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## An Investigation on Level, Sources of Occupational Stress and Coping Strategies among Civil Engineers in Malaysia's Construction Industry

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### ABSTRACT

Stress is one of the most pervasive phenomena of the modern lifestyle, especially in a workplace. The occupational stress terminology is used interchangeably with work stress and/or job stress, but its meaning refers to the same thing. From the perspective of the workplace, the work stress can be defined as the adverse reaction people have to excessive pressures or other types of demand placed on them at work. The objectives of the study are: (i) to examine the level of occupational stress among civil engineers; (ii) to identify the main sources of occupational stress among civil engineers, and (iii) to identify the main coping strategy adopted by civil engineers. The study found that quantitatively, 24.6% of the respondents' experience high level of occupational stress, whereas 37.2% experience moderate level of occupational stress and 38.2% experience low level of occupational stress. Besides, the findings of this study also show that the role ambiguity is the main source of stress (mean value of 3.88), followed by role overload (3.72), role responsibility (3.63), role insufficiency (3.49), role boundary (3.13) and the physical environment (2.89). This study has been fruitful identifying the prevalence of occupational stress among civil engineers, their main source of occupational stress and main coping strategy in a Malaysian context.

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## INTRODUCTION

Stress is one of the most pervasive phenomena of the modern lifestyle. The occupational stress terminology is used interchangeably with work stress and/or job stress, but its meaning refers to the same thing (Larson, 2004). According to the National Institute of Occupational Safety and Health (NIOSH), the work stress can be defined as the harmful physical and emotional responses that occur when the requirements, the requirements of the job do not match the capabilities, resources, or needs of the worker. From the perspective of the workplace, the work stress can be defined as the adverse reaction people have to excessive pressures or other types of demand placed on them at work.

In 2004, the Health and Safety Executive (HSE) United Kingdom stated that around half a million people in the country experience work-related stress at a level that they believed to make them ill, up to five million people very or extremely stressed by their work. Work-related stress costs the country about US \$3.7 billion every year (Johnson *et al.*, 2005). Stress is not limited to any particular profession (Ng *et al.*, 2005; Lath, 2010). Professionals such as civil engineers operate in an extremely competitive environment where projects are designed, constructed and delivered within tight budgets and time frames. All these have combined to make civil engineering work mentally and emotionally demanding and stressful (Wahab, 2010).

The objectives of the study are: (i) to examine the level of occupational stress among civil engineers in Malaysia; (ii) to identify the main sources of occupational stress among civil engineers in Malaysia, and (iii) to identify the main coping strategy adopted by civil engineers in Malaysia. This study has significant contribution to the civil engineer's profession generally and to Malaysian engineers especially. Apart from identifying the sources of stress, coping strategies and effect of stress on the civil engineers, this study will also provide insight about the prevalence and seriousness of stress among civil engineers in Malaysia.

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**Literature Review:**

The following subsections would provide the review of past studies conducted related to occupational stress level, sources of occupational stress, and types of coping strategies.

**Level of Occupational Stress:**

Murugayah (2008) found that generally, management and professional officers of the civil service experienced a moderate level of work stress. Similarly, the Royal Malaysian Navy divers also experienced a moderate level of work stress (Mohd Bokti & Abu Taliba, 2009). However, on the average, managers in the electronic sectors in Malaysia experienced high levels of occupational stress (Kumaresan and Ramayah, 2005). Murugayah (2008) also found that majority of professional officers experienced a moderate level of work stress. Similarly, Hafidah (2006) found that majority of National Anti-Drugs Agency experienced moderate level of work stress and Datu Daiman (1999) who studied occupational stress among headmasters in Kota Marudu, Sabah also found that majority of the respondents were having moderate level of work stress. In Singapore, Boey *et al.* (2008) found that majority (35.4%) of nurses considered the occupational stress as moderate, 32.4% considered it as high, and another 32.2% considered it as low.

