

**THE RELATIONSHIP BETWEEN STRESS, SAFETY BEHAVIOUR AND  
MINDFULNESS OF PROJECT TEAM MEMBERS**

**TAN ZHEE CIN**

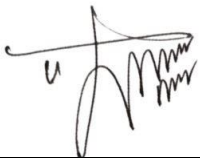
**A project report submitted in partial fulfilment of the  
requirements for the award of Master of Project Management**

**Lee Kong Chian Faculty of Engineering and Science  
Universiti Tunku Abdul Rahman**

**May 2022**

**DECLARATION**

I hereby declare that this project report is based on my original work except for citations and quotations which have been duly acknowledged. I also declare that it has not been previously and concurrently submitted for any other degree or award at UTAR or other institutions.

Signature :  \_\_\_\_\_

Name : Tan Zhee Cin \_\_\_\_\_

ID No. : 2102589 \_\_\_\_\_


Date : 22/04/2022 \_\_\_\_\_

## APPROVAL FOR SUBMISSION

I certify that this project report entitled “**THE RELATIONSHIP BETWEEN STRESS, SAFETY BEHAVIOUR AND MINDFULNESS OF PROJECT TEAM MEMBERS**” was prepared by **Tan Zhee Cin** has met the required standard for submission in partial fulfilment of the requirements for the award of Bachelor of Engineering (Honours) Civil Engineering at Universiti Tunku Abdul Rahman.

Approved by,

Signature :



Supervisor :

Ir. Dr. Lee Wah Peng

Co-supervisor :

Ms. Chong Bee Ling

Date :

22/04/2022

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## **ABSTRACT**

Working in construction industry is stressful due to its harsh working characteristics while stress is one of the major contributor to workplace accidents and injuries as stress can negatively impact an individual's safety behaviour. Project team members are always dealing with tight deadlines and huge workloads and thus it is essential to develop an appropriate strategy for enhancing their work performance as well as safety and health. The benefits of mindfulness have been reported by a large body of studies and they suggested that mindfulness is a promising tool for managing stress and safety behaviour. However, the relationship between mindfulness, stress and safety behaviour of project team members still remains unknown. Therefore, to fill in this research gap, a questionnaire survey was conducted among project team members who are working in the construction industry within Kuala Lumpur or Selangor, Malaysia. To further understand the factors affecting mindfulness, this research also examined the effect of working experience on mindfulness of project team members. The results revealed that project team members with higher mindfulness were likely to have lower stress and better safety behaviour. Furthermore, this research also found that working experience was positively correlated with mindfulness of project team members. These results indicated that mindfulness can be used to predict stress as well as safety behaviour of project team members. Mindfulness-based training programs can be effective to improve employees' safety and health, leading to better work performance.

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**LIST OF SYMBOLS / ABBREVIATION**

D	Death
MAAS	Mindful Attention Awareness Scale
MBCT	Mindfulness-Based Cognitive Test
MBI	Mindfulness-Based Intervention
MBP	Mindfulness-Based Practice
MBSR	Mindfulness-Based Stress Reduction
NPD	Non-Permanent Death
PD	Permanent Death
PSS	Perceived Stress Scale
RSI	Reward Effort Imbalance

## CHAPTER 1

### INTRODUCTION

#### 1.1 Background

The utilization of project team is a clear trend in business and organization, especially in the construction industry to improve their performance and competitive. However, working on projects involve tight deadlines and huge workloads are highly stressful for the project team members, while stress is defined as an negative impact to their performance and safety (Leung, Liang and Olomolaiye, 2016). Excessive stress is harmful to a person's physical and psychological health. Employees who always work under stress usually have low productivity and poor safety performance, leading to occupational disaster. In addition to absence of appropriate stress management programme, employees may use other ways to escape from stress such as drug or alcohol abuse, resignation and so forth. One of the most significant causes of injuries or accidents in construction industry is unsafe behaviour. The work environment and psychological state can influence the members' safety behaviours and it may result in negative outcomes like impaired normal functioning, burnout and health problems. A number of studies suggested mindfulness has emerged as a promising practice in addressing epidemic and professional stress (Hente *et al.*, 2020) and increasing safety behaviours (Kao *et al.*, 2021). Mindfulness improves a person's awareness, help them perform at their best and navigate the inevitable ups and downs of life. Many researches about mindfulness have been published constantly annually but the usage of mindfulness in construction industry still remained unpopular.

#### 1.2 Problem Statement

In addition to the requirements and constraints added to the project, the complexity of project will significantly increase the difficulty of a company to handle and balance between these problems are critically depending on the use of project team. However, even though the project team members are knowledgeable and skilful in solving those project-related problems, but they are still human being who have different level of stress capacity when facing such heavy workload. Zawawi et al. (2014) found that majority of construction professionals in Malaysia construction industry request for leave due to feelings of stress and the study also reported that

the main reason that contribute towards their stress are the job antecedents, including heavy workload under restricted time frame and long working hours required by the job (Zawawi, Bahron and Amirul, 2014). Many studies also agreed that job demand is the main factor causing high stress in Malaysia construction industry (Seth et al., 2021; Omar and Sallehudin, 2018). Seth et al. (2021) also found that stress can negatively affect the physical, psychological and behavioural state of construction professionals, resulting in concentration distracted, unclear mindset, overwhelmed, uncontrolled action and emotion, ultimately, leading to unwanted accidents (Seth et al. 2021). As for this case, the construction personnel should rest more while personnel who faced a more critical stress level should deploy suitable strategies to improve their health.

Currently, large body of studies reported that mindfulness is helpful in mitigating stress and improving safety behaviour. However, the currently available mindfulness-related studies are mainly focused on healthcare professionals, teachers and students, even though the studies that related to construction industry are still focused on construction workers rather than management personnel (Janssen *et al.*, 2018), especially the mindfulness-related studies in Malaysia. The published mindfulness-related studies in Malaysia so far focused on students such as university students (Ramli et al., 2018) and medical students (Keng et al., 2015) as well as healthcare provider likes nurses (Fadzil et al., 2021). Therefore, the available mindfulness-related studies on construction industry in Malaysia is extremely limited. Furthermore, most studies tend to investigate the employees' stress or safety performance before and after mindfulness-based training program while only limited studies survey the mindfulness level of employees with and without mindfulness-based training. As a sound minded person, the way of thinking and decision making could be influenced by their age, past experience, cognitive biases, personality and personal belief (Dietrich, 2010), which means that people without mindfulness training is possible to have high level of mindfulness which learned through their age and past experience. Therefore, to fill in the research gap, a questionnaire survey was administrated among project team members to investigate the relationships between working experience, mindfulness, stress level and safety behaviour by analysing the results obtained.

### **1.3 Aim and Objectives**

The aim of this research is to explore the effect of mindfulness on construction project team members' stress level and safety behaviour, whereas the aim can only be accomplished by achieving the objectives as follow:

1. To investigate the relationship between stress level and safety behaviour of construction project team members.
2. To investigate the relationship between mindfulness and stress level of construction project team members.
3. To investigate the relationship between mindfulness and safety behaviour of construction project team members.
4. To examine the influence of construction project team members' working experience on their mindfulness level.

### **1.4 Research Question**

Based on the above aim and objectives, this research seeks to investigate the following research questions:

1. Is there a relationship between stress level and safety behaviour among project team members?
2. Is there a relationship between mindfulness and stress level among project team members?
3. Is there a relationship between mindfulness and safety behaviour among project team members?
4. Does working experience affect the mindfulness level of project team members?

### **1.5 Hypothesis**

In this research, several hypothesis statements will be predicted based on the objectives and tested based on the results obtained. This research aimed to study the relationship between mindfulness, stress and safety behaviour of project team members. This research is expected to outcome a negative correlation between stress level and safety behaviour, a positive correlation between mindfulness and safety behaviour and a negative correlation between mindfulness and stress in order to indicate that mindfulness as a promising tool for mitigating

stress and safety behaviour is reliable as well as to match with the conclusion evident by previous studies. Therefore, several hypothesis are formulated as following:

1. Stress and safety behaviour

H<sub>1</sub> : Project team member's stress level is significantly correlated with their safety behaviour.

H<sub>a1</sub> : Project team member's stress level is negatively correlated with their safety behaviour.

2. Mindfulness and stress

H<sub>2</sub> : Project team member's mindfulness level is significantly correlated with their stress level.

H<sub>a2</sub> : Project team member's mindfulness level is negatively correlated with their stress level.

3. Mindfulness and safety behaviour

H<sub>3</sub> : Project team member's mindfulness level is significantly correlated with their safety behaviour.

H<sub>a3</sub> : Project team member's mindfulness level is positively correlated with their safety behaviour.

4. Working experience and mindfulness

H<sub>4</sub> : Project team member's mindfulness level is significantly correlated with their working experience.

H<sub>a4</sub> : Project team member's mindfulness level is positively correlated with their working experience.

## 1.5 Significance of Study

This research focused on the project team members in the construction field and explored the relationship between their stress, safety behaviour and mindfulness. As a result, it enhances our understanding of the influences of mindfulness on project team members' stress level and safety behaviour. Many studies supported the positive outcomes of mindfulness training and thus, this research could further increase the readers' confidence towards the effects of



mindfulness on stress and safety behaviour. This research is important because the studies related to project team members' mindfulness is very limited and the role of project team member is critical important as their decisions or instructions could significantly influence the construction project. Furthermore, the safety behaviour of project team members is important as it can be an example for project team members to improve the safety awareness among construction workers (Huang et al., 2021). Therefore, it is important for each project team member to maintain their mental and physical state. In addition, this research also expected to be utilised as a guide for construction organizations to develop a proper strategy for enhancing working conditions, reducing occupational incidents, and improving employee well-being.

### **1.6 Scope and Limitation of Study**

The scope of this research is mainly focusing on the investigation of relationship between stress, safety behaviour and mindfulness of construction project team members as well as the influence of working experience on their mindfulness level. Therefore, a survey questionnaire will be carried out among project team members and management personnel who are working in construction industry within Kuala Lumpur or Selangor, Malaysia. Kuala Lumpur and Selangor are two main states in Malaysia that contributed the highest construction work done in 2021 and thus the population related with this research is expected to be more concentrated in these states (DOSM, 2021). On the other hand, the construction project involved within these states are normally high complexity due to their planning, space, safety and technical requirements such as high-rise building, mass rapid transit, expressway and so forth. Therefore, the stress and safety behaviour of construction project team members who are working in these construction projects are especially important for avoiding undesired incidents. From a research perspective, the population construction project team members within Kuala Lumpur and Selangor may represent the general population and survey results conducted among them may be more comprehensive. The collected results will then analyse using Statistical Package for the Social Science software to investigate the proposed hypothesis.

The state of art of information related to stress, safety behaviour and mindfulness in Malaysia will be explored through a literature review. However, the mindfulness-related studies about construction personnel, especially in Malaysia are very limited. Therefore, both research papers from other overseas countries that study the stress, safety behaviour and mindfulness in construction industry as well as the other industries will be used as references in the literature review.

The time frame provided for this research was limited to two semesters, approximately half a year. Therefore, it is necessary to limit the scope of research to the construction project team members in Kuala Lumpur and Selangor only due to limited time frame given. Other than that, the construction project team members in Malaysia are considered to have very limited knowledge of mindfulness and thus, this research is mainly focusing on the mindfulness that they developed through their age as well as their working experience in construction industry rather than the mindfulness developed through mindfulness-based training program.

