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The Effect of Job Status on Stressors and Stress Coping Strategies in the New Zealand Construction Sector

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ABSTRACT

The construction sector is a substantial employer but has a reputation for having stressful jobs. This study investigates whether stress is affected by job status within the hierarchical structure of construction teams from highest status executives to managers with intermediate status to tradespersons (both skilled and unskilled) with the lowest status. Statistical analysis of survey responses from 300 New Zealand construction workers explores the effect of job status on significant stressors and identifies key stress coping strategies for the different roles. Tradespersons are primarily stressed by physical job demands and are most likely to turn to maladaptive stress responses. They would benefit from site safety and stress reduction training. Relationship-based stressors are problematic for managers, and this could be addressed in communication and role-specific skills training. Both managers and tradespersons would benefit from an organization culture that fosters supportive management, career development, flexible work hours, and counseling services. Executives face stress from long hours, operational problems and managing contractors. If they prioritize financial success, then they may be reluctant to implement costly training programs and flexible work schedules. However, reducing job stress amongst all team members can improve job satisfaction, reduce employee turnover and increase productivity of the whole team.

KEYWORDS

Construction; job status; stressors; stress reduction; New Zealand

Introduction

The construction sector represents a significant component of the economy and ranks among the most substantial employment sectors, both within New Zealand and globally (Chan & Aghimien, 2022; MBIE, 2022). Working in construction offers good earnings and diverse project opportunities, but the sector has a reputation for being unsafe and stressful, with high rates of burnout, suicide and job turnover (Chan et al., 2020; Dodanwala et al., 2023; Zhang et al., 2023). This is because many construction projects are done under intense financial and time pressures with additional unique challenges (such as weather and labour availability) for particular projects and significant consequences from success or failure (Agyekum-Mensah & Knight, 2017; Pretorius et al., 2022). Researchers have shown that trade-level construction jobs may have harsh site conditions (from weather, dust and noise

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exposure), physically strenuous tasks, high workload, strict deadlines, bullying, insufficient autonomy in task execution, ambiguity in role definitions, unfair treatment, absence of adequate recognition or acknowledgment for work done and poor inter-personnel relationships (Finstad et al., 2019; Havet et al., 2020; Reig-Botella et al., 2021). Each of these factors may be a stressor for construction workers, and their cumulative effect could adversely affect their physical and mental health and decrease their job satisfaction (Dédélé et al., 2019). Commonly reported physical symptoms are job-related injuries, muscular-skeletal problems (such as back pain), elevated blood pressure, digestive system, skin and lung disorders. Mental health problems include anxiety, depression, fatigue/sleep problems (Dédélé et al., 2019; Lingard & Turner, 2015; Maqsoom et al., 2023).

Individuals react differently to stress; some are more resilient than others. Coping strategies can be either positive, such as exercising, or negative, such as dulling the perceived stress through substance abuse (Michie, 2002). An individual's job status may affect which particular group of factors are the key stressors and how stressed the individual will feel. Winwood and Lushington (2006) found that directors in the private sector were less stressed and more satisfied with their job compared with workers in lower status positions. At the other end of the job status spectrum, cleaners and low-skilled labourers with poorer socioeconomic conditions have been shown to suffer more stress and have significantly higher risk of suicide than the general population (Greiner et al., 2022; Milner et al., 2013). Within the construction industry, there is a job status hierarchy from lower-status jobs done by tradespersons (T) to higher status managers (M) to executives (E) who own the construction business or lead the construction project. Although numerous investigations have been conducted on the stress attributes particular to the construction industry, the majority have predominantly concentrated on those in M and E jobs (Sun et al., 2022).

The influence of employment status in the construction sector on stressors and coping mechanisms remains inadequately explored, and this research study seeks to bridge this identified research gap. Statistical analysis of survey data from 300 New Zealand construction workers, in T, M and E positions is used to assess whether job status affects the main stressors, the stress response (with reference to both physical and mental health impacts), and the coping strategies. T roles are those involving manual tasks, primarily working on site, using skills or crafts such as cabinetry, wiring and plumbing but also including unskilled, general labourers (Clays et al., 2020). M roles include construction project coordinators, planners and professionals in areas such as architecture, engineering and project management (Lingard & Turner, 2015).

The research findings may influence the way in which construction companies manage stress to improve job satisfaction and workforce performance.

In the next section the studies on stress models and the effect of job status on stress and on stress coping strategies are reviewed.

Literature review

In the previous section, the relationship between construction job stress, coping mechanisms and employment status was identified as the research gap. Stress models attempt to link the causes, effects and management of stress and are discussed below. Thereafter, the research on the effect of job status on stress is reviewed.

Models of stress in the workplace

There have been many attempts to model job-related stress both in general organisations and, more specifically, in the construction environment and these are discussed below.

Models of job-related stress and its effect in general organisations

In any workplace, individuals will be exposed to different stressors and will react differently to them, some people being more resilient than others. In the “bucket model,” an individual’s resilience is viewed as the level in a bucket, with holes in the bucket from stressors (such as physical effort, anxiety, overwork, and poor health) draining resilience out and lowering the level, and behaviours (such as relaxation, good nutrition, and supportive relationships) raising the resilience level (Hill, 2003). The organisation itself and the individual have attributes or inputs that affect the situation. The organisation size, and type of projects will determine factors such as the number of resources available, the complexity of work, the hierarchy within the organisation, and the time and pressure demands. The individual will have varying education level, work experience, soft skills and personality traits that will affect their resilience. Kreitner and Kinicki (2001) proposed a model of job stress as a relationship between a variety of stressors acting on an individual causing a perception of stress, resulting in both physical and mental health outcomes, behavioural changes and stress-coping strategies. They defined potential job stressors in four categories: individual, group, organisational and extra-organisational, with the characteristics summarised in Table 1.

Different aspects of this model have been investigated for people having sedentary or physical job tasks and for people with varying job status (Dèdelè et al., 2019; Reig-Botella et al., 2021). In addition, a variety of job-focussed stress models (Herr et al., 2015) and work-life stress models (Hämmig, 2014) have been developed, for example:

- The Job-Demand-Control (JDC) model: job stress arises from work demands (such as manual work over long periods), coupled with no control over decisions relating to the job such as job continuity and variation in tasks.
- The Effort-Reward-Imbalance (ERI) model: stress is caused by high effort, coupled with poor pay, lack of praise/acknowledgment and lack of promotion prospects.
- The Organisational Justice (OJ) model: Stress is caused by unfair decisions, unequal access to resources and unfair treatment.
- Work-Life-Conflict (WLC) model: Stress is caused by a complex combination of organisational and extra-organisational factors.

These models have been applied in a range of work environments and have linked the stressors to a range of adverse outcomes such as absenteeism, burnout, depression, anxiety,

Table 1. Typical characteristics of stressors at four levels within a general organisation (adapted from Kreitner & Kinicki, 2001).

Individual	Level within an organisation		
	Group	Organisational	Extra-organisational
Job demands			
Role conflict	Managerial behaviour	Culture	Family
Role ambiguity	Team cohesiveness	Structure	Financial
Job control	Inter-group conflict	Technology	Commuting time
Supervisor relationship	Status ambiguity	Project complexity	Health
Work overload			
Work monotony			

muscular skeletal pain, accidents/injuries and mortality rate (Hulsegge et al., 2020; Metzler & Bellingrath, 2017; von Bonsdorff et al., 2012).

Models of stress within the construction sector

Wu et al. (2019) review the early models of stress and effect discussed above and present the Job Demands Resources (JDR) model to include the material, psychological, social and organisational “resources” that help construction managers cope with stress at work. Maqsoom et al. (2023) discuss the importance of the Error-Management Climate (EMC); a combination of construction safety training and ongoing safety review that improves morale and ethical behaviour and reduces health risks. Finally, several studies have considered the Person-Environment-Fit model, showing the importance of the match between a person’s characteristics and the job, in moderating job stress (Maqsoom et al., 2023; van Heerden et al., 2023; Wu et al., 2019).

The effect of job status on the key stressors and stress reduction strategies

The difference in stressors for managers, executives and tradespersons relates partly to their job characteristics and partly to their individual characteristics. Managers and executives tend to have more interactions with other workers, spend more time working in offices, have higher status and are better paid. Tradespersons are mostly involved in manual, on-site tasks. They range from skilled workers (such as electricians and plumbers) to low-skilled general labourers, the latter having lower status and being more socioeconomically disadvantaged (Greiner et al., 2022; Lingard & Turner, 2015). Within their different jobs, each group shares common stressors such as unfair rewards and treatment, job ambiguity and insecurity, heavy workloads/long work hours, lack of team support, and work-family conflict (Enshassi et al., 2016; Sun et al., 2020). Tradespersons have additional stressors from physical site conditions, bullying, and inadequate safety provision (Sun et al., 2022; King & Lamontagne, 2021; Zhang et al., 2023). Managers have more emotional stressors based on role conflict and inter-personnel interaction (Zhang et al., 2020). Frontline managers (such as safety officers and site managers) typically have the lowest job status in the management hierarchy and face a combination of the site-related stressors (unexpected site problems, inadequate resources) of tradespersons and interaction-related stressors of management as they provide the interface between tradespersons and other managers (Liang et al., 2022). There is consensus that whatever the particular stressors are, work-related stress manifests as job dissatisfaction, down time and inefficiency which is costly to the organisation (Lecca et al., 2020).