**Sources of Occupational Stress:**

Hospital workers in Australia and United Kingdom differ in the main factor which made them stressful (Duffy & Ching, 2001). United Kingdom hospital workers reported significantly higher values than Australian workers for the sources of pressure. This indicates that the United Kingdom hospital workers perceive the hospital organizational environment to generate more potential sources of pressure when compared to Australians. Similarly, Malaysian education officials perceived that 'characteristics of the task' were the major source of stress, particularly heavy workload, unrealistic deadlines and pressure to perform. Their second major source of stress was identified to be interpersonal relationships, including uncooperative subordinates and peers, negative work attitudes and conflicts (Myrtle *et al.*, 2007). The same source of occupational stress is supported by teachers in nine schools in a major city in the United Kingdom, whereby they were reported to be stressful at work because of work-related issues (eg. overload, conflict and ambiguity) (Ho, 1996).

Manshor *et al.* (2003) who studied the prevalence of occupational stress among managers in multinational companies in Malaysia, revealed that the main sources of stress are workload, working conditions and relationships at work. Conversely, as studied by Chandraiah *et al.* (2003), the Indian managers who are young adults (25-35 years) and in the early middle age (36-45 years) were experiencing more stress due to role overload, role ambiguity and strenuous working conditions. Baehler and Bryson (2008) conducted an exploratory study on 24 policy advisors/managers in New Zealand and concluded policy advisors experienced stress under the well accepted labels of role overload, changing expectations/priorities, control, culture, external scrutiny and interpersonal relationship. However, these factors differ from the generic concepts associated with them. Fujino *et al.*, (2001) found that permanent night workers in Japan who have high workload, high job control and single were likely to have mental health problems as compared to those who have fewer workload, lower job control and are married. Partially, this finding differs from most of the Western research which found that people with higher job control and single are less stressful.

'Long hours of work' has also been identified as a factor of occupational stress. Kaufman (2005) listed the causes of stress and burnout, among others, extended hours of working and the 24/7 environment and global organizations. Fairbrother and Warn (2003) conducted a research among naval officer trainees and found that stress was associated with the lack of clarity in the work role, disruption of everyday routine and disruption of personal life. On the other hand, stress is not associated with discomfort due to the physical environment, or with the psychosocial factors of leadership, teamwork and social climate. It was interesting to note that a study on customs officers in Malaysia and Jordan found that they were more stressful due to role ambiguity (Barhem *et al.*, 2004). Similarly, management and professional officers in the Malaysian public service also reported to be stressful mostly due to role ambiguity. Role ambiguity is perceived to be the main source of work stress by both customs and management and professional officers because they need role clarity in performing their different nature of the works. Ergonomics workstation factor was also found to be significantly important for production operators of the multinational electronic manufacturing companies in Malaysia (Makhbul and Idrus, 2009). This may be due to the need of having conducive workstations as they are production operators in factories.

Apart from stressors which relate to the work place, Manshor (2000) found in his study that there are numerous other unmeasured variables that can contribute to stress at the workplace, including individual and family factors, socioeconomic and financial status, and mental and health factors. Mathew (2005) found that special educators in India experience work stress due to home/work interface, which include the demands of work has affected the relationship with spouse/children, with social/private life, the spouse's attitude towards the work and the absence of emotional support from others outside work. Study also proved that the stress level at the workplace today is greater than what was experienced by the past generation (Minter, 1999). This is due

to the fact that the current jobs' situations require employees to stand in a longer period (Konz and Rys, 2002/2003). Malaysia, as a developing country that relies on construction industries faces similar phenomenon.

### ***Types of Coping Strategies:***

Folkman and Lazarus (1980) identified two categories of coping techniques, namely: problem-focus coping and emotion-focused coping. Problem-focused coping refers to behaviour directed at solving the problem, e.g. efforts directed at defining the problem, generating alternatives in terms of their costs and benefits, choosing among them and acting. An individual will try to change the troubled person-environment relationship by acting on the environment or oneself. To put it simply, it is an attempt to manage or alter the problem causing distress. On the other hand, emotion-focused coping refers to management of one's emotions, so as to reduce feeling of distress, such as avoidance, minimizing, distancing, selective attention, positive comparison, wresting positive value from negative events, etc. intended to change either the way the stressful relationship with the environment is intended to (as in vigilance or avoidance) or the rational meaning of what is happening, which mitigates the stress even though the actual conditions of the relationship have not changed. This type of coping strategies could alleviate emotional distress. Coping techniques are seen more important nowadays because many researchers found that health outcomes are more often than not a function of coping efficacy rather than simply a consequence of the presence or absence of perceived stress (Roskies & Lazarus, 1980; Folkman & Lazarus, 1985).