## **1.8 Outline of the Report**

This research is outlined into five main chapter as following:

Chapter 1 is the introduction consists of background, problem statement, aim and objectives, research question, hypothesis, significance of study, scope of study, research methodology and outline of the report. The main purpose of chapter 1 is to provide the background of this research and identify the research gap, objectives as well as to inform the significance of this research.

Chapter 2 is the literature review consists of reviews, investigations and explanations from various relevant articles, journals and books about the relationship between working experience, mindfulness, stress and safety behaviour of project team members.

Chapter 3 is the research methodology consists of research method, data collection and data analysis. The main purpose of this chapter is to inform the readers how the research was conducted, what research method and data analysis techniques were used in this research to test the hypothesis as well as how the questionnaire is being designed and distributed.

Chapter 4 is the result and discussion which shows the results analysed using different data analysis techniques according to the data collected from respondents and then discuss the results.

Chapter 5 is the conclusion and recommendation consists of the conclusion, limitations and recommendation for future prospect for this research.

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

This chapter presents the available studies related to this research. Basically, this chapter will include the introduction, impact and relevant investigation of mindfulness, stress and safety behaviour. First of all, the work stress and safety behaviour in construction industry will be discussed, including their impacts, contributors and current investigation while the effects of work stress on construction personnel's safety behaviour will be reviewed as well. Besides, the current development of mindfulness such as the application, impact, experience, practice and scientific perspective about mindfulness will be reviewed. In addition, the factors affecting mindfulness will also be discussed in this chapter, including age, working experience, organizational practice or culture and so forth. The most importantly, the relationship between each of them and the mediator or moderator of those relationship will be reviewed as well.

#### **2.2 Introduction of Stress**

Different articles related to stress have been contributed by various researchers across the world. The term "stress" is derived from the Latin word "string", which means "to draw tight". Selye stated that stress is a reaction response to the stressor (outward situation) which would cause significant changes to mental and physical well-being (Tan and Yip, 2018). The researchers also agreed that stress is an adaptive reaction, a state of mind or an illness the human beings physically and mentally reacting to the changes in their life (Vaidya, Mahavidyalaya and Anil Kumar, 2015; Sahoo, 2016). Stress is unavoidable in everybody's life and everybody can experience stress for different reasons. Further, many different symptoms would occur and lead to different levels of problems when someone is experiencing stress.

Work stress is defined as the perception of an individual who experiences the situation where the workplace demands (stressor) are unable to be fulfilled by his capabilities. Sometimes pressure is confused with stress, pressure can be positive and motivative where it is very essential for a job to achieve better performance, while stress is generally described as a negative impact that will reduce the employee's working performance. Pressure usually come

with anxious and fearful nature when a person is perceived that there is something very important and intended to deliver the best to obtain it. On the other hand, stress often come with many problems that lead to feelings of overload and overwhelmed (Sahoo, 2016; Weisinger and Pawliw-Fry, 2015). The causes of work stress include work environment, workplace relations, customer or timeline pressure, perceived loss of job or security as well as personal issues. The researchers defined work stress as an unhealthy emotion and reaction of employees when their capabilities, resources and needs are unable to match with the workplace requirements or demands (Sajid et al., 2021; Huang et al., 2021; Sahoo, 2016). The performance of employees is inversely proportional to the work stress experienced by the employees (Ajayi, 2018). Sajid et al. (2021) conducted a systematic review and summarised that work stress is found to have different consequences such as cognitive consequences (e.g. mental illness, poor judgement, constant nervous, etc.), behaviour consequences (e.g. sleep disorder, drugs, alcohol, neglect the responsibilities, etc.), emotional consequences (e.g. mental burnout, depression, etc.) and physical consequences (e.g. cardiovascular diseases, body pain, anxiety, etc.). Work stress not only affect the employee itself but also the organization, therefore, reducing the employees' work stress is a must to improve the organization performance and lower the cost for mitigating work stress consequences as well as maintain the health and wellbeing of employees (Sahoo, 2016).

The Reward-Effort Imbalance (RSI) model proposed by Siegrist has been widely used to measure the work stress. This model suggests the reward given should be balanced to the work effort contributed in order to avoid work stress. this model consist of three psychometric scales, including reward, effort and overcommitment. This model shown that if a person experienced imbalance between effort and reward, the person will has higher risk to perceive work stress (Siegrist, 1996; Siegrist and Montano, 2014). Other than that, the Perceived Stress Scale (PSS) developed by Cohen in 1983 is still remain as one of the most widely used psychological tool for measuring the perception of stress until now and usually used together with other existing stress assessment tools to obtain a comprehensive evaluation of stress. The PSS was designed for use in community samples and the questions is relative general nature and easy to understand such as the feelings and thoughts of the respondents during the last few months, therefore, it is free of content specific to any subpopulation group. The items is designed to evaluate how unpredictable, uncontrollable and overloaded the respondents find in their lives (Cohen et al., 1983). However, Maria et al. (2021) argued that Transtheoretical

model (TTM) is a better choice for measuring office worker stress as compared to PSS questionnaire (Maria et al., 2021).

### 2.2.1 Work Stress in Construction Industry

The working environment characteristics is one of the factors that result in work related stress in construction industry. Construction activities are usually defined as 3D (dirty, dangerous and difficult) activities which involve higher risks than other industries. This will negatively affect the employees' mentality and their safety performance. Further, the working nature in construction industry usually involve huge work load, irregular working hours, noisy and harsh working environment. For that reasons, employees may experience increased stress and this may lead to serious occupational disasters (Huang *et al.*, 2021). A construction project is often time pressured and incidents either related to problems of resource or priority can result in critical changes to the project lifecycle as well as stress to the person involved. Gällstedt (2003) categorized the incidents into 9 main categories based on the resource and priority issues. Table 2.1 shows the 9 main categories of incidents that would influence the construction personnels' perception of working condition.

Table 2.1: 9 Main Categories of Incidents in Construction Industry (Gällstedt, 2003)

Resource-related incidents	Priority-related incidents
1. The vanish of valuable resources.	1. The dry-out to other organisational duties.
2. The betrayal of project or self.	2. The circling design-loops.
3. The changes in project-owner preferences.	3. The prioritising of other projects.
4. The assistance other depend upon.	4. The premature close down of projects
5. The lack of human resource.	

The project manager and team members will feel stressed and frustrated when handle these incidents as they still have to ensure the project deliverables anyway. If the incidents are kept on happening or cannot be mitigated effectively, this could negatively impact the individual's motivation and create serious stress among the people involved, leading to undesired perception of working condition (Gällstedt, 2003).

Working on projects involve tight deadlines and huge workloads and this is very stressful for the project team members while stress will negatively impact their working

performance and safety behaviour (Leung, Liang and Yu, 2016). Due to the harsh working characteristics in construction industry, the construction personnel are usually subjected to irregular working hours such as sleep late and wake early, causing poor sleep quality. The excessive working pressure experienced during the day will further deteriorate the sleep quality, leading to increased error and accident rate, reduced productivity and weaken immune system. The construction personnel are found to have decreased Heart Rate Variability (HSR) during work because they are subjected to excessive sympathetic nervous activity and this indicated they are working under high pressure, resulting in an increased need for appropriate recovery, but an appropriate sleep is disturbed by excessive work stress, causing obstruction to the appropriate recovery. Therefore, the construction personnel are found to have higher risk exposed to cardiovascular diseases and other health problems than other professions (Nwaogu and Chan, 2021).

In addition to the factors that contributed to the work stress in construction industry, the personal characteristics of construction personnel such as gender, age, occupation, income, marital status, and personality traits are also heavily associated with the moderating of work stress. Kamardeen et al. reported that the construction personnel with unstable marital status at the middle management level have higher risk of developing work stress-related psychological illness such as anxiety and depression. Because they need to deal with their own personal problems in addition to work stress (Kamardeen *et al.*, 2017). The poor work-life balance in construction industry is consistently researched by various researchers across the world. The current technology improved the communication but it also strongly connected the employees to work, causing them difficult to separate the work from life, eventually leading to irregular working hours and creating stress among the employees (Holden and Sunindijo, 2018). Therefore, the construction organization must apply suitable strategies to cope with the issues of work stress in order to reduce the productivity losses and costs caused by work stress as well as maintain the health and well-being of each construction personnel.

### **2.3 Introduction of Safety Behaviour**

Unsafe behaviour is one of the most significant contributors to the construction accidents. Safety behaviour is defined as an individual's attitudes and concerns about safety, willingness and safety mindset that allow the individuals to work safely (Mohammad et al., 2019). Unsafe behaviour such as wrong use of equipment or tools, negligence during work, work without authority and failure to mention, warn or inform of danger are always the contributors to the

happening of accidents. Safety behaviour can be classified into two broad categories, including safety compliance and safety participation. Safety compliance is defined as an individual's effort to work in a safe manner, including compliance with the standard operating procedures and safety manuals. Safety participation is defined as an individual's effort to participate in the development of a safe working environment, including voluntary to help or assist with safety-related issues (Neal and Griffin, 2002). Safety behaviour is directly influenced by management safety commitment through social support and production pressure. Social support and production pressure has direct effect on the workers' safety motivation, safety knowledge, safety participation and safety compliance, leading to happening of unsafe behaviours (Guo, Yiu and González, 2016). Because, if the management personnel is unable to prioritise the safety by providing sufficient safety-related support to workers and managing the pressure produced on workers, it will negatively influence the workers' safety behaviour as their safety motivation and knowledge are affected.

According to Department of Occupational Safety and Health (DOSH) Malaysia, construction industry has the highest number of fatalities among other industry with a death toll of 84 cases in 2019. Table 2.2 shows the number of Non-permanent Disability (NPD), Permanent Disability (PD) and Death (D) cases of each sector for 2019. The unsafe behaviour and poor safety culture are the major causes of occupational accidents in construction industry (Mohammad et al., 2019). Safety culture is the principles and mutual values of an organization on safety and it is always using as a framework to generate distinctive safety behaviour standard. Safety culture is the main factor for developing safety behaviour and it is a long term process that require all management level personnel's effort.

Table 2.2: Occupational Accident Statistics by Sector for 2019 (DOSH, 2019)

Sector	NPD	PD	D	Total
Hotel and Restaurant	227	3	5	235
Utilities (Electricity, Gas, Water and Sanitary Service)	245	4	9	258
Finance, Insurance, Real Estate and Business Services	384	6	16	406
<b>Construction</b>	<b>227</b>	<b>15</b>	<b>84</b>	<b>326</b>
Transport, Storage and Communication	359	9	21	389
Manufacturing	4661	214	73	4948
Wholesale and Retail Trade	85	2	0	87

Public Services and Statutory Authorities	93	3	3	99
Mining and Quarrying	52	3	5	60
Agriculture, Forestry and Fishery	1111	22	43	1176
<b>Total Cases</b>	<b>7444</b>	<b>281</b>	<b>259</b>	<b>7984</b>

Safety behaviour is categorized as the primary causes of occupational accidents and illness. Jaafar et al. (2017) developed a framework to show the causes of occupational accidents in construction industry. They found that there are four main elements such as human, worksite, management and external elements which can result in occupational accidents and illness. External and management elements are the underlying causes that contribute to occupational safety and health issues while human and worksite elements are the immediate causes of occupational accidents and illness (Jaafar *et al.*, 2017). Figure 2.1 illustrate the framework of causes of occupational accidents and illness. Further, Nadia et al. (2020) suggested the top three causes of construction accidents are management, worksite and human elements, accordingly (Nadia *et al.*, 2020).

