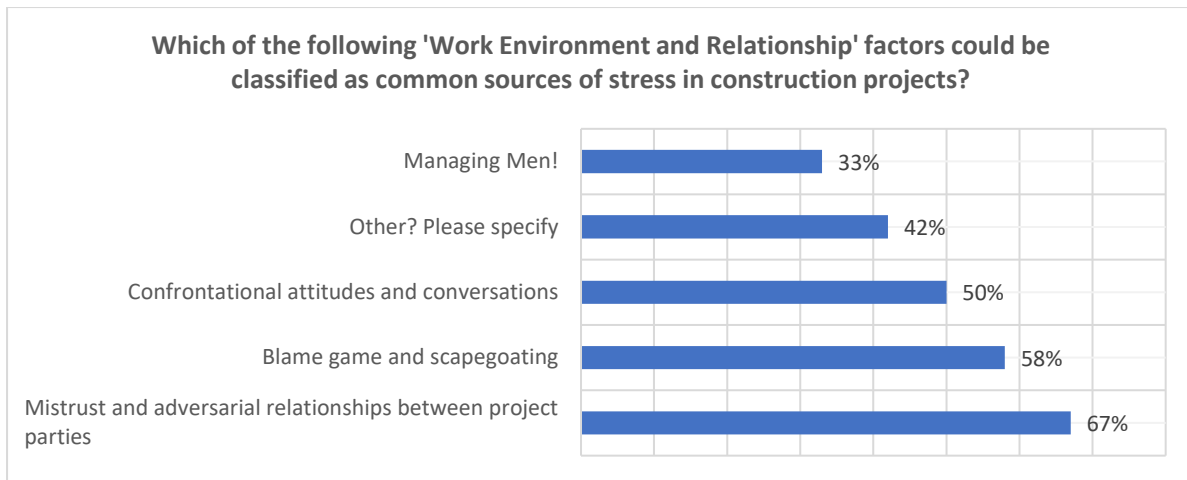


Figure 10: Work environment and relationship factors influencing occupational stress in construction projects

Other factor and comments in relation to the 'work environment and relationships' included:

- *“Archaic practices”*
- *“Dealing with difficult customers who have unrealistic demands and expectations is without doubt a difficult stress factor in a working environment”.*
- *“Managers/leaders competence and ability to hold relevant discussions. also, consistency”*
- *“Change - not steady state industry - the people and processes change every day - difficult to build a team when building a project - and we don't seem to have the same craic we used to - every man for himself....”*

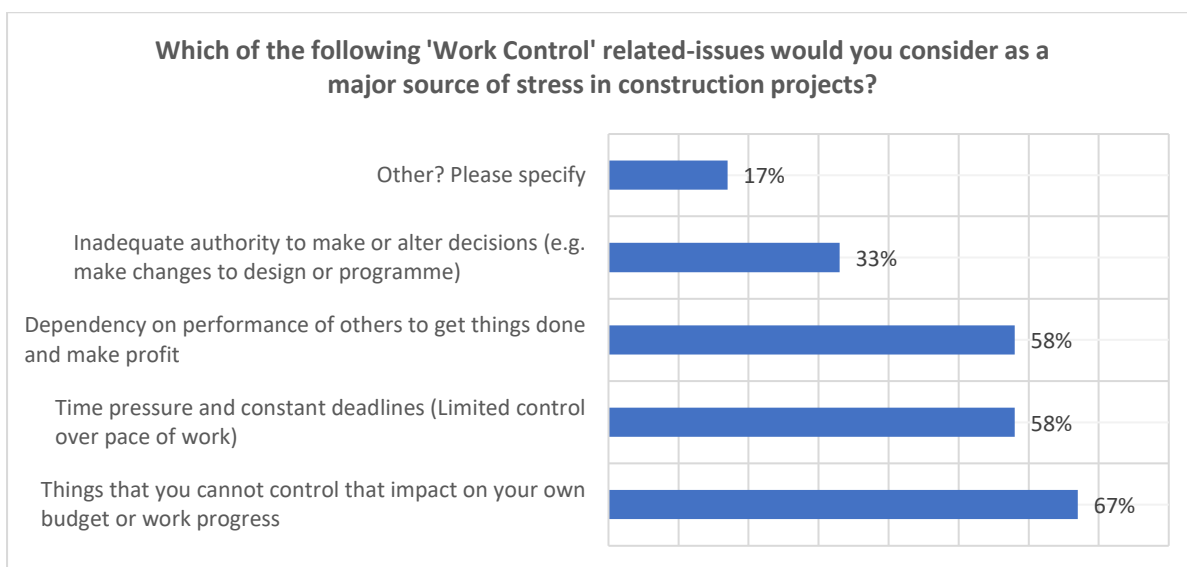


Figure 11: Work-control issues influencing occupational stress in construction projects

Other factors and comments in relation to the 'work control' are:

- *“Competency of supervisors”*
- *“A construction project is a coming together of many organisations that have competing demands”.*

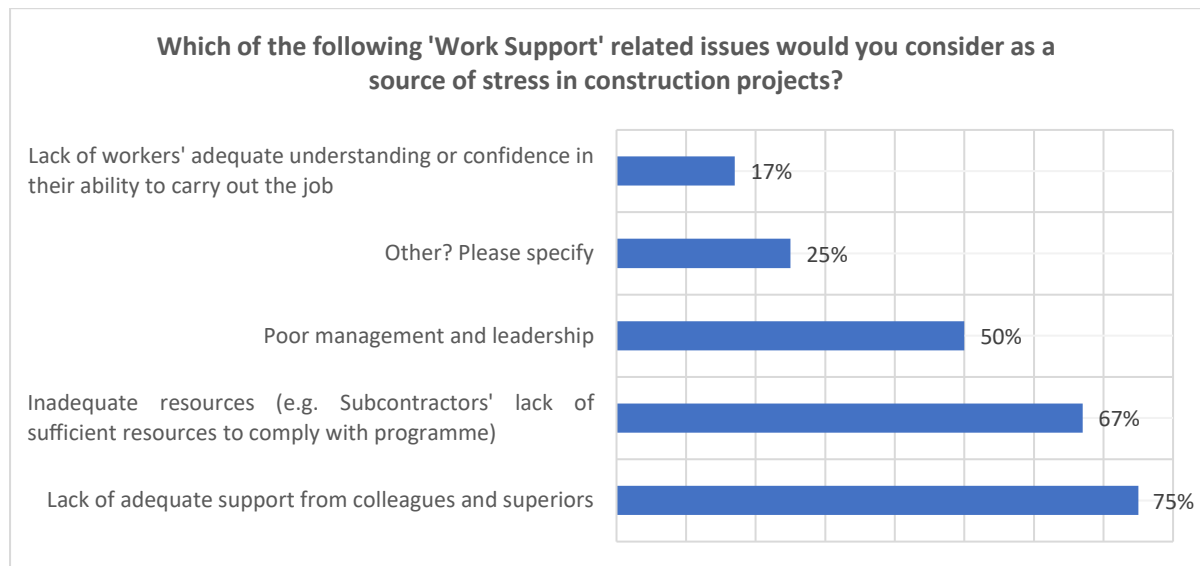


Figure 12: Work-support issues influencing occupational stress in construction projects