Judge and Judge (2009) who studied about coping strategies among athletic interscholastic directors revealed that social support systems were the coping resources most employed by Indiana interscholastic athletic directors in managing stress. This result shows that problem-focused coping is more preferred by people involved in sports. Special educators in India commonly adopt task strategies, in which they recognize their work in such a way that they can fit well to the working conditions and make themselves involve in the situation (Mathew, 2005). Unlike professionals and matured people, students would prefer emotional-focused coping, i.e. by praying to God that the situation would be alright. According to Yusoff (2010), this is the strategy adopted by majority of students in secondary schools in Kelantan to cope with their academic stress. Myrtle *et al.* (2007) indicated that 85% of the Malaysian education officials preferred problem-focused coping, i.e. willing to confront the problem and the person, as well as to work towards changing the source of the stress or their attitude. On the other hand, Kirkcaldy and Furnham (1999) found that most Germany managers tend to adopt rational or proactive coping which includes setting priorities and deal with problems accordingly, try to deal with the situation objectively and in an unemotional way, have stable relationship and plan ahead. Rational and proactive coping is different from problem-focused coping, because the latter is considered to be reactive. From these studies, it is understood that problem-focused coping is preferable as compared to emotion-focused coping. This is so because problem-focused has proven to mitigate the impact of stress on physical and psychological health.

### ***Research Methodology:***

#### ***Research Population and Sampling Procedure:***

Research population refers to the entire group of people, events or things of interest that the researcher wishes to investigate (Sekaran, 2003). The population of interest for this study is all civil engineers in Malaysia. The current number of engineers in Malaysia, according to the Board of Engineers Malaysia (BEM) are 76,653 registered engineers from all disciplines. The breakdown of engineers in Malaysia is civil (19613), mechanical (19613), chemical (7665), electrical (13978), electronic (13798), and other (3066). The sample size of this study is 500. In this study, the researchers would use the most efficient among all probability designs, i.e. stratified random sampling method. Stratified random sampling means that population of interest would be divided into meaningful segments, thereafter, subject is drawn in proportion to their original numbers in the population.

#### ***Research Instruments:***

The first section was meant to identify the respondents' demographic variable. The second section was meant to identify the existence of occupational stress as well as to trace the sources of stress. These items were adopted from the General Health Questionnaire (GHQ-12) and the instrument was developed by Goldberg *et al.* (1997). GHQ originally contains 12 items but for the purpose of this research, 10 items were selected. The third section was to identify the coping techniques used by the respondents and items were adopted from the first component of the Occupational Stress Inventory-Revised (Osipow, 1998). A 5 point Likert scale was used to measure the perceptions of the respondents on the main variables of the study.

#### ***Data Collection:***

A total of 500 questionnaires were distributed to the said engineering companies. The questionnaires were handed personally to the human resource managers in the 29 engineering companies in Kuala Lumpur, Putrajaya and Selangor. The respondents were randomly and independently selected by the HR managers

without the researcher's interference. It took the researchers approximately three weeks to distribute questionnaires and collect the responses

## RESULTS AND DISCUSSION

The findings of the study are now presented accordingly as follows:

### *Frequency Statistics:*

It may be seen that the greatest number of respondents is from the private sector (86.5%) and public sector (13.5%). From the frequencies obtained for this variable, 80.2% of the respondents are male and 19.8% are female; about 24.0% respondents are below 25 years old, 29.5% are between 26 – 30 years old, 24.0% are between 31 – 35 years old, 12.5% are between 36 – 40 years old, 3.1% are between 41 – 45 years old and 6.9% are 46 years old and above: about 42.0% of the respondents are single, 19.4% are married without children, 37.9% are married with children and 0.7% are divorced. It is recorded that about 61.8% of the respondents are Malay, 24.0% are Chinese, 7.3% are Indian and 6.9% are others; about 60.0% of the respondents are graduate engineers, 21.9% are senior engineers, 11.5% are from managers level and 6.6% are from top management level; about 84.4% of the respondents are degree holders, 12.1% are masters holders and 3.5% are PhD holders; about 24.0% of the respondents have working experience for less than 1 year, 30.5% from 1-5 years, 24.0% from 6–10 years, 11.4% from 11–15 years, and 10.1% have experience for more than 15 years.

**Table 1:** Summary of all demographic factors

Profiles		F	%
Sector	Public	39	13.5
	Private	249	86.5
Gender	Male	231	80.2
	Female	57	19.8
Age	≤ 25	69	24.0
	26–30	85	29.5
	31 – 35	69	24.0
	36 – 40	36	12.5
	41 – 45	9	3.1
	≥ 46	20	6.9
Marital Status	Single	121	42.0
	Married without children	56	19.4
	Married with children	109	37.9
	Divorced	2	0.7
Race	Malay	178	61.8
	Chinese	69	24.0
	Indian	21	7.3
	Others	20	6.9
Position	Engineer	173	60.0
	Senior Engineer	63	21.9
	Manager	33	11.5
	Director	19	6.6
Academic qualification	Degree	243	84.4
	Master	35	12.1
	PhD	10	3.5
Number of years working experience	< 1 year	69	24.0
	1-5 years	88	30.5
	6-10 years	69	24.0
	11-15 years	33	11.4
	>15 years	29	10.1

### *Descriptive Statistics:*

#### *Level of Occupational Stress:*

The range for the level of occupational stress is obtained through a descriptive analysis as explained by Pallant (2001). The cutoff points for three levels of occupational stress are shown in Table 2. Based on this

result, the range for every level is developed and shown in Table 3. From Table 2, we can see that the mean, standard deviation for occupational stress are 3.49, and 0.25 respectively, i.e. within the range of moderate level. Hence, we may say that generally civil engineers experience moderate levels of occupational stress. This finding is in line with the findings of Murugayah (2008), who studied the level of occupational stress among management and professional officers; and Mohd Bokti & Abu Taliba (2009), who studied the level of occupational stress among Royal Malaysian Navy divers. In determining the frequency for each level of occupational stress, a descriptive analysis was performed and the result is shown in Table 4. A total of 107 respondents or 37.2% experience moderate level of stress, 110 or 38.2% experience high level of stress and 71 or 24.6% experience low level of stress.

**Table 2:** Levels of occupational stress

N	Valid	288
	Missing	0
Mean		3.49
Std.Deviation		0.25

**Table 3:** Range for every level of occupational stress

Mean value	Level of occupational stress
≤ 3.39	Low
3.39 to 3.75	Moderate
≥ 3.75	High

**Table 4:** Frequency table for levels of occupational stress

		Frequency	Percentage (%)
Valid	Low stress level	110	38.2
	Moderate stress level	107	37.2
	High stress level	71	24.6
Total		288	100.0

### Main Source of Occupational Stress:

The main source of occupational stress was examined through the mean value for each dimension of occupational stress. According to Hair *et al.* (2007), the nearer the mean value of 5, the more dominant the variable is. It was found that role ambiguity is the main source of stress (mean value of 3.88), followed by role overload (3.72), role responsibility (3.63), role insufficiency (3.49), role boundary (3.13) and the physical environment (2.89). The result shows that the mean score for role ambiguity is the highest (3.88) among all dimensions of occupational stress. This indicates that civil engineers perceive that role ambiguity is the main factor which contributes to their stressful condition. This finding verifies that civil engineers were overburdened with role ambiguity which requires them to do few equally important tasks within a limited period of time and limited resources as well. Having been recognized as 'generalists', most civil engineers are entrusted with a wide variety of works, ranging from policy drafting, financial management, and administrative works.