There are different mechanisms for coping with stress and they can be classified as “adaptive” or “maladaptive” in terms of whether they help or harm the individual (Zhang et al., 2023). Adaptive mechanisms include delegating stressful tasks to others, seeking mental health support, and adopting recreational practices, such as exercise and meditation, while examples of maladaptive mechanisms are withdrawal, self-blame and substance abuse (Langdon & Sawang, 2018). Bowen et al. (2014) cite alarmingly high incidences of alcohol consumption, heavy smoking, and drug use in construction workers. They also have a high risk of suicide, particularly in males under 30 years old, and those in unskilled trade jobs such as painters, plasterers, general labourers, concrete workers and roofers (Greiner et al., 2022; Kotera et al., 2019; Lingard & Turner, 2015). All of these risks contribute to the high sick leave,

Table 2. Stress reduction strategies in the construction company job hierarchy.

Job status level	Stress reduction strategy	Reference
T	Site safety training; safety monitoring; involving tradespersons in safety decisions; adopting fair treatment policies; providing job security.	Brandt et al. (2021); Egemen (2024).
M	Providing clear definitions of roles, responsibilities and authority; communication training; including staff in decisions; recognition and support from upper management; clear career development paths.	Cedstrand et al. (2022); Egemen (2024); Zhang et al. (2020); Wu et al. (2019).
All	Providing an encouraging and supportive work environment; emphasising a good work-life balance; co-creation of interventions; workload planning; coping training; counseling services	Cedstrand et al. (2022); Lecca et al. (2020); Liang et al. (2022). Wu et al. (2019).

T: tradesperson M: manager All: tradespersons, managers and executives.

burnout and turnover rate within the construction industry, with an associated high cost to the individual worker's quality of life as well as lower productivity and financial loss to the industry as a whole (Dong et al., 2015; Enshassi et al., 2016; Zhang et al., 2023). This effect is worse for small companies, in part because they lack the financial resources to adopt comprehensive preventative measures (Havet et al., 2020). Employee assistance programs (EAPs) on stress management should address adaptive coping strategies aimed at each level in the organisation's hierarchy, such as those shown in Table 2.

Finally, whilst it is important to tailor stress management strategies to the different needs of construction workers, there are additional complications in implementing them. The construction sector is male-dominated, so qualities such as toughness, stoicism and self-reliance are valued (Kotera et al., 2019). Coping mechanisms need to address male-norms if they are to overcome male reluctance to admit feeling stress and seek help for it (King & Lamontagne, 2021; Liang et al., 2022; Lim & Francis, 2023). Kotera et al. (2019) recommend training programs that encourage self-compassion (i.e., being kind to oneself) and that promote help-seeking as courageous as the mechanism for fostering good mental health in men.

In summary, there are several models for the causes of job stress, some of which have been applied in the construction sector. They show that providing job-appropriate resources, together with a good match between an employee's characteristics and the job demands, help reduce workplace stress. Most research has looked at stress in the context of people in construction management roles, but there is some evidence that young males and people working in unskilled trade jobs are more prone to maladaptive stress responses. Examining the role of job status in stress-related behaviour is the focus of this research. In the next section the research method is described.

Research method

The conceptual framework used to examine the impact of job status (T, M and E) on perceived stressors, stress response and coping strategies across four levels (individual, group, organisational and extra-organisational) in the New Zealand construction sector is shown in Figure 1.

The research objectives are:

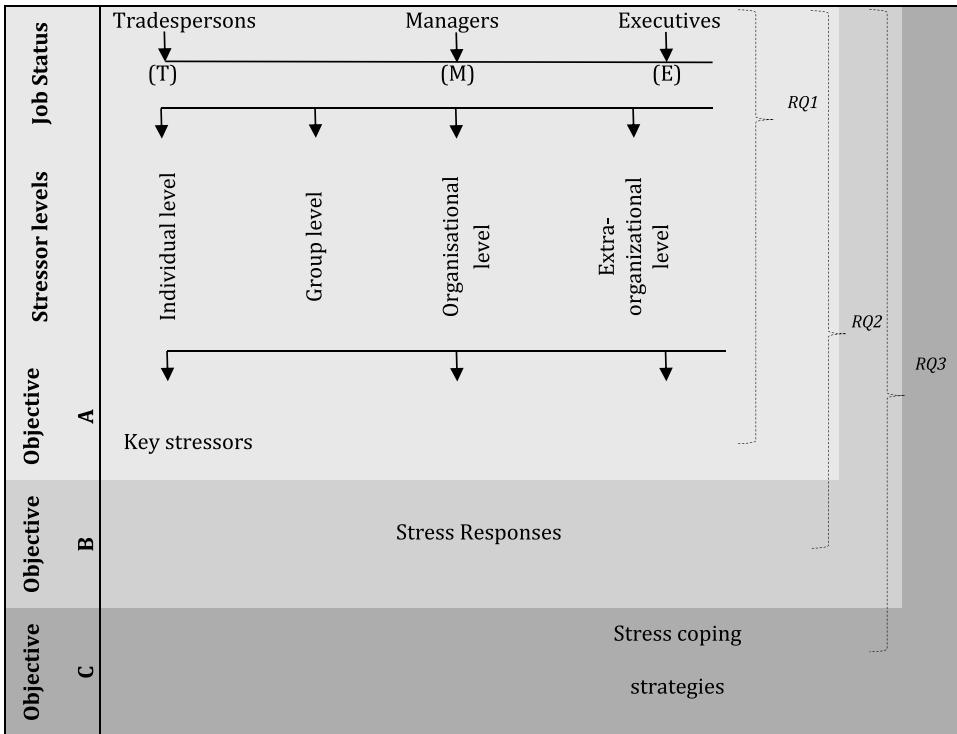


Figure 1. Conceptual framework. Extra-organisational level and not Extra-organizational level in Figure 1.

- (1) Objective A: To ascertain whether there exist statistically significant disparities in the main stressors experienced by construction workers in New Zealand in T, M and E positions.
- (2) Objective B: To identify statistically significant differences in stress response amongst T, M, and E construction workers.
- (3) Objective C: To identify and interpret statistically significant differences in stress reduction strategies amongst T, M, and E construction workers.

This study has three research questions (RQs):

- **RQ1:** Are there statistically significant differences in stressors among construction workers classified as T, M, and E in New Zealand?
- **RQ2:** Do statistically significant disparities exist in stress response between construction workers categorized as T, M, and E in New Zealand?
- **RQ3:** Are there statistically significant differences in stress coping strategies among construction workers classified as T, M, and E in New Zealand?

The research adopted a mixed methods approach, using an online survey of 300 New Zealand construction workers to provide qualitative data on the participant's

perspectives, followed by quantitative statistical analysis of survey responses. The details of each step follow.

Target population, sample size and data collection

The target population is New Zealand construction workers, estimated at 292,800 people in 2021 (MBIE, 2022). For statistical analysis with a confidence level of 90% that the real value is within $\pm 5\%$ of the measured/surveyed value, a sample size of 272 or more surveys is needed (Georgiev, 2023). The researchers collaborated with SiteSafe, a New Zealand organisation representing the country's construction workers by providing mandatory safety certification and membership to everyone working in construction in the country. Together, they developed an online survey collection tool that was distributed through SiteSafe's media platforms. This is convenience sampling (the survey was distributed to all members) in which the voluntary participation introduces self-selection bias from only capturing people who are willing and available to take part. Figure 2 shows the various subsections of the questionnaire.