Other factors and comments in relation to the 'work support' are:

- *“Management may be well supported by access to personal resources and colleague support. Lower skilled workers may not have those personal resources or any formal programmes in place though”.*
- *“Some projects have management teams that are too big where people can hide and not make decisions or fully participate and their colleagues carry them - this is tolerated not managed to improve performance”.*
- *“Lack of autonomy to plan and manage own workload e.g command and control project managers vs path clearing and servant leadership”*
- *“Lack of support from 'head office' to those workers on site - often a disconnect between the two”*
- *“Client and Principal Contractors' behaviours and expectations”*

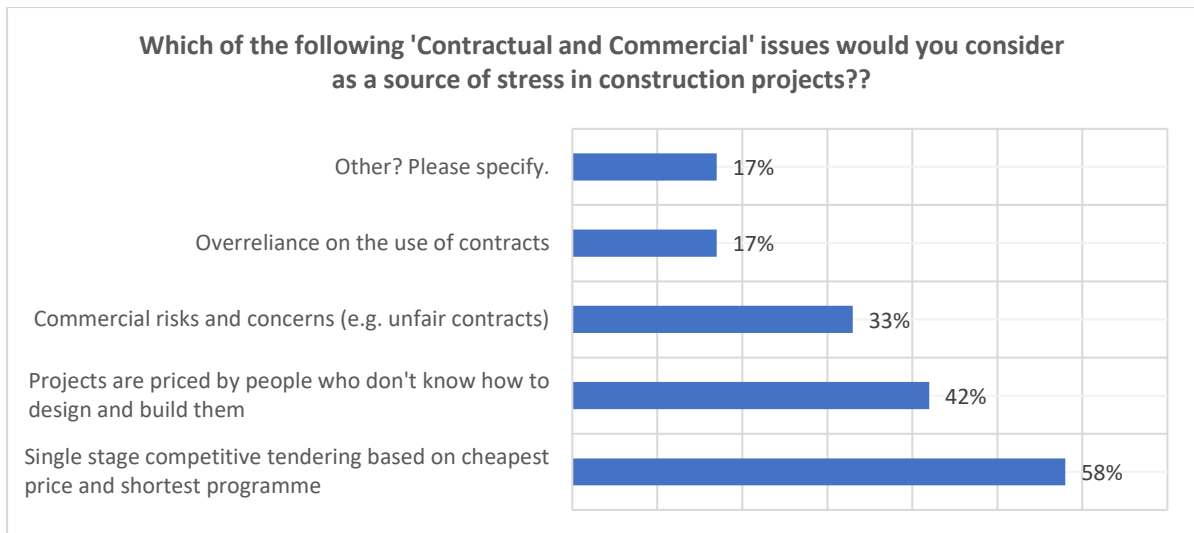


Figure 13: Contractual and commercial issues influencing stress in construction projects

Other factors and comments in relation to 'contractual and commercial pressures':

- *“Commercial assumptions in the bidding phase can be over optimistic. I believe there has also been a trend for clients to push risk further downstream into consultants and contractors without necessarily allowing the budget to deal with those risks adequately in advance”.*
- *“The whole team of client, contractor, designer and the supply chain need to be engaged as early as possible - even concept stage - so that there is full understanding of what is to be delivered and for how much!”*
- *“Lack of scope clarity & expecting more than agreed or 'fair' scope to be included”*

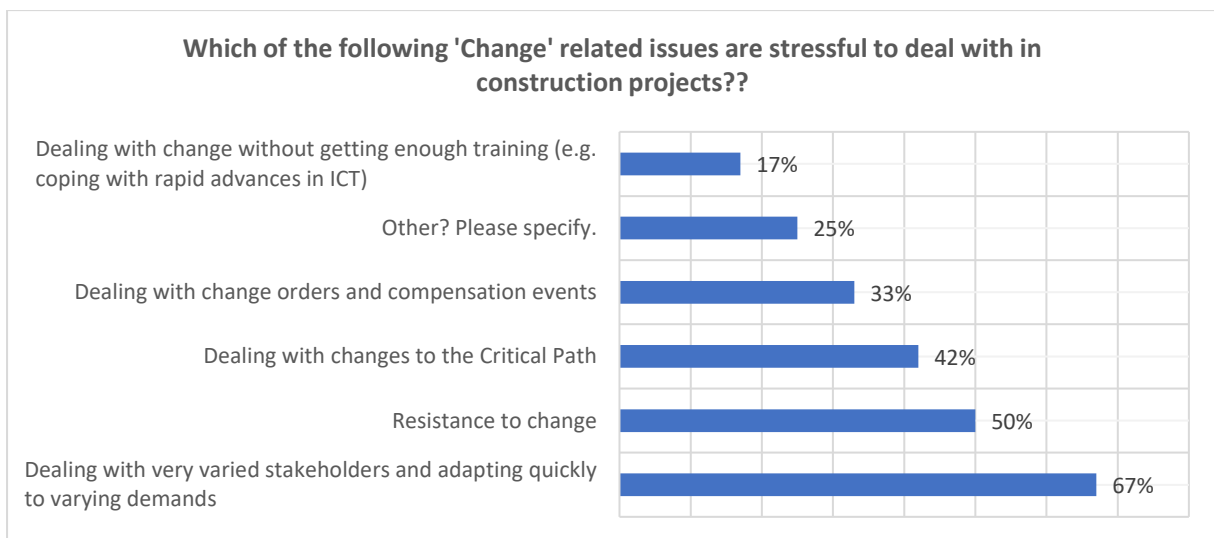


Figure 14: Stressful change-related issued issues to deal with in construction projects

Other factors and comments in relation to 'Change':

- *“Managing change is the main skill on site. Evaluation of the impact of change is variable - all the criticisms of value engineering, etc. and quality / defects are setting a harsh environment to work in mentally”*
- *“Resistance to change needs a gold star - the industry is going through radical change and is governed by those who at times play lip service to its importance and don't back the need*
- *Expectation of accommodating change without full appreciation of impacts outside of just cost*
- *I think that quite often there is a lack of acceptance of the implications of change - by clients as much as contractors and consultants - in order to preserve commercial position.*
- *Changes imposed without consultation.*

Interestingly, the findings of the study suggest that stresses that construction workers may experience in construction projects emerge from the pre-construction stage. In particular, it appears that the construction programme, design and contractual arrangements could have a significant impact on the project supply-chain performance, including the health and wellbeing of the people involved. Thus, the following questions (see Figures 15-17) were introduced to identify and gain a better understanding of the limitations and potential sources of stress embedded in the way we traditionally design, plan and procure construction projects.