To make the matter worse, understaffing is a problem for some and as a result, all trivial works have to be done by themselves. This finding is in agreement with the documented sources of stress in the international literature. Many researchers (Manshor *et al.*, 2003; Murray-Gibbons & Gibbons, 2007; Emilia & Hassim, 2007; Cai *et al.*, 2008; Ho, 1996; Duffy & Ching, 2001; Fairbrother & Warn, 2003; Salmond & Ropis, 2005; Baehler & Bryson, 2008; Fujino *et al.*, 2001; Oates & Oates, 1995; and Myrtle *et al.*, 2007) found that heavy role ambiguity is one of the main factors which causes stress across all types of occupations, namely managers, nurses, teachers, policy advisors and senior education officials.

**Table 5:** Importance / Dominance of source / dimension of occupational stress

Source/Dimension of occupational stress	Mean value	Standard deviation	Importance/Dominance
Role ambiguity	3.88	0.29991	1
Role overload	3.72	0.59019	2
Role responsibility	3.63	0.61872	3
Role insufficiency	3.49	0.39341	4
Role boundary	3.13	0.30250	5
Physical environment	2.89	1.10027	6

### Main Coping Strategy:

In order to identify the main coping strategy adopted by civil engineers, the mean value for each dimension of coping strategies is examined. The main coping strategy is indicated by the nearest mean value to 5. The nearer the mean value of a variable to 5, the more dominant the variable is (Hair *et al.*, 2007). It was found that problem-focused coping is preferred by civil engineers. Descriptive analysis indicates that the mean score for problem-focused coping is the highest with the mean value of 3.67, followed by emotion-focused coping with the mean value of 3.36. The result of descriptive analysis shows that problem-focused coping is preferred by

civil engineers as compared to emotion focused coping. This finding implicates that generally, civil engineers prefer to solve the problem at hands rather than try to evade from the problem. This type of coping strategy is beneficial in the sense that it helps to identify the real cause for the problem and later find a solution to the problem. This finding agrees to studies by Judge and Judge (2009), Mathew (2005) and Myrtle *et al.* (2007) who reported that athletic interscholastic directors, special educators and senior education officials preferred problem-focused coping.

**Table 6:** Importance / Dominance of coping strategies

Dimension of coping	Mean value	Standard deviation	Importance/ Dominance
Problem-focused coping			
i) Problem solving	3.67	0.35	1
ii) Seeking support			
Emotion-focused coping			
i) Positive thinking			2
ii) Escaping	3.36	0.39	
iii) Distancing			

### Conclusion:

The objectives of the study are: (i) to examine the level of occupational stress among civil engineers in Malaysia; (ii) to identify the main sources of occupational stress among civil engineers, and (iii) to identify the main coping strategy adopted by civil engineers. The data were collected via questionnaires distributed amongst the civil engineers in the 29 engineering organizations in Kuala Lumpur, Putrajaya and Selangor. A total of 288 civil engineers completed questionnaires.

This study has been fruitful identifying the prevalence of occupational stress among civil engineers, their main source of occupational stress and main coping strategy. The research found that quantitatively, 24.6% of the respondents' experience high level of occupational stress, whereas 37.2% experience moderate level of occupational stress and 38.2% experience low level of occupational stress. These findings indicate that occupational stress needs to be addressed by all parties concerned because there is a high tendency that the occupational stress level may increase as the proverb says 'prevention is better than cure'. According to Murphy (as cited by Wood & Budden, 2006), understanding the causes of job stress by measuring it accurately and identifying problem areas, implementing interventions and re-evaluating the situation could prove useful.

The findings of this study also show that the role ambiguity is the main source of stress, followed by role overload, role responsibility, role insufficiency, role boundary and the physical environment among the Malaysian engineers in the construction industry. As a result, role ambiguity is the most important source of occupational stress. This indicates that civil engineers perceive that role ambiguity is the main factor which contributes to their stressful condition. This finding verifies that civil engineers in Malaysia especially were overburdened with role ambiguity which requires them to do few equally important tasks within a limited period of time and limited resources as well.

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