From 30 June to 31 July 2020, 300 valid responses were received, providing the data for the research. The details of the survey development, the questionnaire structure and the demographics of the respondents (such as education level, gender, and type and length of construction experience) are provided in (van Heerden et al., 2024). The respondents were 80% male, with an average of 21 years of experience within the construction industry. The majority (84%) had worked in 10 or more projects within the commercial/retail sector (25%), residential sector (20%), industrial sector (19%), and infrastructure (14%). Just over 70% held a certified qualification. Table 3 presents the categorisation of the participants into three distinct job

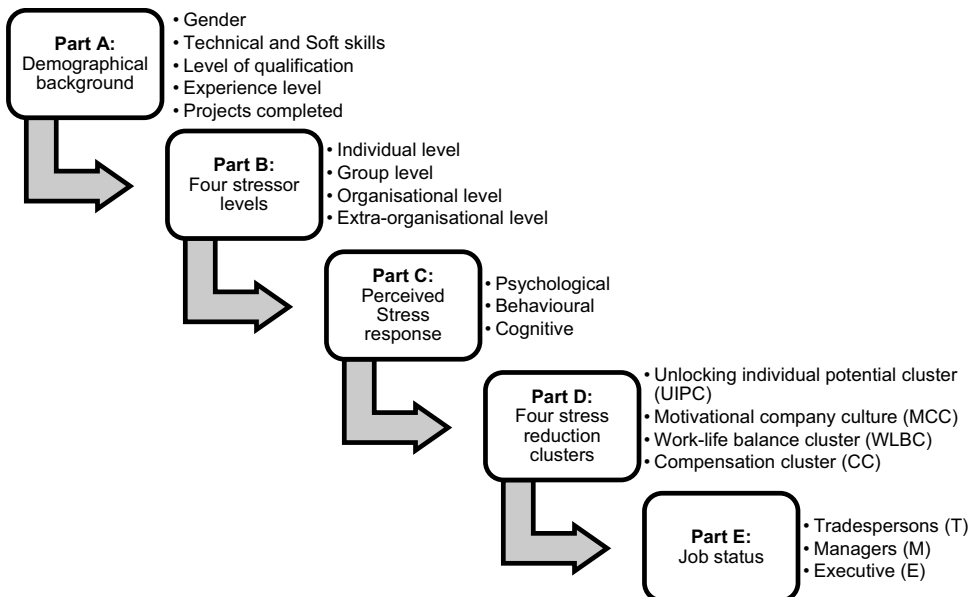


Figure 2. Description of the different subsections used in the questionnaire.

Table 3. Employment level of the respondents.

Job status	Number of participants	Percentage
Unskilled and skilled tradespersons (T)	65	21.7
Managers (M)	185	61.7
Executives (E)	50	16.7

levels, specifically, skilled and unskilled tradespersons (T), managers (M), and executives (E). The sample is strongly biased toward managers who make up almost two-thirds of the sample population and this is recognised as a limitation of the study. In hindsight, this is a disadvantage of using convenience sampling. Other research has shown that tradespersons are less likely to participate in surveys, particularly when they use academic terms (Dasgupta, 2021). Visiting construction sites to talk to tradespersons about their experiences would help increase their participation.

Data analysis

Respondents were asked to rank their perceived stressors, stress responses and stress reduction strategies on a 5-point Likert scale. The four levels (individual, group, organisational and extra-organisation) of perceived stressors, shown in Table 1, were ranked by the respondents as having 1: very low impact; 2: low impact; 3: moderate impact; 4: high impact and 5: very high impact. The respondents also provided data on their most common stress response (psychological, behavioural and cognitive) and on their stress-reduction strategies, with rankings ranging from 1: very uncommon; 2: uncommon; 3: average; 4: common and 5: very common.

IBM SPSS and Minitab 19© statistical software was used for analysis of the variance (ANOVA) between mean values, using the following steps:

- The Kolmogorov – Smirnov test was used to establish that the T, M and E cohorts had a normal distribution in the 5-point Likert value of the variable (stressor, stress response and stress reduction strategy) being considered. The number of observations (refer to Table 3) is 65 for tradespersons, 185 for managers and 50 for executives.
- ANOVA was applied to the mean values to test the null hypothesis, H_0 , that T, M and E responses have no difference in the variable being considered. In univariate statistics, only one variable is analysed at a time. This has the limitation that underlying interactions and inter-dependencies between variables are not taken into account.
- Statistical significance was determined by the p-value, rejecting H_0 where $p < .01$ indicated high significance, $p < .05$ indicated significance, and $p < .1$ indicated marginal significance. It is noted that a small p-value means that H_0 is statistically unlikely and not that it is definitively false. Similarly, a large p-value does not confirm that H_0 is true, but rather that there is not enough evidence to reject it.

The research findings and their implications are presented in the next section.

Results and discussion

The survey questions were grouped into three categories, namely stressors, stress responses and stress reduction strategies. The first set of results shows, for each of these categories, the significant survey responses, defined as those whose mean values scored above 3 on the Likert scale, for the entire cohort of 300 respondents. This is followed by the results on the effect of job status on stressors, stress responses and stress reduction strategies.

Survey response data for all respondents ($n = 300$)

Key stressors

Table 4 shows the stressors whose mean values for the question responses scored above 3 on the Likert scale, for all study respondents. The mean Likert value of each parameter is shown in brackets.

The main stressors at the individual level were workload-related, with workers feeling stress from completion-time pressure, being over-worked, having to multi-task, being interrupted, and having long, inflexible and unpredictable work hours. Inadequate job skills, job status factors (such as job continuity and remuneration), role ambiguity, inter-personnel relationships and ethical dilemmas were additional stressors. At the organisational and group level, leadership/managerial behaviour and lack of team cohesiveness were perceived to be the main sources of stress. Finally, the respondents cited the economy and

Table 4. Key stressors for the entire cohort of respondents ($n = 300$) with mean values of responses shown in brackets.

Individual stressors	Non-individual stressors
<p>Job Demands – workload Pressure to complete project(s) on time (4.20); Being asked to do too much (3.91); Juggling several projects at the same time (3.88); High levels of interruptions in execution of task (3.86); Overload (3.78); Long working hours (3.66); Inflexible work schedules (3.53); Unpredictable working hours (3.29); Pacing of work (3.14)</p> <p>Job Demands – skills requirement Concerns about the task at hand and level of technical skills required (3.45); Preparation or training for the task (3.36); Ability to work with new technology (3.02)</p> <p>Work Condition/Status Job insecurity (3.31); Poor remuneration (3.19); Poor personal health (3.18); Job status (3.14); Condition of work equipment (3.10)</p> <p>Role Conflict With consultants (3.36); With external parties that are key stakeholders (3.34); With contractors (3.33); With upper management (3.24); With fellow staff (3.13)</p> <p>Role Ambiguity High uncertainty in the job process (3.30); Fragmentation of work (3.32); Unclear responsibilities (3.19)</p> <p>Inter-personnel Relationship Experiencing bad relations with coworkers (3.24); Conflict with staff (3.21); Conflict with supervisor (3.13); Lack of support from a mentor (3.07); Work-home conflict (3.36)</p> <p>Ethical Dilemmas Asked to do something unethical on a project (3.55); Bullying and intimidation (3.03); Verbal abuse at work (3.02)</p>	<p>Organisational Level Organisational leadership (3.58); Organisational environment (3.32); Organisational structure (3.27); Introduction of change in work conditions (3.23)</p> <p>Group Level Managerial behavior (3.45); Lack of team cohesiveness (3.44); Intragroup conflict (between 2 or more members of the same group/team) (3.22)</p> <p>Extra-Organisational Level Economy (3.60); Family (3.39)</p>

family issues as additional factors contributing to stress. These findings agree with those reported in the literature. Sunindijo and Kamardeen (2017) and Cattell et al. (2016) found that the main stressors for construction workers were time pressure, excessive workload and long work hours. Poorly defined job scope, lack of support and inadequate compensation have also been identified as significant stressors (Cattell et al., 2016; Finstad et al., 2019; Palaniappan et al., 2023).

Key stress responses

Table 5 shows the significant stress responses for all respondents.

The main psychological impacts of stress were burnout and job dissatisfaction, causing disrupted sleep patterns, fatigue and poor concentration. These findings are similar to those reported by Dodanwala et al. (2023) and Chan et al. (2020).

Key stress-reduction strategies

Table 6 shows the significant stress-reduction strategies for all respondents.

The respondents felt that they would benefit (i.e. have less stress) from better training programs, job resources and mentorship. Within the company culture, they felt that better communication, good relationships with supervisors, job security, more resources and a better work environment with more team building would reduce their stress. Finally,

Table 5. Stress impacts on individuals for the entire cohort of respondents ($n = 300$) with mean values of responses shown in brackets

Psychological impacts	Behavioural impacts	Cognitive impacts
Burnout (3.83); Job dissatisfaction (3.69); Emotions (3.56); Organisational commitment (3.47); Anxiety (3.46); Self-esteem (3.40); Job involvement (3.37); Depression (3.30)	Changes in sleep patterns (3.48); Performance (3.26)	Fatigue (3.71); Lack of concentration (3.46); Forgetfulness (3.43); Poor decision-making (3.12)

Table 6. Stress reduction strategies for the entire cohort of respondents ($n = 300$) with mean values of responses shown in brackets.