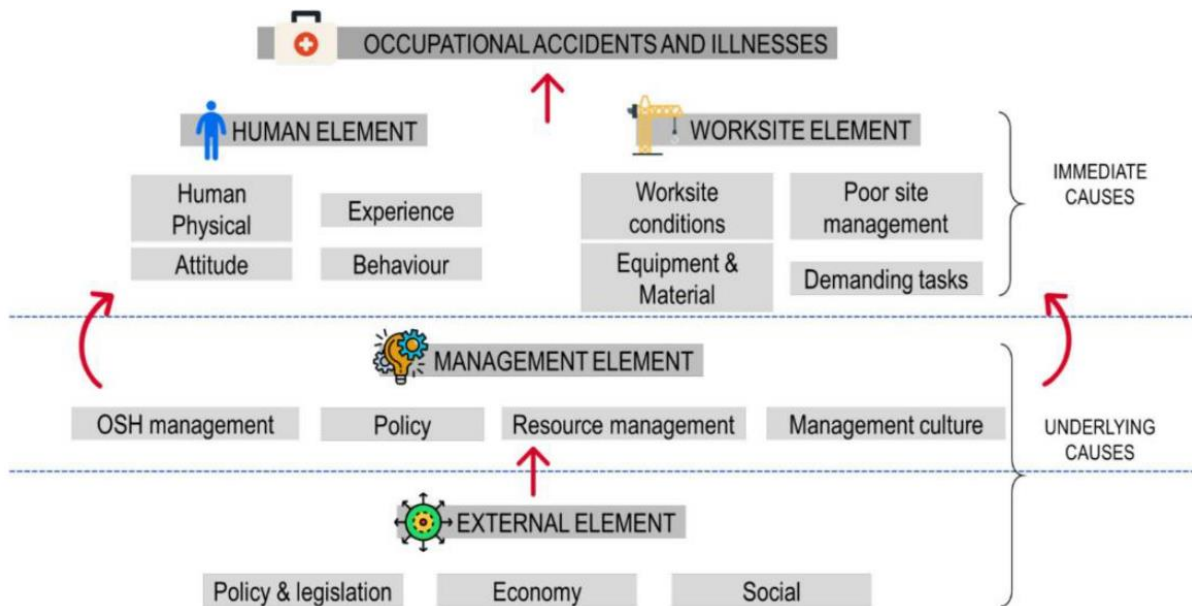


Figure 2.1: Framework of Causes of Occupational Accidents and Illness (Jaafar et al., 2017; Nadia et al, 2020)



## 2.4 Work Stress and Safety Behaviour

The impression given to public about the incidents happened within construction area are normally due to the construction workers' unsafe behaviours. However, the management elements are one of the significant factors that directly influence the worker's safety behaviour and working environment (Nadia *et al.*, 2020). Therefore, the safety behaviour and concerns of management personnel such as the construction manager, project manager and supervisor are essential for building the workers' safety commitment as well as their safety knowledge to ensure greater safety performance. However, the safety behaviour of management personnel is usually affected by work stress while social status perception, social support and professional identity are three main factors that affecting the work stress. Therefore, greater company support, family support and professional identity is significant in reducing work stress while low level of work stress will positively influence safety behaviour (Huang *et al.*, 2021).

Many studies are conducted to identify the effect of work stress on safety behaviour. Liang *et al.* (2022) developed a stress-cognitive-safety model and concluded that suffering stress is able to induce inappropriate safety behaviour. The workers' safety awareness, safety knowledge, subjective norm, safety attitude and perceived behavioural control can be influenced by stress and the stress can affect the safety behaviour through safety awareness, subjective norm and safety attitude (Liang *et al.*, 2022). Jung, *et al.* (2020) conducted a study to investigate how the construction workers' perception of the working environment and psychological condition affects their safety performance. The study found that the workers' safety knowledge and safety motivation can influence the workers' safety behaviour in term of safety compliance and safety participation. Furthermore, the study also concluded that the construction workers with high level of depression and anxiety tend to have low perception of safety behaviour (Jung, Lim and Chi, 2020). From this study it can be understand that the occupational stress from lack of job, job control, reward and organizational justice can cause depression and anxiety, leading to unsafe behaviour.

Construction workers are usually working within a complicated and dangerous environment which involves various stressors, range from lack of resources, job demands until company support and risk factors. Therefore, their stress level and safety behaviour can be directly influenced by various stressors from different ways. Leung *et al.* (2016) revealed that greater job certainty, co-worker support and safety equipment may help in reducing the construction workers' physical stress while psychological stress is more effective to be reduced

by greater job certainty. Further, the physical stress will negatively affect the construction workers' safety behaviour, whereas inappropriate safety behaviour can increase the risk of accident (Leung et al., 2016). Other than that, Wu et al. (2018) suggested that the job itself has the most critical negative effect on construction workers' safety behaviour and this indicated the negative correlation between job stress and safety behaviour. They also found that the negative correlation between job stress and safety participation is greater than that between job stress and safety compliance (Wu *et al.*, 2018). Working in construction industry is stressful as most of the workers are often need to satisfied their organizational stressors at the expense of their own safety. The organizational stressors cause construction workers feel stress, leading to unsafe behaviour and, ultimately, increasing their risk of being involved in injury incidents (Leung et al., 2012). According to Lu and Kuo (2016), job stress can cause employee to ignore safety issues and conduct unsafe behaviour while safety behaviour can be negatively associated with job stress among employee with higher emotional intelligence (Lu and Kuo, 2016). These outcomes clearly indicated that stress can lead to inappropriate safety behaviour.

## **2.5 Introduction of Mindfulness**

Kabat-Zinn (2003) defined mindfulness as “the awareness that arises through paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment by moment.” Shapiro, et al. (2006) further formulated the mindfulness into three components such as intention, attention and attitude. Intention is the motivation an individual willing to focus on a specific object, attention is the cognitive process when an individual is paying attention, attitude is the mental perspective (e.g. compassionate and non-judgemental) adopted by an individual to the object of attention. The combination of these three components will generate a ‘fundamental shift in perspective’. In other words, people with mindfulness are trained to learn how to enter a different relationship with their subjectivity or able to ‘stand back’ and dispassionately view qualia when facing any situations or problems (Lomas *et al.*, 2017).

Large body of study operationalize mindfulness as state and trait. State mindfulness is generally defined as the temporary state of present moment awareness while trait mindfulness is commonly defined as the stability of an individual engages in the mindfulness processes (Jamieson and Tuckey, 2017). The most common mindfulness-based scale used for measuring the state or trait mindfulness level is called Mindfulness Attention and Awareness Scale (MASS) (Brown and Ryan, 2003) which includes 15 items that related to daily living

experience such as “I break or spill things because of carelessness, not paying attention or thing of something else” and “I find it difficult to stay focused on what is happening in the present”. By analysing the Likert-scale from 1 (almost always) to 6 (almost never) that the respondents report, the mindfulness level of respondent can be indicated and show how often the respondents will put themselves in the state of mindfulness and their awareness to surrounding during their daily live. Other than MAAS, other scales such as Toronto Mindfulness Scale (TMS), Five Factor Mindfulness Questionnaire (FFMQ), Delphia Mindfulness Scale (DMS) are all commonly used scale to measure mindfulness.

The impacts of mindfulness on different group of people have been reported by many studies and majority of the studies are focusing on the work-related stresses, mental health issues and well-being. Employees with high level of mindfulness is able to perceive better ability to regulate their emotions in order to motivate themselves and recover faster from psychological distress, thus leading to less perceived stress as well as enhanced working performance (Bao, Xue and Kong, 2015). Besides, mindfulness also found to has a positive impact on job satisfaction and negative impact on turnover intention. In addition, work-family balance mediates the relationship between mindfulness on job satisfaction and turnover intention (Raza *et al.*, 2018). On the other hand, people who are experiencing unemployment will tend to pay more attention to their daily activities and their stress level is able to reduce after followed the mindfulness training program. Moreover, the unemployed people are found to have better confidence in finding a new job as well (de Jong *et al.*, 2013). The mindfulness training also found to have direct effect in mitigating anxiety and depression as mindfulness is focusing on reducing worry and rumination and thus able to reduce the risk of developing mental-related issues (Parmentier *et al.*, 2019).

In contrary, most of the participants experienced transiently anxiogenic during their mindfulness-based interventions practice but none of them are momentarily adversely affected during mindfulness training in daily living post-intervention. The temporary anxious responding to mindfulness training may be elicited due to the motivation of participants who are new to mindfulness training, to regulate their mental and internal states in the process of learning and applying a new meta-cognitive stance, therefore, majority of the participants may feel anxious during the early training stage since they need to replace their strategies in term of awareness while this requires long-term practice. However, the participants became better

evident by increased awareness to internal states after mindfulness training (Aizik-reebs, Shoham and Bernstein, 2021).

Overall, mindfulness is associated with positive outcomes in relation to most measures. Mindfulness is able to improve the people well-being such as job satisfaction, professional quality of life, sleep quality and individual strength as well as protect the people against mental health issues such as stress, anxiety and depression (Lomas *et al.*, 2017). However, the impacts of mindfulness on employees still remains in a relatively equivocal area as the current number of studies and the quality of studies are relatively low and inconsistent. Despite this, mindfulness is found to be effective in decreasing the emotional burnout, stress, anxiety and depression (Janssen *et al.*, 2018). Therefore, further studies are required to indicated the impacts of mindfulness.

### **2.5.1 Factors Affecting Mindfulness**

Currently, large body of studies examine the mindfulness characteristics such as awareness, attention, attitude and so forth as well as the mindfulness outcomes in terms of well-being, stress reduction, work performance and so forth, but the factors that potentially affect the mindfulness level of employees are fewer reported. Individual and workplace factors are important for multiple reasons in affecting the mindfulness experiences of employees and these factors can also act as moderators between mindfulness and workplace outcomes such as job satisfaction, turnover intention, occupational stress, anxiety and so forth. In other words, individual and workplace factors can affect mindfulness level of employees without mindfulness interventions in workplace (Shahbaz and Parker, 2021). However, industrial or other macro factors are significant in affecting the mindfulness of employees, which means different industry will have different individual and workplace factors that affecting the mindfulness of employees. For example, a construction industrial project team member who deal with the construction project management may experience different level of mindfulness as compared to employee who work in education industry that often less interact with dangerous construction processes.

Several studies have shown that there are mindfulness difference across individuals (Brown and Ryan, 2003), which means some individuals tend to have higher mindfulness than others in their work setting. Some employees tend to be more mindful than others due to their working experience as experts is more able to focus attention mindfully on their tasks. Because

employees with more working experience may have relative sufficient confident and ability to resolve problems as they experienced the similar issues before and knew the most effective way to solve or prevent it. Dane and Brummel (2013) revealed that the level of work experience can positively influence the workplace mindfulness of employees to a certain degree, becoming moderator of the relationship between workplace mindfulness and job performance (Dane and Brummel, 2013).