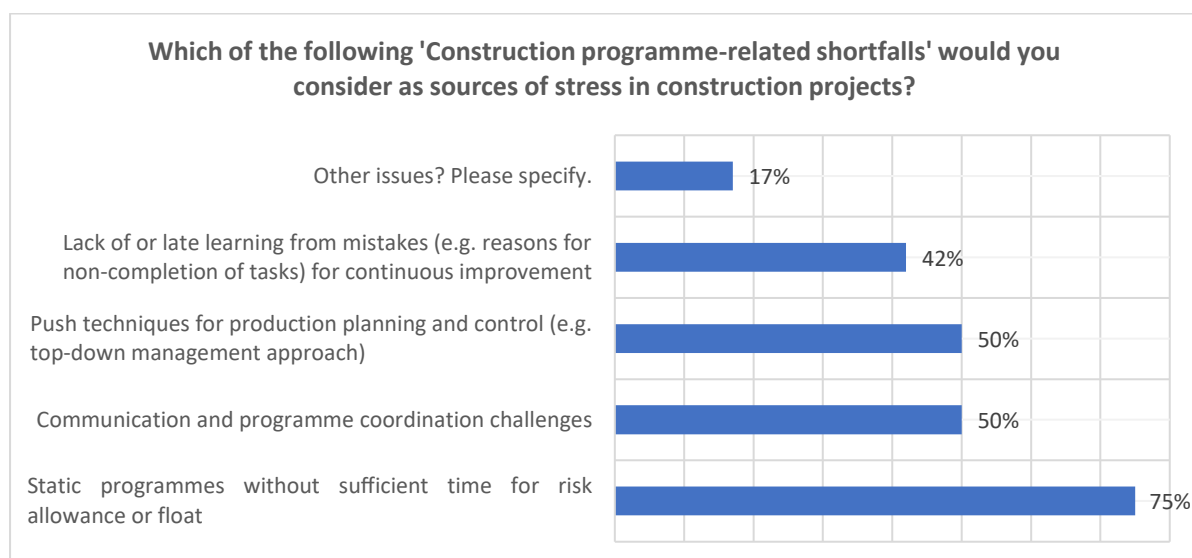


Figure 15: Construction-programme shortfalls as sources of stress in construction projects

Other factors and comments in relation to construction programme-related shortfalls

- *“We will never compete with longer programmes - it’s a cultural thing”.*
- *“In competitive bidding situations, the programme is often tightened by corporate management staff in order to win the project - even though the bidding teams may be the ones eventually delivering the project”.*
- *“Contracts not allowing collaboration before the baseline is produced, and then expecting miracles once collaborative planning starts after mobilisation”*
- *“Inadequate validation of overall milestones at project initiation stage”*
- *“Unrealistic changes made by client organisations without fully understanding the impact the change will have on the delivery team”.*

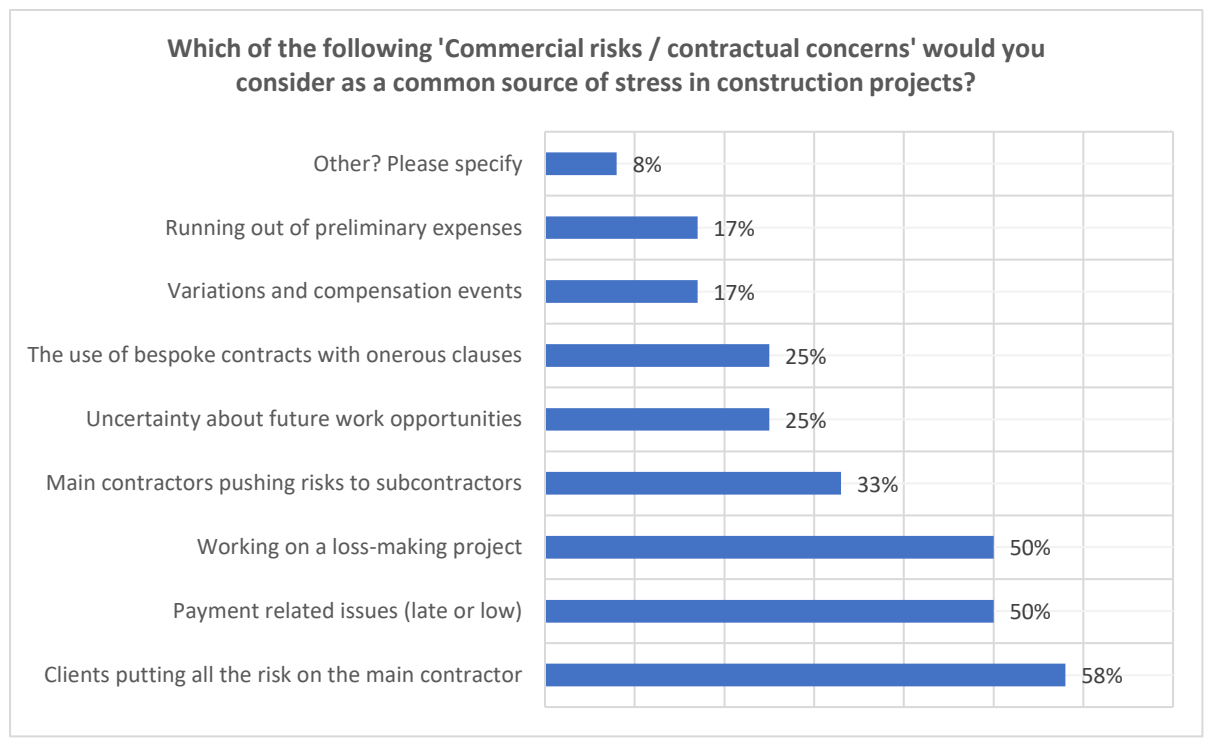


Figure 16: inefficient contractual and commercial arrangements as a source of stress in construction projects