Unlocking individual potential cluster (UIPC)	Motivational company culture (MCC)	Work-life balance cluster (WLBC)	Compensation cluster (CC)
Training and development (3.90); Available resources (3.88); Site mentorship (3.76); Increase project experience (3.72); Improve soft skills and abilities (3.66); Improve technical skills and abilities (3.58)	Transparent and clear communication between staff at all levels (4.15); A good relationship with supervisors (3.96); Job security (3.89), Better work environment (3.65); Available resources (3.88); Regular team building (3.59); No harassment at work (3.42); More career opportunities (3.28); Confidential access to EAP/Counselling/Support services (3.27); Good housing or accommodation (when not at home) (3.21); Regular socializing with team members (3.20)	Ability to take leave between projects (3.59); More control over workload and decision participation (3.56); Ability to take leave during projects (3.53); Reduce the required working hours (3.52); Flexible working hours (3.51); Reduction in workload and responsibilities (3.17); Increase in family time (3.83)	Strong reward and recognition initiatives that complement remuneration (3.95); Increase in salary (3.59)

the respondents wanted a better work-life balance and greater rewards and recognition. Cattell et al. (2016) and Chan et al. (2020) found similar stress-reduction factors.

In summary, the survey response data for 300 New Zealand construction workers supported earlier studies in showing that the main factors causing stress include time pressure, excessive workload, poorly specified job boundaries, and lack of support. These factors led to exhaustion and job dissatisfaction. Respondents felt that their stress would be reduced if they were given better support (through training, mentorship, and improved communication), more control over their tasks and working hours and greater compensation (both monetary and recognition of their efforts).

The effect of job status on key stressors, stress responses and stress reduction strategies

The number of responses for tradespersons (T), managers (M) and executives (E) were 65, 185 and 50 respectively (Table 3). The responses are not evenly spread amongst the three job status levels; they are predominantly managers (61.7%) and this is recognised as a limitation of the research.

Objective A results: the effect of job status on key relation type stressors

The tested null hypothesis (H_0) is:

H_0 : The mean value of the key stressor is independent of the job status (T, M or E) of the respondent.

The null hypothesis is rejected, indicating that there is a significant difference in the stressor arising from the respondent's job status, with significance judged from the p-value of the ANOVA test. The p-value criteria are $p < .01$ indicating highly significant difference, $p < .05$ indicating significant difference, and $p < .1$ indicating marginally significant.

Interval plots for statistically significant differences in key relationship-based stressors between T, M and E workers are presented in Figure 3 in order of decreasing statistical significance (increasing p-value) for ten key stressors. The plots show the Likert ranking for the mean and the 95% confidence interval for each parameter. Not all respondents answered every survey question, so the number of respondents (n) is shown for each figure.

The results show that M workers were most affected by all 10 relationship-based stressors, particularly for interpersonal relationships. Managers must continuously strive to achieve a delicate balance among a wide range of cultural backgrounds, diverse individual skill sets, and varied work styles, all the while endeavouring to prevent breakdowns in communication. T workers had the next strongest perception of stress in all categories except in "conflict with contractors" (Figure 3 (i)). The existence of a hierarchical structure within construction sites is a possible factor contributing to this challenge, potentially resulting in power conflicts and disputes. Furthermore, tensions may escalate when differing management styles within the M workers clash with those of T workers. Es were least affected 9 of the 10 key stressors. They were more stressed by "conflict with contractors" than T workers, which is probably because they have much more interaction with contractors than T workers. Executives often find themselves compelled to make decisions that carry ramifications for the entire project. Their decisions may not always be well-received

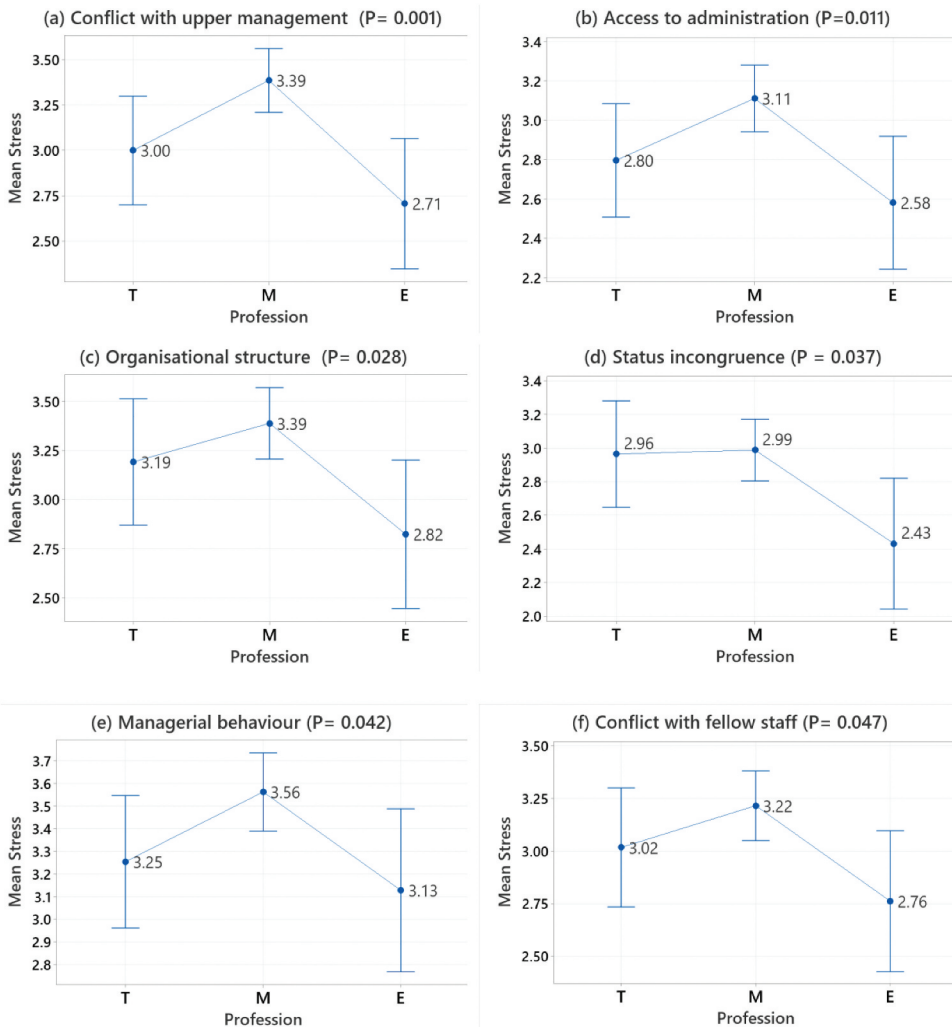


Figure 3. Key differences in the mean ranking of relationship-related stressors. 95% confidence intervals for mean stress impacts for tradespeople (T, $n = 60$), managerial (M, $n = 171$) and executive (E, $n = 43$) workers. Stress: 1 = Very low impact, 2 = low impact, 3 = Moderate impact, 4 = High impact, 5 = Very high impact.

and could face opposition from both M and T workers. Nevertheless, the authority vested in executives enables them to assign duties even in the face of resistance from M and T workers.

Objective A results: the effect of job status on key stressors related to construction site conditions

Figure 4 shows interval plots for statistically significant differences in eight key stressors related to site conditions for T, M and E workers.

T workers do most tasks on the construction site which is why they are the group most affected by all 8 key stressors. Executives are the least affected, since they spend most of their

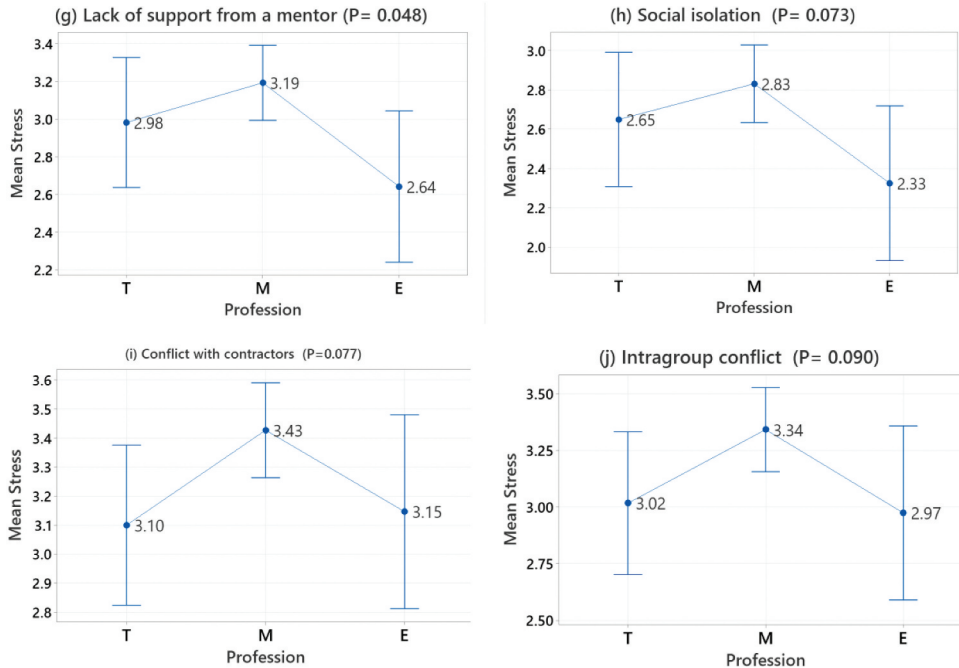


Figure 3. (Continued).

time in office environments. M workers experience a moderate level of impact, as their responsibilities necessitate a combination of time allocated to on-site work and time spent in office settings.