In addition to the work experience, mindfulness will undergo certain changes with increasing working experience as past experience can expand an individual's awareness, attention and intuition, which is especially beneficial in guiding an individual's decision-making and behaviour. Ji et al. (2018) revealed that trait mindfulness has a direct effect in preventing pilots' involvement in incident through influencing risk perception and this effect is strengthen among the more experience pilots as compared to pilots with less experience (Ji *et al.*, 2018).

Moreover, the effect of work experience on employee mindfulness also related to task complexity since some complex problems will required a broader range of experience in supporting the employee to identify the problems and implement the solutions. In other words, employees with higher task complexity, with more experience tend to work mindfully than the employee with relatively less experience, because in complex situation, not only specific technical skills are required but also relevant work experience to guide the employees who working at such complex and dynamic work environment. Therefore, the impacts of mindfulness will be stronger among employees who were either more experience or more intelligent with an increasing task complexity (Zhang and Wu, 2014). According to the above literature outcomes, a positive correlation between work experience and mindfulness may have higher chance of occurring among project team members.

Other than working experience, several studies found that older adults reported higher mindfulness than the younger adults as older adults have greater attention on the present moment rather than ruminating about the past and greater awareness about the consequence of poor safety behaviour such as not wearing personal protective equipment, getting insufficient sleep, not engaging in healthy diet or regular exercise and so forth. Older adults is more motivated to experience the present as increasing age increases the awareness that life is limited, therefore, older age usually associated with focusing more about the present moment rather

than worrying about the future and past (Shook *et al.*, 2021). Additionally, Mahlo and Windsor (2021) revealed that the relationship between present moment attention and well-being becomes stronger as age increases, especially adults with age over 40 years old because increasing age increased the awareness of life finitude (Mahlo and Windsor, 2021).

Besides, the organizational practice also affect the employee workplace mindfulness. Yin *et. al* (2019) recently found that the positive association between mindfulness and employee creativity is stronger when employees perceived higher leader humility, where humility is the tendency to learn from others. In other words, the employee creativity is strengthen when they realized their supervisors to be humble leader, because employees are always concerned about others' comments or judgement towards their creative performance or ideas, therefore, they will often thinking about whether it is appropriate to try out or share their creative ideas and often look to their leader's behaviours to identify whether there is any support or acceptance for their creativity. If leader humility is high, employee will see their leader is open to different creative ideas and humble to learn from them as well as the leaders will appreciate the employees' efforts and contributions (CheungS *et al.*, 2019). Then, the employees can focus on the present moment to develop more creative ideas and more willing to engage in idea sharing activity instead of concern too much the impression they leave when they share or attempt to any creative ideas.

Other than that, the level of organizational error tolerance exerts considerable impacts to the relationship between mindfulness and creativity. Specifically, the relationship between mindfulness and employee creativity is strengthen for organization with high level of error tolerance (Wang *et al.*, 2021). Employees who work in high level error tolerance organization will more focus on the present moment rather to proactive pursue their goals rather than afraid of failure, high level of organizational error tolerance also motivated employees to try out new ideas, alternative solutions to resolve problems instead of worry about the final result or punishment when errors are made.

Furthermore, individual mindfulness can be affected by team mindfulness, individual mindfulness shows the cognition at the individual level while team mindfulness shared the mutual belief among team members at the collective level (Liu *et al.*, 2020). In other words, team members will perceive lower distraction during their works if team mindfulness is high as a mindful team will consider stress in a more non-judgemental ways, leading to reduced

resource-consuming processes like slow project progress, unclear goals and so forth as the team mindfulness, awareness affects the team members' way of communicate and work, helping them to complete the task and interact with other team members more objectively rather than affected by irrelevant matters such as conflict, emotional thought and anxiety.

### **2.5.2 Mindfulness-Based Practice**

In recent years, mindfulness has become widely known around the world as large body of studies reported its benefits in different terms such as attention, awareness, emotion, safety, decision-making, stress, well-being, work performance and so forth. Hence, people now can learn mindfulness-based practice (MBP) through various ways, including courses, apps, workshops, one-to-one or group sessions. Mindfulness-based practice involve different techniques, including body scan, sitting meditation practice, breathing space, mindful movement, bringing attention to daily activities and so forth. Mindfulness-based practice can be classified into formal and informal practice. Formal mindfulness-based practice is practitioners purposely assign some time to engage in mindfulness meditation practices. Informal mindfulness-based practice is practitioners specifically engage in mindful moments through bringing mindful attention and awareness to daily activities without a fixed duration such as mindful walking or mindful eating, in other words, practitioners pay attention to and aware of what they are doing in daily life (Birtwell *et al.*, 2019; Shahbaz and Parker, 2021).

Numerous of studies investigated whether formal or informal mindfulness-based practice is more strongly associated with positive outcomes and is more appropriate to be implemented as a part of school or workplace. However, the relationship between mindfulness and its outcomes is complex. Birtwell *et al.* (2019) found that both frequency and duration of informal practice are positively associated with well-being and psychological flexibility but only frequency of formal practice is positive associated with well-being, both frequency and duration of formal practice is not significantly related to psychological flexibility (Birtwell *et al.*, 2019). Segal *et al.* (2013) revealed that the effectiveness of mindfulness practice is likely to depend on the quality of actual mindfulness practice than the quantity of mindfulness practice (Segal *et al.*, 2013). Hassed *et al.* (2021) found that the quality of both formal and informal mindfulness-based practice are strongly associated with positive outcome as compared to quantity (duration) of formal and informal mindfulness-based practice (Hassed *et*

*al.*, 2021). Therefore, it is yet to know which type of mindfulness-based practice is more effective.

However, majority of practitioners reported that they preferentially used informal mindfulness-based practice during daily activities through acting with awareness when drinking coffee, eating and walking. Because regularly long formal mindfulness practice may be difficult for certain employees who constrained with work schedule and family issues, therefore, informal mindfulness practice may be an alternative way of developing mindful skill for employees who cannot perform regular formal mindfulness practice throughout the week since informal practice is sufficient to reduce negative effect and improve well-being, with no significant difference between practitioners' mindfulness score after intervention (Verger *et al.*, 2021). Birtwell *et al.* (2019) results also highlighted the potential of informal mindfulness practice as participants reported difficulties in practice mindfulness formally such as requiring to set aside time, falling asleep during formal practice and concerning about whether they are practicing correctly. Therefore, most of the participants are willing to practicing mindfulness informally after the study as informal practice can be easily integrated into daily basis as compared to formal practice (Birtwell *et al.*, 2019). Kakoschke *et al.* (2021) also suggested informal mindfulness practice may be a promising intervention that associated with improvement in study engagement, trait mindfulness, perceived stress and mental health among students (Kakoschke *et al.*, 2021).

### **2.5.3 Mindfulness-Based Intervention**

Mindfulness-based intervention (MBI) is a mindfulness-based training program that compiled with different mindfulness practices (Kabat Zinn, 2003). Mindfulness-based stress reduction (MBSR) and mindfulness-based cognitive therapy (MBCT) are the two most commonly used standardised mindfulness-based interventions. Both of them involve an eight weeks sessions of formal and informal mindfulness practice for approximately 45 minutes a day. Mindfulness-based intervention is originally developed for clinical context such as the Kabat Zinn's MBSR program was designed for the treatment of chronic pain and the Segal *et al.*'s MBCT was designed for treatment of recurrent depression. Over the years, mindfulness-based intervention is increasingly deploy in occupational context, not only for treating physical and mental health issues within workplace such as stress, burnout, sleep disorder, anxiety and so forth, but also implement for improving employees work performance, safety behaviour, decision-making and so forth. For instance, a systematic review of literature that covering all occupations, all



forms of mindfulness-based intervention and a range of well-being related outcomes was conducted (Lomas *et al.*, 2019). The results indicated that mindfulness-based intervention has significant positive effect on deficit-based outcomes such as stress, anxiety, distress, depression, and burnout as well as relatively less significant positive effect on asset-based outcomes such as health, work performance, compassion, empathy, mindfulness and well-being.

Besides, numerous of studies examine the effect of brief mindfulness-based intervention on health-related outcomes such as psychological outcome (e.g. anxiety and depression, emotional outcome (e.g. anger, sadness and distress), cognitive outcome (e.g. attention and memory) and stress. currently, there is no widely agreed definition for brief mindfulness-based intervention, the possible explanation is briefer and less intense intervention that only represent approximately half of the standard MBSR program. In other words, MBSR usually consist of around 45 minutes practice per day for 8 weeks, brief MBI only consist of not more than 30 minutes practice per day for not more than 4 weeks. Derose *et al.* (2021) investigated that brief MBI has significant positive effect on at least one health-related outcomes and this evident the potential of brief MBI in attracting people to begin mindfulness practice and continue for a long term (Derose *et al.*, 2021).

The efficacy of MBI ion has been widely reported by various researchers and the home-practice in MBI was reported as an important factor in affecting the therapeutic effects of the treatment. Home-practice is defined as a set of mindfulness practice taught by MBI teacher for participants to complete between sessions and continue after the entire MBI sessions. The result shown that the improvement on clinical outcomes can be predicted by analysing the home-practice, therefore, it is important for future research to identify the recommended quantity and quality of home-practice in MBI (Lloyd *et al.*, 2018).Parsons *et al.* (2017) found that there is a small but significant association between home-practice and intervention outcomes, the most possible explanation is mindfulness practice is often conceptualized as a type of mental training and thus more practice may produce more benefits (Parsons *et al.*, 2017).

## **2.5 Mindfulness and Stress**

The mindfulness-stress-performance model developed by Leung, *et al.* (2016) shows that the three type of stress such as objective, emotional and physical stresses can be reduced by respective mindfulness characteristics such as attention which divided into present focus, awareness and decentering, enlightenment which divided into description, observation and

consciouscuriosity as well as attitude which divided into acceptance, non-judgemental and non-reactivity. The study showed that description can reduce objective stress, observation and awareness can reduce emotional stress, awareness can reduce physical stress. Awareness not only reduce stress but also improve safety performance as well as description and observation can increase working performance (Leung et al., 2016).

Furthermore, Leung and Ahmed (2019) conducted a research to study the difference between construction professionals who participated in mindfulness-based stress reduction programme and construction professionals who did not participated in mindfulness-based stress reduction (MBSR) programme in term of mindfulness characteristics. The study reported that the MBSR participants scored higher in majority of mindfulness characteristic as compared to those non-participants. So the study concluded that mindfulness has significant positive impact on construction professionals by reducing their emotional stress and improving their organizational performance (Leung & Ahmed, 2019). Therefore, it is recommended that mindfulness-based stress reduction programme or other mindfulness-based training to be promoted to the construction organizations as mindfulness is capable to reduce stress and improve safety and working and organizational performances.

In addition, the positive outcomes of mindfulness on stress reduction are not only effective to construction workers or professionals but also students. The influence of mindfulness is found to be directly related to academic stress and self-regulation among undergraduate students. Student with high level of mindfulness often have a high level of self-regulation but low level of academic stress. Because, mindfully thinking will improve the students' attention, carefulness and well-being as well as the students will manage to deal with the situations with safety and appropriate strategies instead of being override by excessive emotional responses (Ramli *et al.*, 2018). These outcomes clearly indicated that high level of mindfulness is normally associated with low level of stress.