Other factors and comments in relation to contractual and commercial issues:

- *“Lump sum contracts”*
- *“Clients could use the Construction Playbook to help provide better collaboration across the team(s) - this would engender better working”*

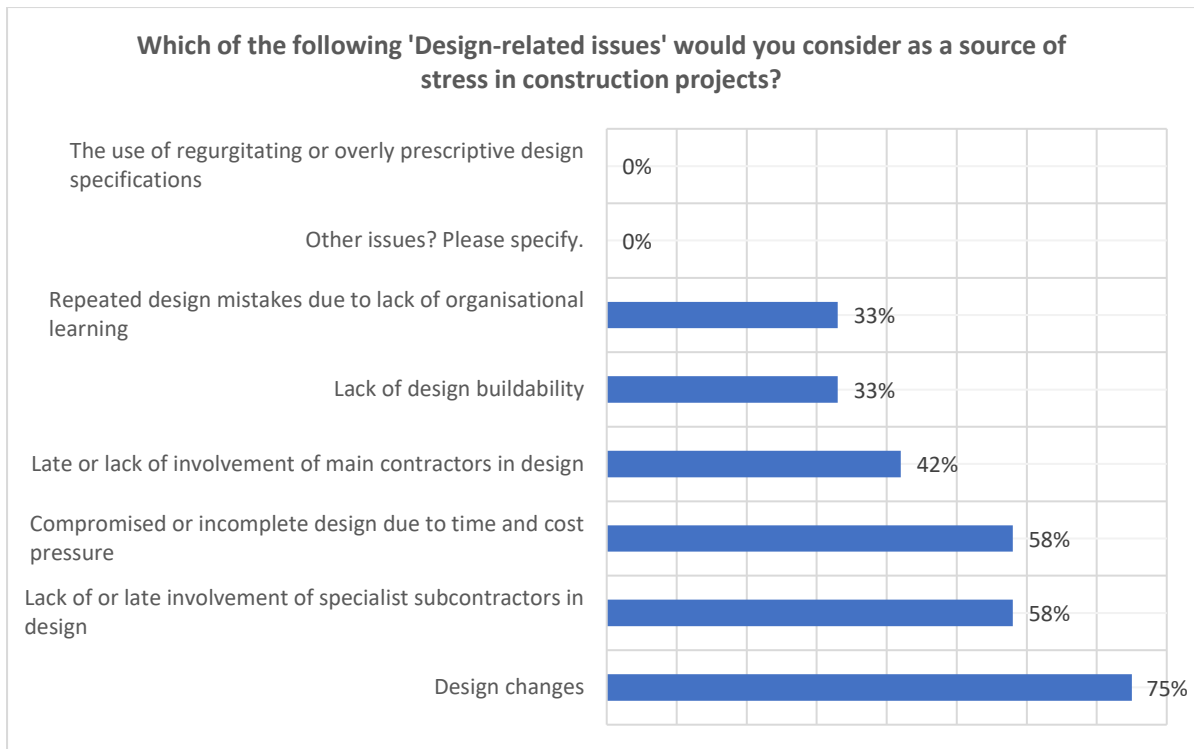


Figure 17: Inefficiencies in design as a source of stress in construction projects

Other factors and comments in relation to design-related issues:

- *“Main contractors have a very skeleton staff - the bulk of the work is done by specialists and these people can be missed out of the loop - especially M&E”.*
- *“Designers need to be made more aware of occupational health issues within construction and not leave the contractors to sort it out”*
- *“Designers don't know what they are getting wrong, because sites make their designs work”.*
- *“Inability to draw construction knowledge into the design process”.*

4.2. The Main Coping Mechanisms and Organisational Strategies Adopted for Managing Occupational Stress in UK construction projects

The participants were also asked to assess the common organisational and project level strategies adopted within construction projects, in terms of their importance. There were also given the opportunity to provide any other suggestions or critical comments. The findings are presented in Figure 18.