Objective B results: the effect of job status on key stress responses

The physical site working environment and masculine culture make T workers more prone to substance abuse (Figure 4 (h)). Similarly high prevalence of suicide, mood disorders and substance abuse among younger unskilled “blue-collar” workers (similar to our “tradesperson” classification) are reported by others (King & Lamontagne, 2021; Pidd et al., 2017). According to Frimpong et al. (2022), this population is subjected to various psychosocial risk factors (PRFs) both within and beyond the confines of the construction sector, that make them susceptible to mental health challenges. The PRFs stem from demanding workplace conditions, which impact worker efficiency, job contentment, and ultimately, their psychological wellbeing (Leung et al., 2010; Turner & Lingard, 2020).

Objective C results: the effect of job status on stress reduction strategies relating to relationships

Figure 5 (a) to (e) are interval plots with statistically significant differences in five key stress reduction strategies related to relationships for T, M and E workers. The plots for training that relate to managing relationships are Figures 5 (f) to (h).

M workers are the group likely to suffer from relationship-related stressors, which explains why they place the highest value on all relationship-related stress reduction strategies (Figure 5). They need clear communication between staff at both T and M levels.

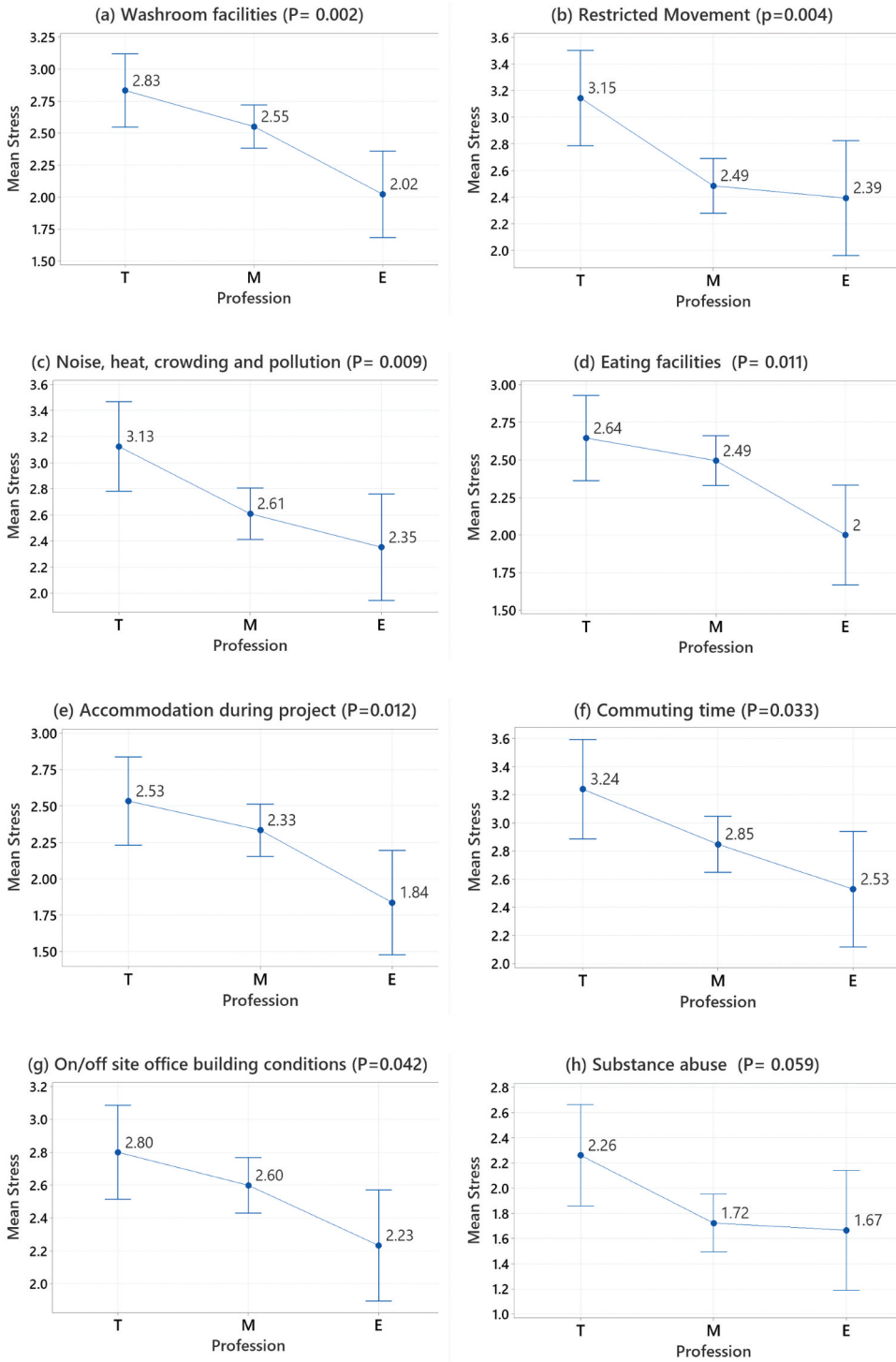


Figure 4. Key differences in the mean ranking of site-related stressors. 95% confidence intervals for mean stress impacts for tradespeople (T, $n = 60$), managerial (M, $n = 171$) and executive (E, $n = 43$) workers. Stress: 1 = Very low impact, 2 = low impact, 3 = Moderate impact, 4 = High impact, 5 = Very high impact.

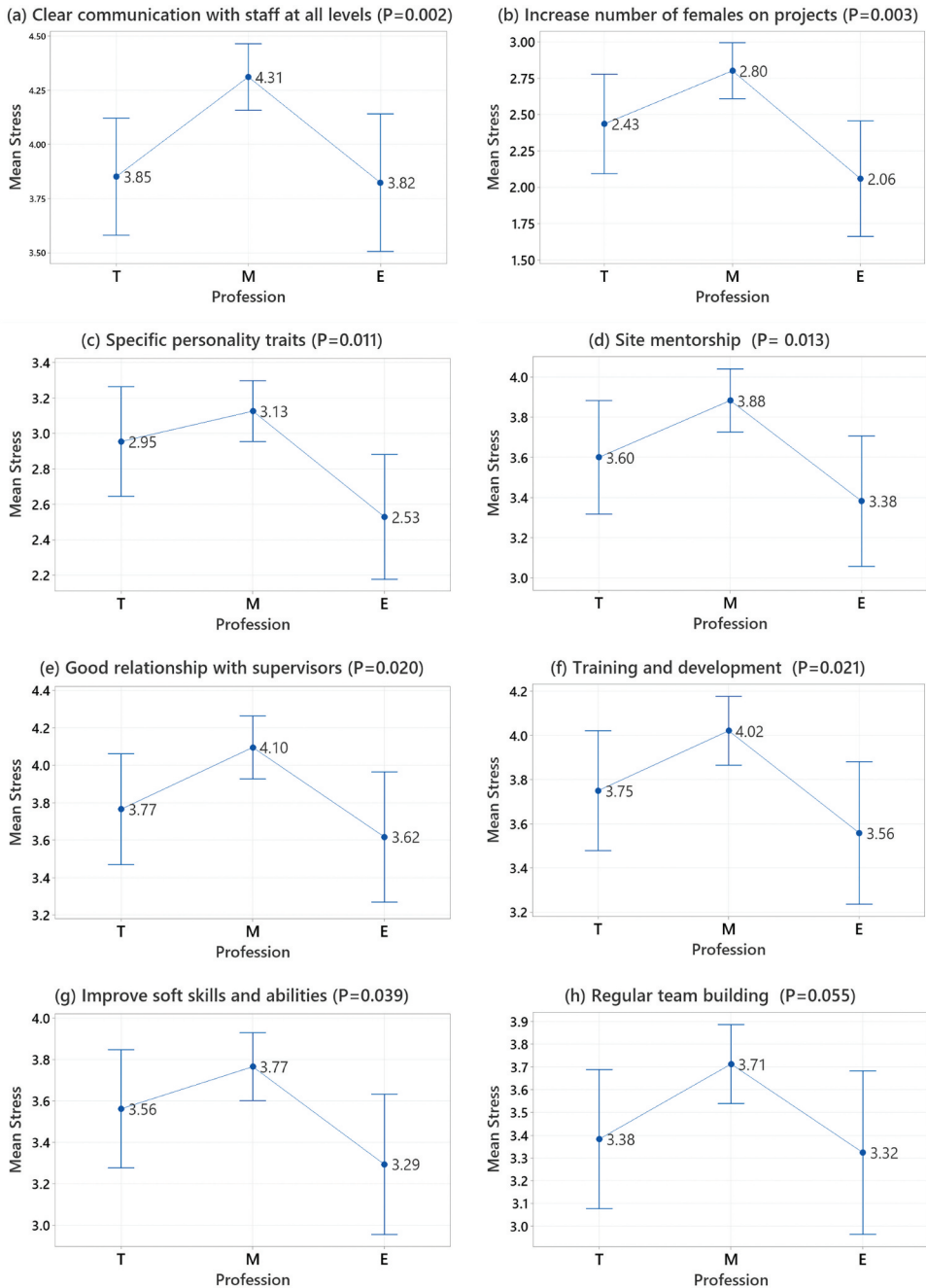


Figure 5. Key differences in the mean ranking of relationship-related stress reduction strategies. 95% confidence intervals for mean stress impacts for tradespeople (T, $n = 47$), managerial (M, $n = 146$) and executive (E, $n = 34$) workers. Stress: 1 = Very low impact, 2 = low impact, 3 = Moderate impact, 4 = High impact, 5 = Very high impact.