## **2.7 Mindfulness and Safety behaviour**

Mindfulness is found to be directly related to workplace injuries, safety compliance and safety participation. When the employees possessed sufficient high level of mindfulness, safety behaviour will occur and form a strong safety climate within the workplace. Therefore, the direct effect of mindfulness on safety compliance and safety participation can be moderated by safety climate such that the best safety behaviour will occur when both safety climate and

mindfulness level are high. This also indicated that mindfulness is helpful in preventing workplace injuries or accidents since mindfulness is effective in increasing employees' safety behaviour, particularly in workplace with strong safety climate (Kao *et al.*, 2021).

Zhang and Wu (2014) revealed that both safety compliance and safety participation were positively associated with dispositional mindfulness and thus suggested that mindfulness is a good predictor of safety behaviour (Zhang and Wu, 2014). Kao *et al.* (2021) were then further expand the findings of Zhang and Wu (2014) by investigating the mediating role of safety behaviour within the link between mindfulness and occupational injuries. Their result also further identified safety climate as the moderator on the relationship between mindfulness and safety behaviour (Kao *et al.*, 2021). The improvement of safety behaviour is likely to be happened when employees possessed high level of mindfulness and engaged into a workplace with strong safety climate and thus, the lowest occupational injury could be found.

Apart from that, mindfulness was found to be more related with errors and breaches as compared to safety participation. In other words, the effects of mindfulness on safety compliance is more significant than safety participation because a mindful worker has higher awareness to hazard, leading to reduction of errors and breaches. On the other hand, the effects of mindfulness on safety participation are mediated by different coping strategies such as the positive effects of mindfulness on safety participation can be mediated by problem-focused coping strategies while the negative effects of mindfulness on errors and breaches will be mediated by emotion-focused coping strategies (Liang *et al.*, 2022).

Moreover, one of the mindfulness characteristics, awareness can directly improve the workers' safety performance because the mindful workers are able to pay full attention to their task, leading to aware of all safety rules and regulations, therefore, prevent the workers from engaging in unsafe behaviors which will cause injuries or accidents (Leung *et al.*, 2016). Overall to say, mindfulness has positive influence on workers' safety behaviour in terms of safety compliance and participation. These outcomes clearly indicated that mindfulness could improve safety behaviour.

## **2.9 Conclusion**

The literature review outcomes many significant evidences from various studies on the impacts of mindfulness on stress and safety behaviour. Working in construction industry is stressful

and this is agreed by many researchers since the construction activities are usually difficult and dangerous. However, some studies found that one's working experience can positively affect the mindfulness level of that person because employees who rich in relevant working experience are more able to work mindfully by focusing on the present moment and they are more confident in solving problems based on their past working experience, personal skills and knowledge. In addition, working under excessive stress is harmful to a person's physical and mental health, leading to injuries or accidents. Many studies reported the negative correlation of stress on safety behaviour in which the safety behaviour is one of the most important factor in causing the injuries and accidents in construction activities. The way of stress affect an individual may not the same for everyone but will generally impact an individual's working performance, mental health and well-being. Other than that, construction workers often put themselves in danger by conducting unsafe behaviour and there are many reasons that cause this to be happened such as tight timeline, carelessness, negligence and so on. Therefore, it is strongly suggested that the construction organization to apply some effective coping strategies to deal with stress and unsafe behaviour. Many studies suggested that mindfulness could be an useful tool for reducing stress and improve safety behaviour. Employees with higher level of mindfulness will be more aware of their body, mind and feelings in the present moment and thus, they are able to deal with any situation by paying full attention and conduct their tasks carefully. The following Table 2.3 shows the summary of literature used.

Table 2.3: Literature Summary of Mindfulness, Stress, Safety Behaviour and Work Experience

Study	Mindfulness	Stress	Safety Behaviour	Work Experience	Outcomes
Ajayi, 2018		Work stress (+)			Work performance (-)
Dane and Brummel, 2013	Workplace mindfulness (+)				Job performance (+)
Gällstedt, 2003		Resource-related and priority-related incidents (+)			Motivation (-) Perception of working condition (-)
Guo et al, 2016		Pressure (-)	Social support (+)		Safety motivation, knowledge, participation and compliance (+)
Holden and Sunindijo, 2018		Irregular working hours (+)			Work-life balance (-)
Huang et al., 2021		Work stress: Work environment, timeline, etc. (-)	Company, support and professional identity (+)		Occupational disaster and disease (-)
Janssen et al., 2018	Mindfulness (+)	Burnout, stress, anxiety and depression (-)			

Study	Mindfulness	Stress	Safety Behaviour	Work Experience	Outcomes
Ji et al., 2018	Mindfulness (+)			Work experience (+)	Decision-making (+) Behaviour (+) Incident involvement (-)
Jung et al., 2020		Perception of working environment (-)	Safety knowledge and motivation (-) Safety compliance and participation (-)		Safety behaviour (-)
Kao et al., 2021	Mindfulness (+)		Safety behaviour (+)		Occupational accident and injury (-) Safety climate (+)
Karmadeen et al, 2017		Personal issues: unstable marital status, female (+)			Anxiety (+) Depression (+)
Leung and Ahmed, 2019	Mindfulness (+)	Emotional stress (-)			Organizational performance (+)
Leung et al, 2016	Mindfulness characteristic (+)	Physical, psychological stress (-)	Safety behaviour (+)		Work performance (+)

Study	Mindfulness	Stress	Safety Behaviour	Work Experience	Outcomes
Leung, Liang and Yu, 2016		Tight deadline, huge workload (+)			Working performance (-) Safety behaviour (-)
Liang et al., 2022	Mindfulness (+)	Stress (-)	Safety awareness, safety attitude, subjective norm (+)		Safety behaviour (+)
Lomas et al., 2017	Mindfulness (+)	Stress, anxiety and depression (-)			Well-being (+)
Lu and Kuo, 2016		Work stress (+)	Safety compliance and participation (-)		Safety behaviour (-)
Mohammad et al, 2019			Unsafe behaviour, poor safety culture (+)		Occupational accident (+)
Nadia et al., 2020		human, worksite, management (-)	Safety behaviour (-)		Occupational accident and illness (+)
Nwaogu and Chan, 2021		Irregular working hours, nervous, poor sleep quality, excessive pressure (+)			Accident rate (-) Productivity (-) Immune system (-)

Study	Mindfulness	Stress	Safety Behaviour	Work Experience	Outcomes
Parmentier et al., 2019	Mindfulness training (+)	Anxiety and depression (-)			Mental health related illness (-)
Ramli et al., 2018	Mindfulness (+)	Emotional responses (-)			Well-being, attention, carefulness (+)
Sahoo, 2016		Stress-related problems (+)			Overload (+) Overwhelmed (+) Organizational performance (-) Well-being (-)
Sajid et al., 2021		Work stress: cognitive, behaviour, emotional and physical (+)			Physical and mental state (-)
Tan and Yip, 2018		Job stressor (+)			Well-being (-)
Weisinger et al., 2015		Excessive pressure (+)			Overload (+) Overwhelmed (+)
Wu et al., 2018		Work stress (+)	Safety compliance and participation (-)		Safety behaviour (-)
Zhang and Wu, 2014	Mindfulness (+)		Safety compliance and participation (+)		Safety behaviour (+)



## **CHAPTER 3**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter will present the principle methodologies that the author use to examine the aim and objectives of this research, including the research method, data collection and data analysis techniques. This research aimed to study the relationships between mindfulness, stress and safety behaviour, therefore, the corresponding research methodologies should be selected appropriately to ensure the quality of research. In this research, the data collection method will include several validated measurements by referencing the assessment developed in other studies such as the mindful attention awareness scales, perceived stress scale and other safety behaviour related measures since there are three different components such as mindfulness, stress and safety behaviour are going to be studied in this research.

#### **3.2 Research Method**

The selection of research method is vital as it helps in determining the solutions to research problems. The research methods are generally classified into qualitative and quantitative research. Qualitative research can be understood as an in-depth study of social and cultural phenomena and this type of research is more focusing on texts while quantitative research is to investigate the general trends of a specific research problems across the selected population and this type of research is more focusing on number (Goundar, 2012). In other words, qualitative research is concerned with the phenomena that can be expressed in terms of word such as knowledge, attitudes and opinions and its data are usually collected through observation and description, whereas quantitative research is concerned with phenomena that can be expressed in terms of quantity and can be statically analysed for comparison or relation.

In this research, quantitative research will be adopted because the level of mindfulness, stress and safety behaviour can be statically measured and result in number-based outcomes that are easier to be interpreted. Besides, quantitative research is simpler in yielding data from a larger population and the collected data are easier to be organised and analysed. In this research, the data will be collected through online questionnaire survey to obtain the primary

data, whereas the secondary data is collected by literature review. This type of research design is inexpensive and save time because the online survey forms are free of charge and it can be delivered to targeted population immediately.

### **3.3 Data Collection**

This research is going to collect data through online questionnaire survey which contains only close-ended questions. The questionnaire survey will be designed to determine the respondents' background, mindfulness level, stress level and safety behaviour. The online questionnaire survey will be developed using google form and distributed to qualified respondents via e-mail and google form link (through social media platform). The targeted population in this research consists of project team members who are working in the construction industry within Kuala Lumpur or Selangor area, Malaysia. The way to invite them to participate the questionnaire survey is voluntary and through a reliable relationship.

#### **3.3.1 Survey Sample**

Sampling method is the process of selecting a representative from a population of interest for the purpose to understand the required information or data of the whole population through fewer people (sample). Therefore, the greater the sample size, the better the data quality obtained in respect to the targeted population. Basically, there are two major sampling method such as probability and non-probability sampling method. Probability sampling method is a technique where all the samples within the targeted population are giving with equal chance of being selected to participate the research while non-probability sampling method is a sampling technique where only qualified samples who are selected according to certain criteria are giving with opportunity to participate the research.

In this research, a simple random probability sampling technique will be adopted to give all people in the targeted population an equal chance of being selected. The population that eligible to participate the questionnaire in this research is targeted on the people who are working in Malaysia's construction industry and possessing a mainstream role such as developer, contractor, consultant, supplier and other. The aim and objectives of this research is mainly related to mindfulness, stress and safety behaviour, therefore, different characteristics like age, gender, working experience and race are giving equal chance as well. The number of people who are eligible to participate the survey is expected to be huge amount and thus, the sampling frame is impossible to be listed. Since this research will adopt simple random

probability sampling method and thus, the responses that will be return may not equal to the total number of distributed questionnaire. However, survey response rate above 60% should be the goal for most of the research (Fincham, 2008). In this research, the sample size will be estimated by using the following formula called Cochran's sample size formula (Bartlett, Kotrlik and Higgins, 2001):

$$N = \frac{Z^2 \times P \times (1 - P)}{L^2}$$

Where,            N = Sample Size  
                       Z = Confidence Level  
                       P = Proportion of Population that presents the given characteristics  
                       L = Limit of Error

According to the formula above, the confidence level for this research is expected to be 95% reliable, so the Z value is equal to 1.96 and the proportion of population that presents the expected effects of mindfulness is unknown, therefore, the P is equal to 50%. In this research, the respondents were assumed to have limited knowledge of mindfulness and thus, a higher margin of error is acceptable and the limit of error for the Cochran's sample size formula is expected to be within +/- 10%.