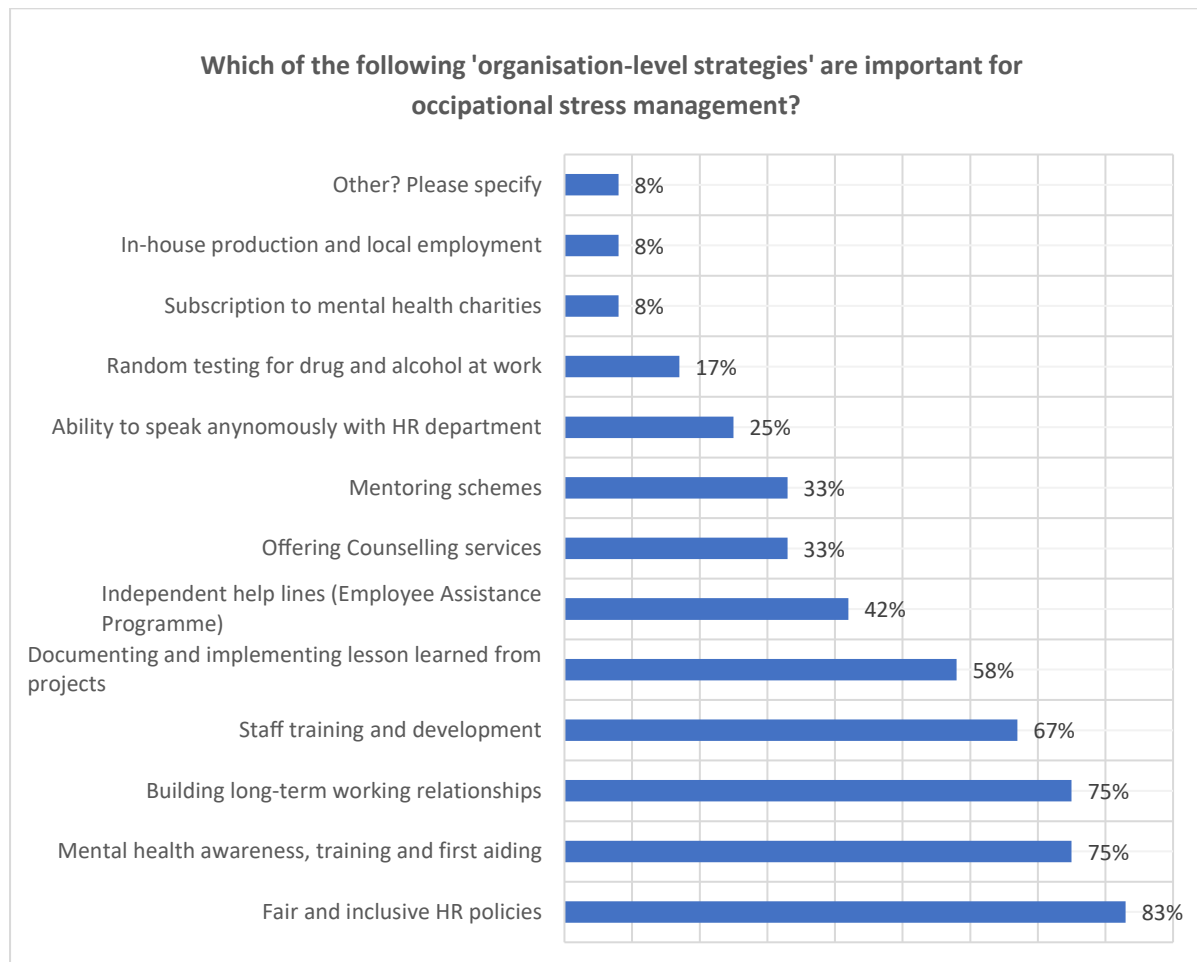


Figure 18: Organisational strategies for managing occupational stress in construction

Other Suggestions or comments in relation to organisational strategies for managing occupational stress in construction:

“You won't be successful or profitable if you don't look after and invest in your people. Subcontractors are more difficult”.

“Most choices were reactive rather than proactive. Needs to be high level strategy to focus on the prevention of stress in the first place”

“Many of the items listed concern dealing with stress when it has occurred. I think that stress prevention is far more embedded in the management practices of a project”.

Interestingly, the responses received indicate that common practices used in construction at an organisational level for managing occupational stress are rather reactive rather than proactive. The following question, therefore, included a list of preventive measures at a project supply-chain level as identified in this study (see Figure 19).

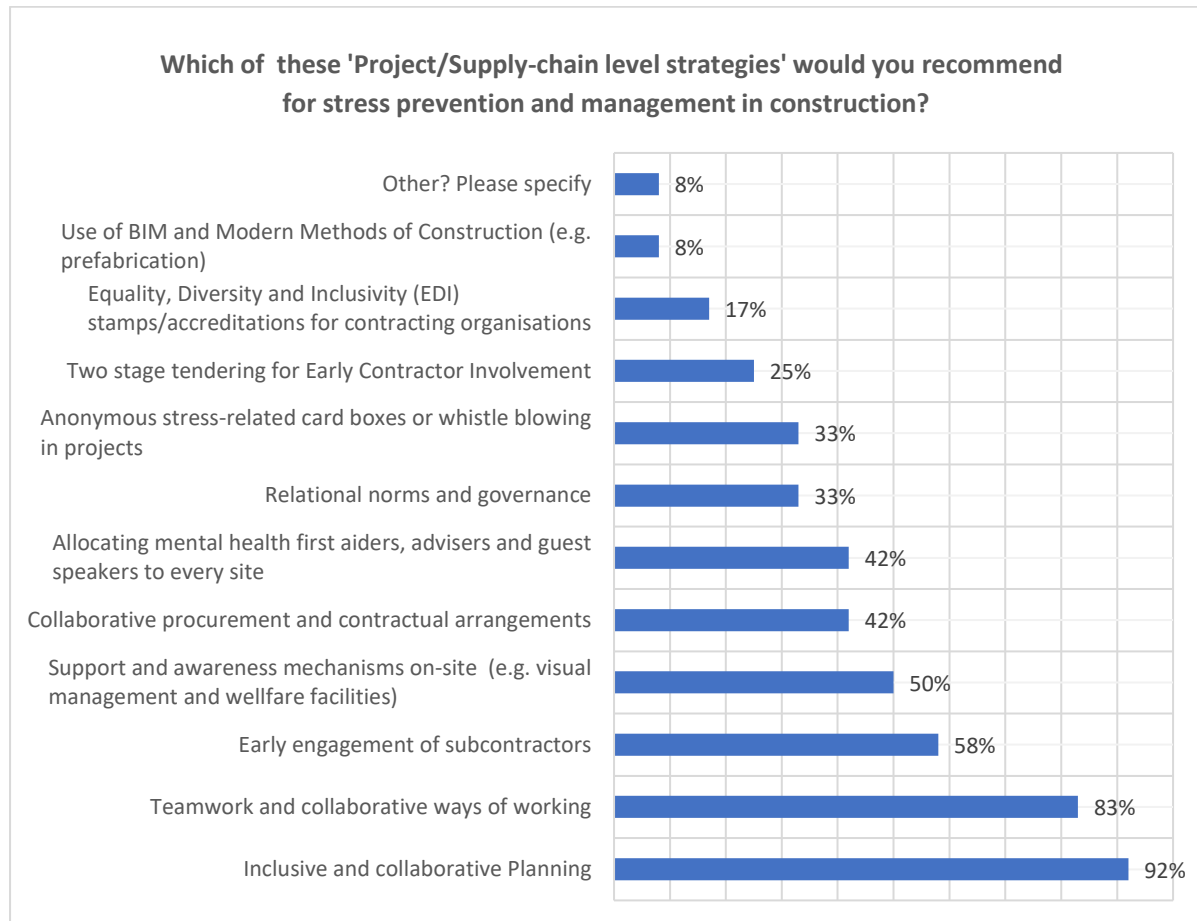


Figure 19: SCM strategies for reducing occupational stress in construction projects

Other suggestions or comments in relation to project/supply-chain level strategies:

“This is about action - what you do - not policies / charters”.

“Apply CDM as it was intended”.

“Cultural change is needed”.

“Re whistleblowing, experience shows any issue too contentious, particularly with senior staff, is more often than not managed under the carpet”.

“I think much more emphasis has to be placed on the skills of management to create conversations that allow people to jointly resolve issues that may be causing stress”.

“Stress boxes should be checked by a cross supply chain team”.

“Independent (charitable) organisation to review 'whistle blower' feedback”.

4.3. Barriers to Making Improvements in Occupational Stress Management in the UK Construction Sector

The participants were then asked to evaluate the list of barriers to occupational stress, as identified from the case study interviews (Figure 20). They were also asked to suggest any other factors or add any further comments.