Tworkers are primarily task oriented, so they communicate mostly with other Tworkers and only occasionally with their managers. For this reason, the latter prefer stress reduction strategies such as site mentorship and training to develop their technical and soft skills.

Prior investigations have indicated that personality characteristics including neuroticism, conscientiousness, self-esteem, and extraversion significantly affect perceived stress and coping mechanisms (Liu et al., 2021; Walker, 2011). Individuals exhibiting neurotic tendencies frequently perceive situations as significantly perilous and possess restricted strategies for managing stressors, while those who are conscientious, self-assured and extrovert are less susceptible to stress and cope better. Stress management training should address individual personality traits.

Objective C results: the effect of job status on stress reduction strategies relating to work conditions

Figure 6 shows interval plots for statistically significant differences in eight key stress reduction strategies related to work conditions for T, M and E workers.

Once again, M workers value the stress reduction strategies related to work conditions more strongly than the other groups of workers. This suggests that M workers devote considerable time to on-site construction work, thereby exposing themselves to some of the same environmental risks encountered by their T counterparts, although to a lesser degree. The predominantly sedentary nature of M roles, characterised by extended periods of desk-bound tasks, can exacerbate health issues related to stress. Comparing Figures 5 and 6, T workers place a higher value on stress reduction strategies related to work conditions than those related to relationships. T workers typically engage in physically demanding activities that can result in fatigue, musculoskeletal ailments, and other enduring health concerns. Their continuous outdoor labour exposes them to hazardous site conditions, including noise, dust, noxious substances, heavy machinery, and various other project-specific dangers. Both T and M workers place similar value on parameters such as reduction in workload and responsibilities (Figure 6(i)) and in more career opportunities (Figure 6(d)). These are not a priority for executives who have control over their own workload and have already reached the pinnacle of their profession.

Practical implications of the findings

The research has shown that job status level affects the key stressors, stress responses and stress reduction strategies and this needs to be considered both in providing Employee Assistance Programmes (EAP's) and in changing the organisation culture. Tradespersons should get programs that address site safety training and monitoring and be supported with better job security and fair treatment, in agreement with Brandt et al. (2021) and Egemen (2024). Managers require training in communication and role-specific skills and value a culture with clearly defined responsibility and career development paths (Egemen, 2024; Li et al., 2022; Zhang et al., 2020; Wu et al., 2019). Organisations should develop a supportive work environment with realistic workload planning for all employees and an emphasis on adaptive stress reduction training, including counseling services and self-compassion training (Kotera et al., 2019; Lecca et al., 2020; Liang et al., 2022). There is a direct correlation between reduced stress, occupational satisfaction, and job efficacy;

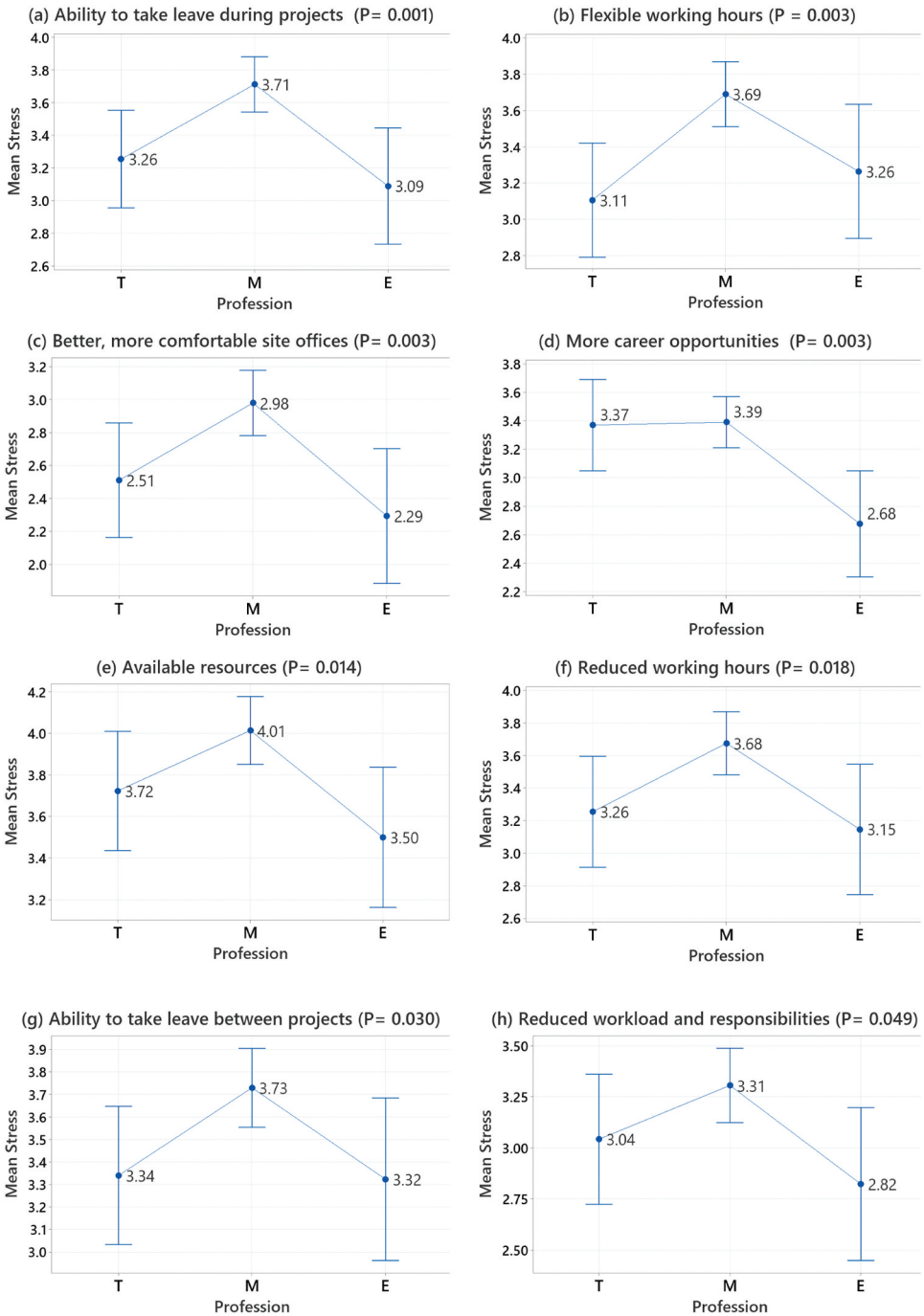


Figure 6. Key differences in the mean ranking stress reduction strategies related to work conditions. 95% confidence intervals for mean stress impacts for tradespeople (T, $n = 60$), managerial (M, $n = 171$) and executive (E, $n = 43$) workers. Stress: 1 = Very low impact, 2 = low impact, 3 = Moderate impact, 4 = High impact, 5 = Very high impact.

workers who are less stressed enjoy their jobs and are more productive and less likely to leave the job (Choi & Kim, 2017; Egemen, 2024; Jebelli et al., 2018). The cost of implementing these stress management strategies specifically designed to address the requirements of each tier within the construction industry's job status hierarchy will be offset by the economic benefits of a more productive construction workforce.

The main findings from the research and the limitations are discussed in the next section, together with recommendations for future research.

Conclusion

Within the construction industry, there is a lack of consensus concerning the influence of employment status on the perception of and reaction to work-related stressors. The study reported here investigates this matter within the framework of the New Zealand construction industry. It reports the key factors that make workers feel stressed (at the individual level, the group level, the organisational level and the extra-organisational level), their responses to stress and the ways in which they mitigate that stress. It shows that there are clear differences in stressors, stress responses and stress reduction strategies related to job status.