Thus,

$$N = \frac{1.96^2 \times 0.5 \times (1 - 0.5)}{0.10^2} = 96$$

Therefore, a total number of 140 online questionnaire survey forms are going to be distributed and 96 responses are expected to be received for this research to ensure the research quality.

### 3.3.2 Questionnaire Design

The online questionnaire survey form will be designed for examining the mindfulness level, stress level and safety behaviour of respondents. Therefore, the survey form will consist of four parts of questionnaire including individual survey and items that measure mindfulness, stress and safety behaviour. First part of the survey is to obtain the background of respondents, second part of the survey is to obtain the mindfulness level of respondents, third part of the survey is to obtain the stress level of respondents, and the last part of the survey is to measure the safety

behaviour of respondents (see Appendix A). All respondents are required to answer the survey by rating their level of agreement with the statements covering the mindfulness, stress and safety behaviour using a five point Likert-type for stress and safety behaviour questionnaire while six point Likert-type scale for mindfulness questionnaire.

### **3.3.3 Mindful Attention Awareness Scale (MAAS)**

MAAS is a 15-item scale questionnaire designed to assess mindfulness and the measurement of MAAS focused on awareness in relation to self-control and many aspects of well-being. The questions of MAAS is able to show how frequent the individuals will put themselves into the state of mindfulness and how aware they can sense the surrounding during their daily living experiences and this will directly indicated their level of mindfulness. This scale has been used in a wide range of populations and has demonstrated strong psychometric properties and validity inferences (Brown and Ryan, 2003). The respondents are needed to answer the questionnaire by indicating how frequently or infrequently they have the experience asked in the statement of each items using a six-point Likert-scale ranging from 1 (almost always) to 6 (never).

### **3.3.4 Perceived Stress Scale (PSS)**

PSS is one of the most widely used psychological instrument for measuring the perception of stress, developed by Cohen et al. in year 1983. It is a self-report questionnaire that used to measure the degree to which situation the individuals' life are appraised as stressful. The items within the PPS questionnaire are designed to measure how unpredictable, uncontrollable and overloaded the individuals find in their life. The items is general in nature rather than focus on a specific event or experience. The PSS assessment is 10-item scale (PSS-10) questionnaire and currently it can be shortened into a 4-item scale questionnaire as a brief version for survey session that need faster interview. The respondents are required to answer the questionnaire by indicating how often they felt or thought a certain way according to the question asked in each items using a five-point Likert-scale ranging from 1 (never) to 5 (very often) (Lee, 2012).

### **3.3.5 Safety Behaviour**

In this research, the measures of safety behaviour are assessed using items adapted from Lyu et al. (2018) in terms of safety compliance and participation. The respondents will be asked about their effort in compliance with safety rules and regulations as well as participating in safety-related activities. In this questionnaire, the respondents are required to answer according

to their daily work on how frequent they put effort to keep themselves safety, improve the workplace safety and prevent the happen of incidents by rating the five-point Likert-scale ranging from 1 (never) to 5 (very often).

### **3.4 Data Analysis**

The data collected will be analysed using the Statistical Package for the Social Science (SPSS) Version 26.0 Software through various quantitative data analysis techniques such as:

1. Shapiro-Wilk Normality Test
2. Cronbach's Alpha
3. One-Way Anova
4. Pearson's Correlation

#### **3.4.1 Descriptive Statistics Analysis**

All the demographic variables such as gender, age, academic qualification, profession, working experience and mindfulness training experience will be analysed using SPSS software and presented in the form of table with corresponding frequency and percentage.

#### **3.4.2 Shapiro-Wilk Normality Test**

Statistical errors are commonly happened in scientific researches because most of the parametric tests, including correlation, regression, t-test and analysis of variance are conducted based on the assumption that the data obtained are normally distributed, therefore, the normality test should be taken into account for using parametric statistical tests to ensure the accuracy and reliability of the results and conclusions (Ghasemi and Zahediasl, 2012). Shapiro-Wilk test is one of the most used normality test and it can be conducted using SPSS software. This test compares the scores in the samples to a normally distributed set of scores with the same mean and standard deviation, if the test is significant, it means the scores is not normally distributed. Shapiro-Wilk test is recommended for a sample size of less than 50 but it also can handle sample size up to 2000. For significance value greater than 0.05, it is sufficient to indicate normal distribution of data.

#### **3.4.3 Cronbach's Alpha Test**

Cronbach's Alpha test was developed by Lee Cronbach in 1951 to provide a measure of internal consistency of a test or scale and it is expressed by the Cronbach's alpha coefficient as a number range from 0 to 1. Internal consistency describes the extent to which all the items in a test

measure the same concept and hence it is connected to the inter-relatedness of the items within the test (Tavakol and Dennick, 2011). This test is important to show the validity and reliability of a test or survey questionnaire which included multi-Likert items. A wide range of different qualitative descriptions are used by the researchers to interpret different range of Cronbach's Alpha coefficient but the common practice is science education journals are remained the use of alpha value that reached 0.70 as a sufficient measure of the test or survey questionnaire reliability and internal consistency (Taber, 2018). Table 3.1 shows a general interpretation of different range of Cronbach's Alpha coefficient.

Table 3.1: Range of Reliability and its Cronbach's Alpha Coefficient (Mohd Arof et al., 2018)

<b>Cronbach's Alpha coefficient</b>	<b>Reliability level</b>
> 0.90	Excellent
0.80 – 0.89	Good
0.70 – 0.79	Acceptable
0.60 – 0.69	Questionable
0.50 – 0.59	Poor
< 0.59	Unacceptable

#### 3.4.4 One-way Analysis of Variance (ANOVA) Test

The significant difference of means between two independent groups or dependent groups can be obtained using t-test. However, in this research, the hypothesis statement,  $H_1$  and  $H_{a1}$  is related to the comparison between project team members' mindfulness level and their working experience which including more than 2 groups. Therefore, the most suitable analytical method is one-way analysis of variance (ANOVA) for determining the significant difference exists in the means of more than 2 groups. In general, the ANOVA test is focused on the variation of variances, it compares the variation of sum of squares for groups, SSC between groups to the variation of sum of squares for errors, SSE within groups and then identify the probability (significance value) for rejecting the null hypothesis which stated that the mean responses are equal in all groups (Ostertagova and Ostertag, 2013). If the significance value obtained is less than 0.05, then it can be concluded that there is a significant difference between the groups. Afterwards, post hoc test which also known as multiple comparison test is developed to test the statical significance difference between two specific groups. The ANOVA test provides the

overall difference and the most useful information to the researchers as it is designed to identify the significance difference between specific pairs of means.

### 3.4.5 Pearson's Product-Moment Correlation Test

The Pearson's correlation test is a measure of the strength and direction of relationship between two variables and can be shown on a scatterplot diagram if both of them are continuous variables. The strength of that relationship between two variables is indicated by the correlation coefficient which varies from -1 to +1, where -1 is total negative correlation, 0 is no correlation and +1 is total positive correlation. This correlation coefficient signifies how strong the linear relationships between the two specific variables or not, therefore, the linearity between the two variables' data are required to checked first using scatterplot diagram. Besides, the Pearson's correlation test is a parametric test that required normally distributed continuous data and thus, the data is needed to be tested for normality (Akoglu, 2018). Table 3.2 shows the descriptive interpretation for various range of Pearson's correlation coefficient that are using in this research.

Table 3.2: Interpretation of Various Range of Pearson's Correlation Coefficient (Akoglu, 2018)

Correlation coefficient		Interpretation
+1	-1	Perfect
+0.9	-0.9	Strong
+0.8	-0.8	Strong
+0.7	-0.7	Strong
+0.6	-0.6	Moderate
+0.5	-0.5	Moderate
+0.4	-0.4	Moderate
+0.3	-0.3	Weak
+0.2	-0.2	Weak
+0.1	-0.1	Weak
0	0	None

### **3.5 Summary**

This research will adopt quantitative as research method by distributing questionnaire through online Google Form. Simple random probability sampling technique will be adopted in this research to targeted population which is project team members that working within Kuala Lumpur and Selangor area in Malaysia. The questionnaire distributed consists of 4 main parts, including questions asking about the respondents' background, MAAS questions to obtain respondents' mindfulness score, PSS questions to obtain respondents' stress condition and safety behaviour question in term of safety compliance and participation adapted from Lyu et al. (2018). The collected data will be analysed using SPSS V26 software through different techniques, including normality test, Cronbach's Alpha test, one way ANOVA for testing the relationship between working experience and mindfulness of project team members as well as Pearson's correlation test for testing the relationship between mindfulness, stress and safety behaviour. The result will then illustrated using pie chart diagram for demographic information and table for quantitative data analysis test.



## CHAPTER 4

### RESULT

#### 4.1 Introduction

This chapter will present the results obtained from the online questionnaire survey and the data analysis of the results using different techniques. A total of 100 responses were collected for this research out of 140 questionnaire that distributed through E-mail, WhatsApp, Facebook and WeChat. The summary of respondents' individual survey will be presented at section 4.2. The responses for each questionnaire were input to the SPSS software for analysing and the output for each test will be presented at section 4.2, 4.3, 4.4 and 4.5.

#### 4.2 Demographic Information

The respondents are required to answer the first part in the questionnaire survey which consists of question asking about the respondents' background, including gender, age, academic qualification, working status, profession, working experience and mindfulness practice. All 100 respondents' responses have been analysed using frequency analysis and shown in a pie chart diagram in term of percentage.

Table 4.1 shows the summary of demographic information obtained from the 100 respondents. Almost every categories of different aspect have been represented by a considerable number of respondents, therefore, we believed that the results obtained from this questionnaire survey are reliable and able to represent their population, making this research more comprehensive as it can analyse the targeted population wholly.

Table 4.1: Summary of the Demographic Information of Respondents

Demographic Variables		Frequency	Percent
Gender	Male	93	93.0
	Female	7	7.0

Age (years old)	< 20	0	0.0
	20 – 29	85	85.0
	30 – 39	11	11.0
	40 – 49	4	4.0
	> 50	0	0.0
Academic Qualification	SPM	0	0.0
	Bachelor	98	98.0
	Master	2	2.0
	PhD	0	0.0
Profession	Developer	59	59.0
	Consultant	31	31.0
	Contractor	7	7.0
	Supplier	2	2.0
	Others	1	1.0
Working Experience (years)	< 1	30	30.0
	1 – 5	55	55.0
	6 – 10	9	9.0
	> 10	6	6.0
Mindfulness Practice	Yes	26	26.0
	No	74	74.0

Out of 100 respondents, 93% are male and 7% are female. The gender of respondents in this research is quite imbalance as the number of female is quite less as compared to the number of male. However, this will not significantly affect the results as gender is not interest in this research.

The age of respondents are majority fall between 20 to 29 years old, 85%; followed by 30 to 39 years old, 11%; while the number of respondents who age between 40 to 49 years old is the least, 4%.

For the academic qualification of respondents, 98% of respondents are holding a bachelor degree qualification while only 2% of respondents are holding a master degree qualification.