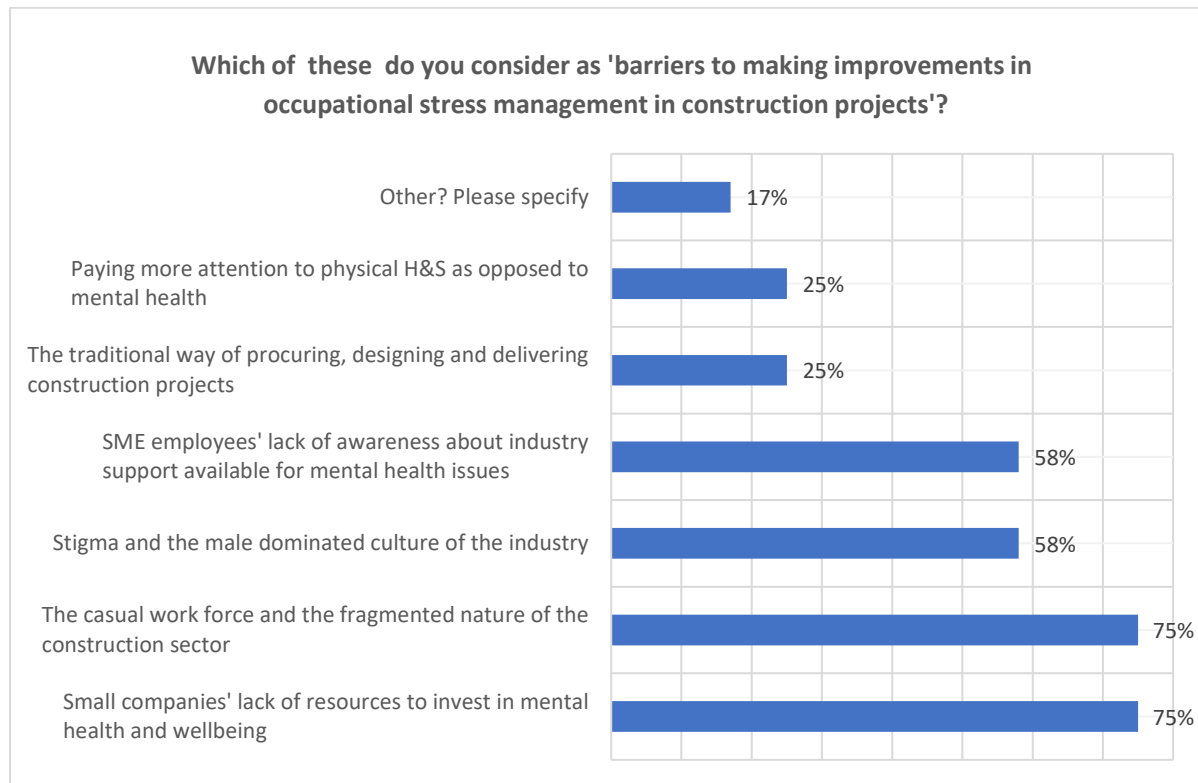


Figure 20: Barriers to occupational stress awareness and improvements in construction

Other factors or comments in relations to the 'barriers':

- The fragmented way subcontractors get their labour through agencies and self-employed means there are not ongoing / meaningful relationships - it's all too transient.
- The low skilled workers seem most at risk from the most serious consequences of stress. The industry is likely to remain fragmented so we must work to improve within that parameter.
- SMEs unfortunately don't have the financial luxury to put the right support systems in place. It needs dedicated resource and delivery.
- It's too easy to take tick box options (silver bullet) and think you have the solution

4.4. Strategies for Applying HSE’s Management Standards in construction projects

The focus group’s agenda included a discussion on how to apply the UK’s HSE Management Standards at a project / supply-chain level in construction (See Tables 9-14). Hence, the findings of the study show that ‘workflow’ can have a significant influence on occupational stress in construction, the participants were, therefore, asked to provide suggested strategies for overcoming the ‘workflow’ stressor in construction projects (Table 5).

Table 5: How to minimise delays and disruptions to workflow in construction projects?

Suggested strategies for managing workflow in construction projects
<ul style="list-style-type: none"> • <i>“Better communication within the Supply-Chain”</i>
<ul style="list-style-type: none"> • <i>“Engage the correct people involved in any project throughout the project, ensure enough time for preplanning and then communicate to all those involved in a timely manner”</i>
<ul style="list-style-type: none"> • <i>“Good collaboration and communication between all parties involved”</i>
<ul style="list-style-type: none"> • <i>“Focus on a collaborative delivery model which puts people as a priority on par with programme and cost”</i>
<ul style="list-style-type: none"> • <i>“Start at the top - get the buy in of the client to set the strategy for the whole team”</i>
<ul style="list-style-type: none"> • <i>“Training in and use of the Last Planner System (i.e. collaborative planning) is a good place to start”</i>
<ul style="list-style-type: none"> • <i>“Effective, collaborative, and inclusive look ahead planning sessions”.</i>
<ul style="list-style-type: none"> • <i>“Better collaboration across all parties and not to have restrictive penalties imposed just because the SME is at the end of the supply-chain”</i>
<ul style="list-style-type: none"> • <i>“Create planning and variation conversations that are more inclusive of specialist contractors”</i>
<ul style="list-style-type: none"> • <i>“Nobody knows more than everyone. Collaborate on risk, planning and co-creating the right culture”</i>

Table 6: How can we apply HSE's 'Demands' MS in Construction Projects?

(1) Demands

✚ This includes issues such as workload, work patterns and the work environment.

The standard:

- Employees indicate that they are able to cope with the demands on their job; and
- Systems are in place locally to respond to any individual concerns.

Ways to achieve the 'Demand' standard at a project / supply-chain level?

- *"I think we need to accept that demands will probably continue to be high - I believe the key is to go about creating conversations where people have the opportunity to mitigate those demands or the impacts of them".*
- *"Elevate stress/mental health to a project value criterion. This enables the design and delivery team to include it in all processes".*
- *Make 'Demands' part of the agenda in meetings throughout the supply chain".*
- *"Create an atmosphere where it is OK to say 'No'".*
- *"Communication remains key to this and there must be an open forum for discussion".*
- *"Capability requires skilled workers in adequately resourced teams. Consultation / feedback is a given. Supervision that recognises more than just work done".*
- *"Peer support structures and daily checks".*
- *"Look to review previous cases and where 'lessons can be learnt' and apply to the ways of working going forward".*
- *"Have a process in place so that everyone is aware of what needs to be followed".*
- *"3 levels of stress risk assessment: Organisational, project (divisional) and individual".*
- *"A method of assessing individuals' mood daily, and at end of week assessment of how the week went plus reasons why good or poor".*

Table 7: How can we apply HSE's 'Control' MS in Construction Projects?