Tradespersons are most stressed by physical site conditions and would benefit from site safety training. The typical labour-intensive work, low control over the way they perform tasks and male norms in site behaviour increase their likelihood of anxiety, substance abuse and depression. Poor leadership and fewer career opportunities are additional psychological stressors that need to be addressed if tradesperson job satisfaction is to improve.

Managers are most stressed by the quality of relationships amongst individuals and team members. They view communication and role-specific skills training as strong avenues to reduce stress. They also feel that more career opportunities and more flexible working hours would improve their job satisfaction. Executives do not regard training and development as effective stress reduction strategies for themselves, but they do value reduced working hours. They face stressors that are mainly associated with operational activities and interactions with contractors. Having reached the most senior job positions with autonomy over their work tasks, they are less affected by career progression stressors than tradespersons and managers. Executives will ultimately be responsible for implementing an organisation culture that provides a supportive work environment with optimal workload planning for all employees and an emphasis on adaptive stress reduction training, including counseling services. They will have to balance the cost of training programs and flexible workload plans against the benefits of a more satisfied and productive workforce.

Whilst the findings contribute to an understanding of how stress is perceived by tradespersons, managers, and executives in the construction sector of New Zealand, there are some limitations. Firstly, the respondent sample is strongly biased toward managers, perhaps because tradespersons are less willing to complete online surveys and see little value in academic research. In future research their participation could be facilitated by face-to-face interviews, conducted on the construction site during their breaks. It is particularly important to assess the tradesperson demographic since they are the group most likely to experience stress and to adopt poor stress-coping behaviours. A second limitation is that respondents with different characteristics (such as varying genders or diverse educational

backgrounds) may interpret the survey questions in different ways. In-person interviews would allow clarification of ambiguous questions which would help limit this effect. Finally, the results reflect the construction industry in New Zealand, which consists primarily of small and medium size businesses. The findings may be less relevant to countries where very large construction companies are the norm.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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Data availability statement

The data supporting the reported results can be requested from the corresponding author, subject to the terms and conditions established during the comprehensive ethics evaluation conducted at Massey University.

Ethical approval

This research was approved by the Massey University Human Ethics Committee: Human Ethics Northern Committee, New Zealand, Ethics Notification – NOR 19/47.

References

- Agyekum-Mensah, G., & Knight, A. D. (2017). The professionals' perspective on the causes of project delay in the construction industry. *Engineering, Construction & Architectural Management*, 24(5), 828–841. <https://doi.org/10.1108/ECAM-03-2016-0085>
- Bowen, P., Govender, R., & Edwards, P. (2014). Structural equation modeling of occupational stress in the construction industry. *Journal of Construction Engineering and Management*, 140(9), 04014042. [https://doi.org/10.1061/\(ASCE\)CO.1943-7862.0000877](https://doi.org/10.1061/(ASCE)CO.1943-7862.0000877)
- Brandt, M., Sundstrup, E., Andersen, L. L., Wilstrup, N. M., & Ajslev, J. Z. (2021). Safety climate as a predictor of work ability problems in blue-collar workers: Prospective cohort study. *BMJ Open*, 11(3), e040885.
- Cattell, K., Bowen, P., & Edwards, P. (2016). Stress among South African construction professionals: A job demand-control-support survey. *Construction Management & Economics*, 34(10), 700–723. <https://doi.org/10.1080/01446193.2016.1203967>
- Cedstrand, E., Augustsson, H., Alderling, M., Sánchez Martínez, N., Bodin, T., Nyberg, A., & Johansson, G. (2022). Effects of a co-created occupational health intervention on stress and psychosocial working conditions within the construction industry: A controlled trial. *Frontiers in Public Health*, 10, 973890. <https://doi.org/10.3389/fpubh.2022.973890>
- Chan, A. P. C., Nwaogu, M. J., & Naslund, J. A. (2020). Mental ill-health risk factors in the construction industry: Systematic review. *Journal of Construction Engineering and Management*, 146(3), 04020004. [https://doi.org/10.1061/\(ASCE\)CO.1943-7862.0001771](https://doi.org/10.1061/(ASCE)CO.1943-7862.0001771)

- Chan, D. W., & Aghimien, D. O. (2022). Safe working cycle: Is it a panacea to combat construction site safety accidents in Hong Kong? *Sustainability*, 14(2), 894. <https://doi.org/10.3390/su14020894>
- Choi, E., & Kim, J. (2017). The association between work–life balance and health status among Korean workers. *Work*, 58(4), 509–517. <https://doi.org/10.3233/WOR-172641>
- Clays, E., Hallman, D., Oakman, J., & Holtermann, A. (2020). Objectively measured occupational physical activity in blue-collar workers: What is the role of job type, gender and psychosocial resources? *Applied Ergonomics*, 82, 102948. <https://doi.org/10.1016/j.apergo.2019.102948>
- Dasgupta, P. (2021). The importance of exposure assessment in blue collar jobs: Construction as an example. In K. Palaniappan & P. McCauley (Eds.), *Occupational wellbeing* (pp. 3–13). IntechOpen.
- Dedelé, A., Miškinytė, A., Andrušaitytė, S., & Bartkutė, Ž. (2019). Perceived stress among different occupational groups and the interaction with sedentary behaviour. *International Journal of Environmental Research and Public Health*, 16(23), 4595. <https://doi.org/10.3390/ijerph16234595>
- Dodanwala, T. C., Santoso, D. S., & Yukongdi, V. (2023). Examining work role stressors, job satisfaction, job stress, and turnover intention of Sri Lanka’s construction industry. *International Journal of Construction Management*, 23(15), 2583–2592.
- Dong, X. S., Wang, X., Largay, J. A., & Sokas, R. (2015). Long-term health outcomes of work-related injuries among construction workers—findings from the national longitudinal survey of youth. *American Journal of Industrial Medicine*, 58(3), 308–318. <https://doi.org/10.1002/ajim.22415>
- Egemen, M. (2024). Assessing the individual effects of different job satisfaction facets on the job performance of qualified employees in the unique conditions of the construction industry. *Ain Shams Engineering Journal*, 15(7), 102789.
- Enshassi, A., Al Swaity, E., & Arain, F. (2016). Investigating common causes of burnout in the construction industry. *International Journal of Construction Project Management*, 8(1), 43–56.
- Finstad, G. L., Ariza-Montes, A., Giorgi, G., Lecca, L. I., Arcangeli, G., & Mucci, N. (2019). The JDCS model and blue-collar bullying: Decent working conditions for a healthy environment. *International Journal of Environmental Research and Public Health*, 16(18), 3411.
- Frimpong, S., Sunindijo, R. Y., Wang, C. C., & Boadu, E. F. (2022). Domains of psychosocial risk factors affecting young construction workers: A systematic review. *Buildings*, 12(3), 335. <https://doi.org/10.3390/buildings12030335>
- Georgiev, G. Z. (2023). *Sample size calculator*. Retrieved December 17, 2024, from <https://www.gigacalculator.com/calculators/power-sample-size-calculator.php>
- Greiner, B. A., Leduc, C., O’Brien, C., Cresswell-Smith, J., Rugulies, R., Wahlbeck, K., Abdullah, K., Amann, B. L., Pashoja, A. C., Coppens, E., Corcoran, P., Maxwell, M., Ross, V., de Winter, L., Arensman, E., Aust, B., & Moda, H. M. (2022). The effectiveness of organisational-level workplace mental health interventions on mental health and wellbeing in construction workers: A systematic review and recommended research agenda. *PLOS ONE*, 17(11), e0277114. <https://doi.org/10.1371/journal.pone.0277114>
- Hämmig, O. (2014). Prevalence and health correlates of work-life conflict among blue-and white-collar workers from different economic sectors. *Frontiers in Public Health*, 2, 221. <https://doi.org/10.3389/fpubh.2014.00221>
- Havet, N., Fournier, J., Stefanelli, J., Plantier, M., & Penot, A. (2020). Disparate exposure to physically demanding working conditions in France. *Revue d’Épidémiologie et de Santé Publique*, 68(6), 327–336. <https://doi.org/10.1016/j.respe.2020.09.008>
- Herr, R. M., Bosch, J. A., Loerbroks, A., van Vianen, A. E., Jarczok, M. N., Fischer, J. E., & Schmidt, B. (2015). Three job stress models and their relationship with musculoskeletal pain in blue-and white-collar workers. *Journal of Psychosomatic Research*, 79(5), 340–347. <https://doi.org/10.1016/j.jpsychores.2015.08.001>
- Hill, R. J. M. (2003). Healthy work: Managing stress and fatigue in the workplace. *Occupational Safety and Health Service, Department of Labour, Wellington, New Zealand*, 1–79.
- Hulsegge, G., van Mechelen, W., Proper, K. I., Paagman, H., & Anema, J. R. (2020). Shift work, and burnout and distress among 7798 blue-collar workers. *International Archives of Occupational and Environmental Health*, 93, 955–963. <https://doi.org/10.1007/s00420-020-01536-3>
- Jebelli, H., Hwang, S., & Lee, S. (2018). Eeg-based workers’ stress recognition at construction sites. *Automation in Construction*, 93, 315–324. <https://doi.org/10.1016/j.autcon.2018.05.027>