Question asking about the respondents' working status in this questionnaire survey is necessary since large number of unemployment cases occurred during Covid-19 pandemic. However, the period where this questionnaire survey are distributed has passed the lockdown and the country has opened to social and economic activities, therefore, there is only 1% of respondent out of 100 respondent is unemployed.

A total of 59% of the respondents are come from contractor background, 31% of the respondents are come from consultant background, 7% of the respondents are come from supplier background, 2% of the respondents are come from developer background and only 1% of respondents are come from other background, may be sales or marketing. The construction project usually involves different organizations as well as different departments and thus, it is necessary to clarify the profession of respondents because mindfulness may differ between profession. However, there is limited time frame for this research to study on this topic. Therefore, this question may not be considered in this research but future research direction.

The majority of the respondents, 55% out of 100 respondents , possessed 1 to 5 years of working experience in construction jobs. This in line with the experience that majority age group in this research which is 20 to 29 years old should have. Subsequently, there are 30% out of 100 respondents have less than 1 year of experience, may be is fresh graduate. While the respondents with 6 to10 years of experience and above 10 years of experience is 9% and 6% out of 100 respondents in respectively.

When the survey is asking the respondents whether they are practicing mindfulness or not, 74% of respondents answer no that they have not practiced mindfulness before and only 26% of respondents answer yes that they have practiced mindfulness before. The answer of respondents on this question is not significant important since this research is mainly focusing on investigating the influence of working experience towards the respondents' mindfulness level whether they practice mindfulness or not. However, this question is critical in identify the knowledge level of respondents on mindfulness as well as the popularity of mindfulness in Malaysia's construction industry. In future research, this question may be removed.

#### 4.2 Shapiro-Wilk Test of Normality for Mindfulness, Stress and Safety Behaviour

The assessment of normality on collected data is usually a prerequisite for many statistical analysis test in order to determine whether the data collected is normal. The sample size for this research is less than 2000 samples and thus, the Shapiro-Wilk Sig. value will be observed. According to table 4.2, the Shapiro-Wilk Sig. value of mindfulness and stress are greater than 0.05 and thus, the data is normal. The Sig. value of safety behaviour is less than 0.05, means the data of safety behaviour is deviate from a normal distribution. However, the numerical normality test might be over sensitive to make an objective judgement on safety behaviour. Figure 4.8, 4.9 and 4.10 shows the normal Q-Q plot of mindfulness, stress and safety behaviour. By interpreting the graphical normal Q-Q plot, the data of mindfulness, stress and safety behaviour are normally distributed as all the data point are close to the diagonal line.

Table 4.2: Shapiro-Wilk Test of Normality for Mindfulness, Stress and Safety Behaviour

	<b>Tests of Normality</b>					
	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Mindfulness	.059	100	.200 <sup>*</sup>	.990	100	.694
Stress	.065	100	.200 <sup>*</sup>	.986	100	.382
Safety Behaviour	.097	100	.022	.968	100	.016

\*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

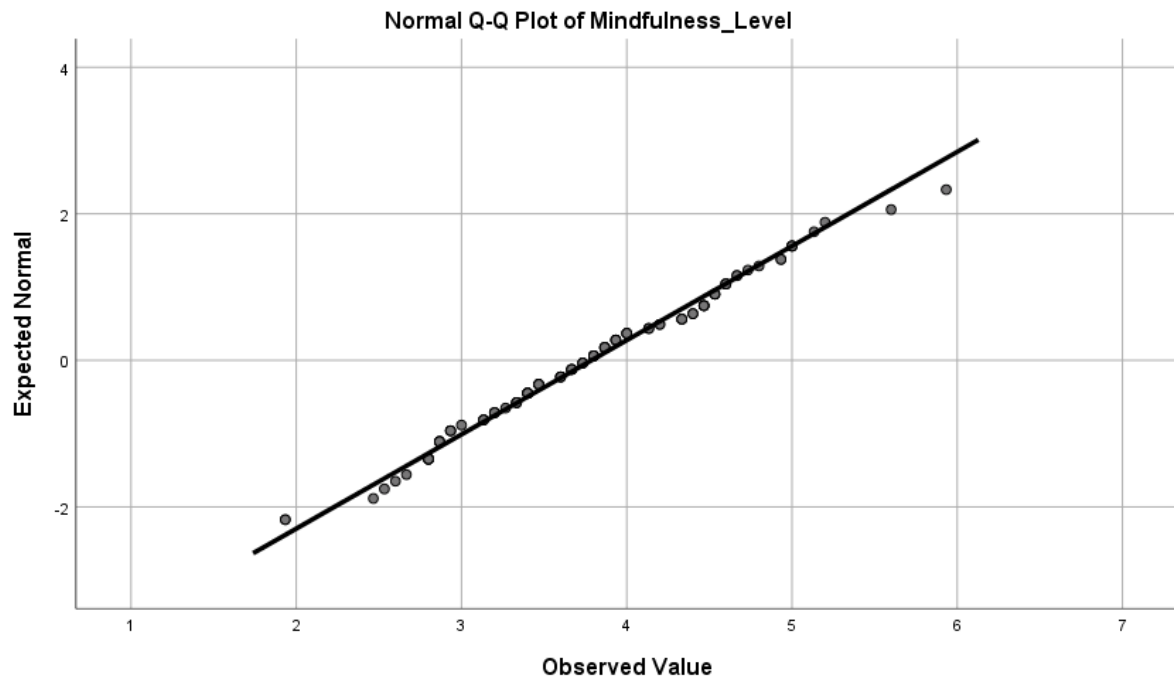


Figure 4.1: Normal Q-Q Plot of Mindfulness



Figure 4.2: Normal Q-Q Plot of Stress

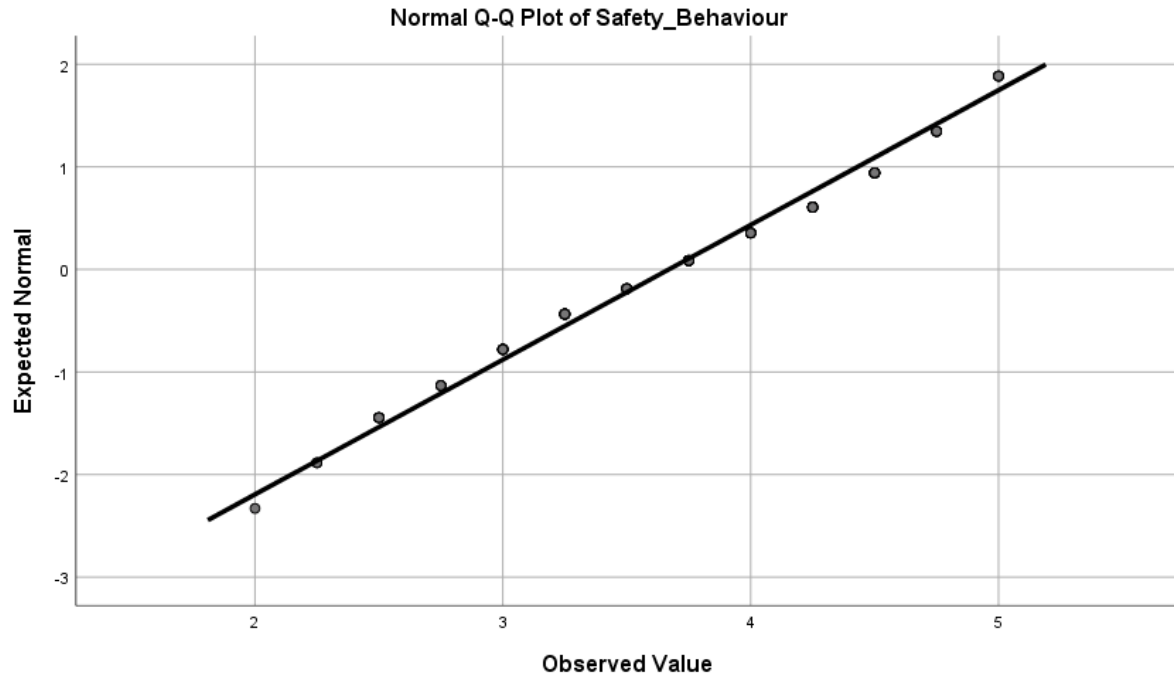


Figure 4.3: Normal Q-Q Plot of Safety Behaviour

### 4.3 Cronbach's Alpha Test for Mindfulness, Stress and Safety Behaviour

To assess the internal consistency of data obtained from the questionnaire in which the questionnaire are all contained multiple Likert-scale options, Cronbach's Alpha test is applied. According to table 4.3, 4.4 and 4.5, the Cronbach's Alpha value of mindfulness, stress and safety behaviour are 0.906, 0.867 and 0.922, in respectively. This indicated a high level of internal consistency for the scale of mindfulness, stress and safety behaviour with this specific samples.

Table 4.3: Cronbach's Alpha Test of Mindfulness

Reliability Statistics		
Cronbach's Alpha Based		
Cronbach's Alpha	on Standardized Items	N of Items
.907	.906	15

Table 4.4: Cronbach's Alpha Test of Stress

Reliability Statistics		
Cronbach's Alpha Based		
Cronbach's Alpha	on Standardized Items	N of Items

.867	.867	10
------	------	----

Table 4.5: Cronbach's Alpha Test of Safety Behaviour

Reliability Statistics		
Cronbach's Alpha Based		
Cronbach's Alpha	on Standardized Items	N of Items
.917	.922	4

#### 4.4 One Way Anova Test for Relationship between different Working Experience Group and Mindfulness

Table 4.6 shows the descriptive analysis between mindfulness level of project team members and different working experience group. The result shows that 30 respondents with less than 1 year working experience score an average of 3.3556 in MAAS with standard deviation of 0.6121; 55 respondents with 1 to 5 years working experience score an average of 3.7552 in MAAS with standard deviation of 0.64891; 9 respondents with 6 to 10 years working experience score an average of 4.6593 in MAAS with standard deviation of 0.40338; and 6 respondents with more than 10 years working experience score an average of 4.9222 in MASS with standard deviation of 0.97745.

Table 4.6: Descriptive Analysis between Mindfulness Level and Different Working Experience group

Descriptive								
Mindfulness Level								
95% Confidence								
Interval for Mean								
			Std.	Std.	Lower	Upper		
	N	Mean	Deviation	Error	Bound	Bound	Minimum	Maximum
Less than 1 year	30	3.3556	.61210	.11175	3.1270	3.5841	1.93	4.47
1 to 5 years	55	3.7552	.64891	.08750	3.5797	3.9306	2.47	5.00
6 to 10 years	9	4.6593	.40338	.13446	4.3492	4.9693	3.73	5.00

More than 6 10 years	6	4.9222	.97745	.39904	3.8965	5.9480	3.20	5.93
Total	100	3.7867	.77786	.07779	3.6323	3.9410	1.93	5.93

Table 4.7 shows the output of ANOVA test between different working experience group and mindfulness level of project team members. The result shows that the significance value is 0.000, which is below 0.05, therefore, there is a statistically significant difference between working experience and mindfulness level of project team members. Table 4.8 shows the multiple comparison between different working experience group and mindfulness level of project team members. The result shows that there is a statistically significance difference in MAAS score between project team members with less than 1 year working experience and 1 to 5 years working experience ( $p = 0.036$ ), between project team members with less than 1 year working experience and 6 to 10 years working experience ( $p = 0.000$ ), between project team members with less than 1 year working experience and above 10 years working experience ( $p = 0.000$ ), between project team members with 1 to 5 years working experience and 6 to 10 years working experience ( $p = 0.001$ ), as well as between project team members with 1 to 5 years working experience and above 10 years working experience ( $p = 0.00$ ). However, there is no significance difference between project team members with 6 to 10 years working experience and above 10 years working experience ( $p = 0.865$ ). In summary, there was a statistically significance difference between groups as determined by one way ANOVA ( $F(3,96) = 16.306$ ,  $p = 0.000$ ). A Tukey post hoc test revealed that the MAAS score is significant higher for project team members with less than 1 to 5 years year working experience ( $3.3556 \pm 0.61210$ ,  $p = 0.036$ ), project team members with 6 to 10 years working experience ( $4.6593 \pm 0.40338$ ,  $p = 0.000$ ) and project team members with more than 10 years working experience ( $4.9222 \pm 0.97745$ ,  $p = 0.000$ ) as compared to project team member with less than 1 years working experience ( $3.3556 \pm 0.61210$ ). Furthermore, there is no statistically significant difference between the MAAS score of project team member with 6 to 10 years and more than 10 years working experience ( $p = 0.865$ ).