(2) Control

✚ How much say does the person have over the way they do their work

The standard:

- Employees indicate that they're able to have a say about the way they do their job; and
- Systems are in place locally to respond to any individual concerns

Ways to achieve the 'Control' standard at a project / supply-chain level?

- *“CDM requires the workforce to be consulted - we just need to follow the guidance! Discussion should include not only what work needs to be done but how the individual can carry out that function”.*
- *“Change of leadership style - embrace servant leadership”.*
- *“Encourage an environment that takes ownership and is confident to speak up to allow for a collaborative approach”,*
- *“Create 'safe environments' for people to be open and honest”,*
- *“Existence of guideline or Standard of Practice (SOP) noting the 'standard work' expectation that all team members are aligned with”*
- *“Change of leadership style - embrace servant leadership - what do you need me to do to allow you to do your job”.*
- *“Dispense with the idea that instructions must be top down”.*
- *“The use of the Last Planner System for collaborative project-production planning and control opens the door to this in a structured way”.*
- *“Communication throughout the supply chain”.*
- *“Clear job descriptions and method statements”.*

Table 8: How can we apply HSE's 'Support' MS in Construction Projects?

(3) Support

✚ This includes the encouragement, sponsorship, and resources provided by the organisation, line management, and colleagues

The standard:

- Employees indicate that they receive adequate information and support from their colleagues and superiors; and
- Systems are in place locally to respond to any individual concerns

Ways to achieve the 'Support' standard at a project / supply-chain level?

- *“What about support for external / home lifestyle issues, e.g. Long distance travel etc.”.*
- *“Bring them into collaborative risk and planning sessions”.*
- *“There must be a policy / process for support which all parties are committed to”.*
- *“We can do this with employees - eap, bupa, counselling service, etc. MH first aiders / champions are in place. Sub-contractors - regulars we have trained some MH first aiders - support is harder - when workers do no return we don't know why or where they went”.*
- *“For low skilled workers who appear to be at great risk, this appears to be extremely important. What can clients and main contractors do to ensure casual workers are supported. MATES is one scheme. We must recognise the vulnerable nature of people who may come into the industry as casual labour”.*
- *“A culture that encourages concerns to be raised and resolved to the benefit of the team and the project in general”.*
- *“A forum/platform to gather issues & concerns plus prompt & constructive feedback & support”*
- *“All participants commit to a 'charter' of support?”*

Table 9: How can we apply HSE's 'Relationships' MS in Construction Projects?

(4) Relationships

✚ This includes promoting positive working to avoid conflict and dealing with unacceptable behaviour

The standard:

- Employees indicate that they receive adequate information and support from their colleagues and superiors; and
- Systems are in place locally to respond to any individual concerns

Ways to achieve the 'Relationship' standard at a project / supply-chain level?

- *"Create leaders not managers".*
- *"Not an easy one in the 'woke' world. Discipline and rules are part of life. Good behaviour is a given. Banter / tribalism (electricians better than trade x, etc.) and some 'belonging' / identity is actually important - more team building required. It is about people".*
- *"People have their careers, their commercial positions and their personal identities at stake. It may be helpful to reconfigure what we expect of leaders in the industry. How can we promote leaders who carer about people?".*
- *"Need to deal with blame culture - driven by low profit margins".*
- *"Independent dispute resolution".*
- *"High Performance team charters that call out behaviours that are not acceptable and determine ground rules and behaviours and shared goals that support a high-performance team".*
- *"Develop clear & unambiguous norms regarding how persons behave & communicate with one another".*
- *"Ensure expected standards are clear and communicated".*
- *"This links into the Company Culture, ensuring the employees are engaged and are working in a positive environment".*
- *"Develop an understanding of the next customer principle" (see Leong and Tilley, 2008).*

Table 10: How can we apply HSE's 'Role' MS in Construction Projects?

<p>(5) Role</p> <p>✚ This includes whether people understand their role within the organisation and whether the organisation ensures that the person does not have conflicting roles.</p> <p><i>The standard:</i></p> <ul style="list-style-type: none"> - Employees indicate that they understand their role and responsibilities; and - Systems are in place locally to respond to any individual concerns 	
<p>Ways to achieve the 'Role' standard at a project / supply-chain level?</p>	<ul style="list-style-type: none"> • <i>“Develop a 'project first' mentality rather than safeguarding individual company interests”</i> • <i>“I don't think is so relevant to construction - we don't have the office politics of the civil service. Roles are well defined in our organisation and we have a small management structure - people know each other and are held accountable - no issue”.</i> • <i>“Projects are fluid and their requirements change day by day. Consequently, people's perceptions of their roles may change frequently. It could be helpful to make role definition a regular conversation rather than an annual appraisal event”.</i> • <i>“Understanding roles are vital but the focus on behaviours should be what stops the conflict”.</i> • <i>“Structured training and mentoring support”.</i> • <i>“Collaboratively planning together helps people understand roles”.</i>

Table 11: How can we apply HSE's 'Change' MS in Construction Projects?

<p>(6) Change</p> <p>✚ This includes how organisational change (large or small) is managed and communicated in the organisation.</p> <p><i>The standard:</i></p> <ul style="list-style-type: none"> - Employees indicate that the organisation engages them frequently when undergoing an organisational change; and - Systems are in place locally to respond to any individual concerns 	
<p>Ways to achieve the 'Change' standard at a</p>	<ul style="list-style-type: none"> • <i>“Communication again - need to include all the team in briefings on a regular basis”.</i> • <i>“Utilising digital technology to improve performance and mitigate these triggers”.</i>

**project /
supply-chain
level?**

- *Regular Project-team meetings”.*
- *“Unrealistic changes made by client organisations without fully understanding the impact the change will have on the delivery team”- this requires teamwork.*
- *“Refuse last minute requests to fix the system”.*
- *“Collaborative look-ahead planning”.*
- *“Early warnings to collaboratively solve problems before they occur”.*
- *“Investing in the training and development of the supply-chain”.*

5. Conclusions and Recommendations

This study was conducted to investigate the main sources of stress in construction projects and to develop supply-chain management strategies for preventing or reducing occupational stress. The study adopted a multi-methods qualitative research approach comprising of a systematic literature review, an in-depth case study and a focus group with a sample of industry experts. A summary of the main findings and recommendations of the study are provided below:

- This study identified seven main sources of stress in construction projects in the UK (Figure 7). It is recommended that these potential stressors should be tackled by the project-team as early as possible in construction projects. It is also suggested that these could be adapted for use as construction supply-chain management standards (CSCMS) for Improving occupational stress management and productivity in construction projects. These CSCMS are:
 1. Workflow
 2. Work demands
 3. Work environment and relationships
 4. Work support
 5. Work control
 6. Dealing with change or variations
 7. Contractual risk allocations and commercial arrangements
- 'Workflow' is a concept that has been relatively overlooked in construction theory and practice for many decades (Koskela, 2000; Hamzeh, 2009; Sacks, 2016). The empirical findings of this study, however, revealed that 'Workflow' is the most significant source of stress in UK construction projects. It is, therefore, suggested that both academic and industry efforts should focus on finding innovative ways for enhancing workflow and collaboration in construction projects. Further, it is suggested that policymakers should consider the potential for incorporating 'workflow' into the HSE's Management Standards. Public-sector clients, decision makers and project managers are also urged to devise effective strategies for managing 'workflow' in their construction projects, in order to improve the productivity, health, and wellbeing of their workforce and supply-chain.
- This study identified three main causes of setback and disruptions to workflow in construction projects, namely: (1) Construction Programme-related issues and shortfalls; (2) Design-related issues (errors, omissions and value-loss); and (3) Lack of or inadequate communication of information. The findings of the study also highlight the importance of engaging specialist sub-contractors in both design and construction programme development.

- The study raises significant concerns regarding the use of the critical path method, which is widely adopted in construction for project planning and control. It is seen by many subcontractors as stressful, onerous, and ineffective. See, as an example the critique quoted below. This finding is consistent with various studies that criticised CSM as being inadequate for controlling work in construction projects (see for example, Koskela, et al., 2014; Dave, et al., 2015; Mossman and Sarhan, 2021). The findings of this study indicate a general preference and need for the use of inclusive and collaborative planning techniques. Thus, it is suggested that training the supply-chain, especially specialist contractors, on the use of the Last Planner System® (also known in the UK as the Collaborative Planning System) is a good place to start.

“Each company will be asked to produce their own programme. You know, rough time scales for each and then that’s how the main contractors will make their programme, but that doesn’t take into consideration the coordination that needs to come in between the trades within the programme” (Curtain Walling Supervisor, 2020)

- The study found that the most stressful ‘work demands’ in construction are: [1] Workload, [2] Unrealistic project budget and demands; and [3] Long travelling distances from home to site.
- The findings of the study indicate that ‘Leadership Style’ plays a significant role in influencing occupational stress in construction. Most of the participants of this study identified lack of adequate support from colleagues and superiors as one of the main sources of stress in construction. This is consistent with the findings of a study conducted by the Chartered Institute of Building (CIOB) more than a decade ago. The CIOB’s survey exposed a severe lack of leadership within the construction industry (CIOB, 2008). Thus, it is suggested in this study that construction companies need to invest more heavily and consistently in leadership development and training. This seems to require a larger focus on the softer skills needed for relationships and stakeholder management, and the ability to create planning and variation conversations that are more inclusive of specialist contractors.
- ‘Stress’ and ‘Risks’ are closely related in construction. Both tend to be pushed and transferred down the supply-chain, as indicated in this study. Specifically, ‘single stage competitive tendering based on cheapest price and shortest programme’ has been identified in this study as a deeply rooted source of stress and value-loss in construction projects. Thus, as suggested by an industry expert who participated in the focus group of this study:

“The whole team of client, contractor, designer and the supply chain need to be engaged as early as possible - even concept stage - so that there is full understanding of what is to be delivered and for how much!” (Industry Expert, 2021)

- The study identified the most common and important organisational-level strategies for managing occupational stress in construction projects (see Figure 18). However, most of these were considered by experts of the focus group as ‘reactive’ strategies that are focussed on dealing with stress when it has occurred. Instead, they emphasised the need for ‘proactive’ strategies that are more embedded in the management practices of a project. Interestingly, this study was able to develop, based on the findings of a well-rounded case study, a list of ‘preventive’ strategies at a project supply-chain level, which were then assessed by industry experts through a focus-group exercise. Accordingly, the following strategies were identified as the most important for stress prevention and management in construction:
 1. Inclusive and collaborative planning.
 2. Teamwork and collaborative ways of working.
 3. Early engagement of subcontractors.
 4. Support and awareness mechanisms on project sites (e.g. visual management and welfare facilities).
- The study also identified the main barriers to making improvements in occupational stress in construction. These are listed below:
 1. Small companies' lack of resources to invest in mental health and wellbeing
 2. The casual work force and the fragmented nature of the construction sector
 3. Stigma and the male dominated culture of the industry
 4. SME employees' lack of awareness about industry support available for mental health issues.

Despite these challenges and barriers identified. The findings of this study indicate a growing level of appreciation and awareness of mental health issues in construction, especially amongst highly qualified professionals. More clients and contractors are also getting more convinced about the importance of establishing long-term working relationships. However, it is suggested, according to one of the industry experts who participated in this study’s focus group that:

“The low skilled workers seem most at risk from the most serious consequences of stress. The industry is likely to remain fragmented so we must work to improve within that parameter” (Industry Expert, 2021)

- There have been criticism and doubts about the relevance of the HSE’s (2007) Management Standards to the construction industry. These arguments are based on two main concerns, as the HSE’s Management Standards are regarded as being: (1) more related to the general workforce who tend to work in a relatively closed work environment; and (2) more appropriate for implementation at an organisational level rather than a temporary project-organisation like in construction projects. This study found that there is very little awareness of the HSE’s Management Standards and their relevance to construction. These standards do not seem to be generally considered at a project level in construction. Furthermore, this study provides novel contribution to knowledge within this domain through:
 - Identifying the main sources of stress in construction projects.
 - Shedding empirical light on the significance of the concept of ‘Flow’ as a potential stressor within construction projects, and arguably any other work-environment. Thus, it is suggested that workflow, is a critical area of any work design, and could be incorporated into the HSE’s Management Standards.
 - Providing recommendations, in the form of construction supply-chain management (CSM) strategies, on how to apply the HSE’s Management Standards at a construction project level. This, also, includes offering a list of suggested strategies for minimising setbacks and disruptions to work-flow in construction projects. More empirical research work may, however, be needed to supplement and develop these suggestions.
- Hence, many of the sources of stress in construction projects emerge from the design, planning, and procurement stages. It is recommended that further research should be conducted to gain further insights from designers (i.e. architects and engineers), office planners, procurement and commercial managers, and construction lawyers. It is also suggested that an industry-wide survey could be conducted to validate the findings of this study.

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