- King, T. L., & Lamontagne, A. D. (2021). COVID-19 and suicide risk in the construction sector: Preparing for a perfect storm. *Scandinavian Journal of Public Health*, 49(7), 774–778.
- Kotera, Y., Green, P., & Sheffield, D. (2019). Mental health shame of UK construction workers: Relationship with masculinity, work motivation, and self-compassion. *Revista de Psicología del Trabajo y de las Organizaciones*, 35(2), 135–143.
- Kreitner, R., & Kinicki, A. (2001). *Organizational behavior* (5th ed.). McGraw-Hill Education. ISBN 0072315008.
- Langdon, R. R., & Sawang, S. (2018). Construction workers' well-being: What leads to depression, anxiety, and stress? *Journal of Construction Engineering and Management*, 144(2), 04017100. [https://doi.org/10.1061/\(ASCE\)CO.1943-7862.0001406](https://doi.org/10.1061/(ASCE)CO.1943-7862.0001406)
- Lecca, L. I., Finstad, G. L., Traversini, V., Lulli, L. G., Gualco, B., & Taddei, G. (2020). The role of job support as a target for the management of work-related stress: The state of art. *Quality-Access to Success*, 21(174), 152–158.
- Leung, M. Y., Chan, Y. S., & Yuen, K. W. (2010). Impacts of stressors and stress on the injury incidents of construction workers in Hong Kong. *Journal of Construction Engineering and Management*, 136(10), 1093–1103.
- Li, K., Wang, D., Sheng, Z., & Griffin, M. A. (2022). A deep dive into worker psychological well-being in the construction industry: A systematic review and conceptual framework. *Journal of Management in Engineering*, 38(5), 04022051. [https://doi.org/10.1061/\(ASCE\)ME.1943-5479.0001074](https://doi.org/10.1061/(ASCE)ME.1943-5479.0001074)
- Liang, H., Yang, W., Liu, T., & Xia, F. (2022). Demographic influences on perceived stressors of construction workers during the COVID-19 pandemic. *International Journal of Environmental Research and Public Health*, 19(7), 4192.
- Lim, H. W., & Francis, V. (2023). A conceptual model of cognitive and behavioral processes affecting mental health in the construction industry: A systematic review. *Journal of Construction Engineering and Management*, 149(11), 04023114. <https://doi.org/10.1061/JCEMD4.COENG-13551>
- Lingard, H., & Turner, M. (2015). Improving the health of male, blue collar construction workers: A social ecological perspective. *Construction Management & Economics*, 33(1), 18–34.
- Liu, S., Lithopoulos, A., Zhang, C. Q., Garcia-Barrera, M. A., & Rhodes, R. E. (2021). Personality and perceived stress during COVID-19 pandemic: Testing the mediating role of perceived threat and efficacy. *Personality & Individual Differences*, 168, 110351. <https://doi.org/10.1016/j.paid.2020.110351>
- Maqsoom, A., Ashraf, H., Alaloul, W. S., Salman, A., Ullah, F., Ghufran, M., & Musarat, M. A. (2023). The relationship between error management, safety climate, and job-stress perception in the construction industry: The mediating role of psychological capital. *Buildings*, 13(6), 1528. <https://doi.org/10.3390/buildings13061528>
- MBIE. (2022). *Building and construction sector trends biannual snapshot: May 2022*. New Zealand: Minister of Business, Innovation & Employment. Retrieved December 17, 2024, from <https://www.mbie.govt.nz/assets/building-and-construction-sector-trends-biannual-snapshot-may-2022.pdf>
- Metzler, Y. A., & Bellingrath, S. (2017). Psychosocial hazard analysis in a heterogeneous workforce: Determinants of work stress in blue-and white-collar workers of the European steel industry. *Frontiers in Public Health*, 5, 210. <https://doi.org/10.3389/fpubh.2017.00210>
- Michie, S. (2002). Causes and management of stress at work. *Occupational and Environmental Medicine*, 59(1), 67–72.
- Milner, A., Spittal, M. J., Pirkis, J., & LaMontagne, A. D. (2013). Suicide by occupation: Systematic review and meta-analysis. *British Journal of Psychiatry*, 203(6), 409–416. <https://doi.org/10.1192/bjp.bp.113.128405>
- Palaniappan, K., Natarajan, R., & Dasgupta, C. (2023). Prevalence and risk factors for depression, anxiety and stress among foreign construction workers in Singapore - A cross-sectional study. *International Journal of Construction Management*, 23(14), 2479–2487. <https://doi.org/10.1080/15623599.2022.2070343>

- Pidd, K., Duraisingam, V., Roche, A., & Trifonoff, A. (2017). Young construction workers: Substance use, mental health, and workplace psychosocial factors. *Advances in Dual Diagnosis, 10*(4), 155–168. <https://doi.org/10.1108/ADD-08-2017-0013>
- Pretorius, S., Steyn, H., & Bond-Barnard, T. J. (2022). The relationship between project management maturity and project success. *Journal of Modern Project Management, 10*(1), 218–231.
- Reig-Botella, A., Detaille, S., Clemente, M., López-Golpe, J., & De Lange, A. (2021). Time perspective and the risk of developing burnout: An empirical study among different blue-collar workers in Spain. *Sustainability, 13*(6), 3271.
- Sun, C., Hon, C. K., Way, K. A., Jimmieson, N. L., & Xia, B. (2022). The relationship between psychosocial hazards and mental health in the construction industry: A meta-analysis. *Safety Science, 145*, 105485. <https://doi.org/10.1016/j.ssci.2021.105485>
- Sun, M., Zhu, F., & Sun, X. (2020). Influencing factors of construction professionals' burnout in China: A sequential mixed-method approach. *Engineering, Construction & Architectural Management, 27*(10), 3215–3233. <https://doi.org/10.1108/ECAM-02-2020-0106>
- Sunindijo, R. Y., & Kamardeen, I. (2017). Work stress is a threat to gender diversity in the construction industry. *Journal of Construction Engineering and Management, 143*(10), 04017073. [https://doi.org/10.1061/\(ASCE\)CO.1943-7862.0001387](https://doi.org/10.1061/(ASCE)CO.1943-7862.0001387)
- Turner, M., & Lingard, H. (2020). Examining the interaction between bodily pain and mental health of construction workers. *Construction Management & Economics, 38*(11), 1009–1023. <https://doi.org/10.1080/01446193.2020.1791920>
- van Heerden, A., Boulic, M., McDonald, B. W., & Chawynski, G. (2024). Gender-perceived workplace stressors by New Zealand construction professionals. *International Journal of Construction Management, 25*(3), 289–300. <https://doi.org/10.1080/15623599.2024.2317039>
- van Heerden, A., Jelodar, M. B., Chawynski, G., & Ellison, S. (2023). A study of the soft skills possessed and required in the construction sector. *Buildings, 13*(2), 522. <https://doi.org/10.3390/buildings13020522>
- von Bonsdorff, M. B., Seitsamo, J., von Bonsdorff, M. E., Ilmarinen, J., Nygård, C. H., & Rantanen, T. (2012). Job strain among blue-collar and white-collar employees as a determinant of total mortality: A 28-year population-based follow-up. *BMJ Open, 2*(2), e000860.
- Walker, A. (2011). *Organizational behaviour in construction* (1st ed.). John Wiley & Sons. ISBN 1405189576.
- Winwood, P. C., & Lushington, K. (2006). Disentangling the effects of psychological and physical work demands on sleep, recovery and maladaptive chronic stress outcomes within a large sample of Australian nurses. *Journal of Advanced Nursing, 56*(6), 679–689. <https://doi.org/10.1111/j.1365-2648.2006.04055.x>
- Wu, G., Hu, Z., & Zheng, J. (2019). Role stress, job burnout, and job performance in construction project managers: The moderating role of career calling. *International Journal of Environmental Research and Public Health, 16*(13), 2394.
- Zhang, L., Yao, Y., & Yiu, T. W. (2020). Job burnout of construction project managers: Exploring the consequences of regulating emotions in workplace. *Journal of Construction Engineering and Management, 146*(10), 04020117. [https://doi.org/10.1061/\(ASCE\)CO.1943-7862.0001913](https://doi.org/10.1061/(ASCE)CO.1943-7862.0001913)
- Zhang, S., Sunindijo, R. Y., Frimpong, S., & Su, Z. (2023). Work stressors, coping strategies, and poor mental health in the Chinese construction industry. *Safety Science, 159*, 106039. <https://doi.org/10.1016/j.ssci.2022.106039>