Table 4.7: One Way ANOVA Test between Working Experience and Mindfulness level of Project Team Members

<b>ANOVA</b>					
Mindfulness					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	20.220	3	6.740	16.306	.000
Within Groups	39.682	96	.413		
Total	59.902	99			

Table 4.8: One Way ANOVA Test between Working Experience and Mindfulness level of Project Team Members

<b>Multiple Comparisons</b>						
Dependent Variable: Mindfulness						
Tukey HSD						
(I) Working Experience	(J) Working Experience	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Less than 1 year	1 to 5 years	-.39960*	.14593	.036	-.7811	-.0181
	6 to 10 years	-1.30370*	.24435	.000	-1.9426	-.6648
	More than 10 years	-1.56667*	.28753	.000	-2.3184	-.8149
1 to 5 years	Less than 1 year	.39960*	.14593	.036	.0181	.7811
	6 to 10 years	-.90411*	.23118	.001	-1.5086	-.2997
	More than 10 years	-1.16707*	.27642	.000	-1.8898	-.4443
6 to 10 years	Less than 1 year	1.30370*	.24435	.000	.6648	1.9426
	1 to 5 years	.90411*	.23118	.001	.2997	1.5086
	More than 10 years	-.26296	.33885	.865	-1.1489	.6230
More than 10 years	Less than 1 year	1.56667*	.28753	.000	.8149	2.3184
	1 to 5 years	1.16707*	.27642	.000	.4443	1.8898
	6 to 10 years	.26296	.33885	.865	-.6230	1.1489

\*. The mean difference is significant at the 0.05 level.

#### 4.5 Pearson's Product-Moment Correlation Test for Relationship between Mindfulness, Stress and Safety Behaviour

Table 4.9 shows the Pearson's correlation test on the relationship between mindfulness and stress as well as mindfulness and safety behaviour of project team members. The result shows that there was a moderate, negative correlation between mindfulness and stress, which is statistically significant ( $r = -0.582$ ,  $n = 100$ ,  $p = 0.000$ ), a strong, positive correlation between mindfulness and safety behaviour, which is statistically significant ( $r = 0.760$ ,  $n = 100$ ,  $p = 0.000$ ) as well as a strong, negative correlation between stress and safety behaviour, which is statistically significant ( $r = -0.659$ ,  $n = 100$ ,  $p = 0.000$ ).

Table 4.9: Pearson's Product-Moment Correlation Test between Mindfulness, Stress and Safety Behaviour of Project Team Members

Correlations				
		Mindfulness	Stress	Safety Behaviour
Mindfulness	Pearson Correlation	1	-.582**	.760**
	Sig. (2-tailed)		.000	.000
	N	100	100	100
Stress	Pearson Correlation	-.582**	1	-.659**
	Sig. (2-tailed)	.000		.000
	N	100	100	100
Safety Behaviour	Pearson Correlation	.760**	-.659**	1
	Sig. (2-tailed)	.000	.000	
	N	100	100	100

\*\* . Correlation is significant at the 0.01 level (2-tailed).

#### 4.6 Summary

In conclusion, this chapter has completely analyse all parts of the questionnaire. The demographic information of respondent such as gender, age, academic qualification, profession, working experience and mindfulness practice were shown in form of pie chart with percentage stated for each category. The normality test for mindfulness, stress and safety behaviour data

shown that all data are normally distributed by interpreting the graphical Q-Q plot. Besides, the Cronbach's Alpha value of mindfulness, stress and safety behaviour are 0.906, 0.867 and 0.922, in respectively, which indicated an high level of internal consistency for the scale of mindfulness, stress and safety behaviour in this research as well as the high level of reliability for the data collected from the online questionnaire survey. Other than that, the one way ANOVA test for relationship between different working experience group and mindfulness investigated that there was a statistically significant difference between working experience and mindfulness, where working experience has positive association with mindfulness of project team members. Both MAAS score for project team member with different working experience group have significant difference to each other except the MAAS score of project team member with working experience of 6 to 10 years and more than 10 years. Next is the Pearson's correlation test shown that the relationship between mindfulness, stress and safety behaviour are all statistically significant to each other. Specifically, a moderate, negative correlation between mindfulness and stress, a strong, positive correlation between mindfulness and safety behaviour, as well as a strong, negative correlation between stress and safety behaviour. Last but not least, all hypothesis formed were accepted and supported with evidence to answer the research questions.

## CHAPTER 5

### DISCUSSION

#### 5.1 Working Experience and Mindfulness

Hypothesis 4 predicted that the working experience of project team members would significantly correlated with their mindfulness level and this hypothesis was tested using one way ANOVA. The result yielded a statistically significant difference between working experience and mindfulness level of project team members ( $p < 0.05$ ). Specifically, the result revealed that the project team members with more working experience in construction industry scored significant higher in MAAS questionnaire than the project team members with relative less working experience. Therefore, both  $H_4$  and  $H_{a4}$  are supported.

Project team members with more work experience were found to have higher mindfulness as compared to project team members with less working experience. Therefore, the findings of this research are in line with Dane and Brummel (2013), Zhang and Wu (2014) and Ji et al. (2018). Zhang and Wu (2014) also further revealed that more experienced employees were found to be engaged in fewer unsafe behaviour and they identified that employees who were high in mindfulness are either more intelligent or more experienced. A possible explanation is that more experienced project team members may be more confident in identifying problems and implementing solutions. This may be because the more experienced project team members have already experienced the similar problems throughout their career and thus, they should be more aware of their decisions and pay more attention to their work in order to prevent the happening of the same problems again or may be the more experienced project team members knew the best solutions for the similar problems that they experienced before and thus, they should be more focus on the present to resolve the problems rather than overthinking, worry or stress.

The experience they gained from working more years in a certain industry is likely to be the reason they can solve the problems more effectively and handle better with the stressful environment as their working experience is one of the important factor to support and guide their decision-making and behaviour. However, it can be a drawback for more experienced

non-mindful project team members because their confidence in solving problems may make them deviate from normal procedure which may bring potential risk to the workplace, especially those error-intolerant industry (Zhang and Wu, 2014).

According to Table 4.6, the mean MAAS score of respondents is getting higher and higher as their working experience is falling at a higher category. A possible explanation is that the mindfulness can be developed throughout the age as well as working experience (Dietrich, 2010). Fresh graduates who are working less than 1 year within the construction industry may not familiar with the working environment so immediately and thus, they would easily feel stress, nervous as well as unable to identify the correct behaviour due to harsh working characteristic in construction industry. Besides, although project team members with 1 to 5 years of working experience have significant higher MAAS score than the project team member with less than 1 years of working experience but they are just starting to develop their abilities for coping with the stressful working environment by repeatedly experiencing the processes where they encountered a problem until they found an effective way to resolve the problem. Therefore, their MAAS score is still significantly lower than the project team members with working experience of either 6 to 10 years or above 10 years. For instance, Mučenski et al. (2015) conducted a research to investigate the influence of workers' experience in construction jobs towards the occupational injuries. Their results revealed that young workers with less than 4 years of working experience are the higher risk group for workplace accidents or injuries in construction industry (Mučenski et al., 2015). The capability and ability of project team members in assessing risk are critically depending on their working experience, educational background as well as the knowledge of health and safety (Purohit et al., 2018). Therefore, we can make an assumption that project team members with less than 4 years of working experience have higher chance to engage in unsafe behaviours that may lead to accidents or injuries due to limited training, education or experience in practicing risk assessment and hazard identification. In addition, we also can assume that the cases can be worse if project team member with less than 4 years of working experience are working under stress, their attention and awareness may be distracted until conducted inappropriate decisions because their capability and ability in analysing and dealing with complex situation may not as mature as project team members with more than 5 years of working experience. Therefore, the MAAS score for the groups with less than 5 years of working experience are significantly different and lower than the groups with more than 5 years of working experience.

However, there is no statistically significant difference between the MAAS score of project team member with 6 to 10 years and more than 10 years of working experience. The mean MAAS score for project team members with above 10 years of working experience is the highest, 4.9222 but the mean MAAS score for project team members with 6 to 10 years of working experience is still comparable which is 4.6593. This may be because working for 6 to 10 years in construction industry is consider sufficient ability to cope with almost any situations, showing a kind of mindful mindset as compared to working for above 10 years. According to findings of Mučenski et al. (2015), we can assume that project team member with 6 to 10 years or above 10 years of working experience are likely to have sufficient knowledge and skills acquired throughout their careers in construction jobs for supporting them to pay full attention on their task and maintain moment-by-moment awareness of their thoughts, emotions and surrounding environment.

## **5.2 Stress, Safety Behaviour and Mindfulness**

Hypothesis 1, 2 and 3 predicted the relationship between mindfulness, stress and safety behaviour of project team members in construction industry and these hypothesis were tested using Pearson's Product-Moment Correlation Test. The correlation test yielded a statistically significant strong, negative correlation between stress and safety behaviour. Therefore, both  $H_1$  and  $H_{a1}$  are supported. This finding is in line with previous researches as stated in literature review section such as Lu and Kuo (2016), Huang et al. (2021) and Liang et al. (2022).

Wu et al. (2018) explained that working environment in construction industry is stressful due to the job itself, including huge workload, dangerous workplace, irregular working hours and so forth, causing construction personnel suffered from stress-related problems such as body pain, sleep problem, depression, helplessness and so forth, the most importantly is stress was found to have strong negative effect on safety behaviour of project team members like what the result shown in this research. One possibility to explain this result is that the attention to safety regulations and procedures were distracted and the awareness to surrounding hazards were affected when project team member were suffered from stress.

Jung, Lim and Chi (2020) revealed that excessive stress on work was found to have negative effect on safety behaviour by decreasing safety motivation. Yang et al. (2020) also further explained that people working under stress are likely to demonstrate low level of cognition, learning ability, memory and motivation than those with little stress. For instance,

project team members can be lack of interest on their work when they are working under stress, they tend to ignore the safety issues to get the job done as quickly as possible in order to relieve themselves from additional burdens. Because it is hard to progress faster while complying with safety regulations when project team members are facing tight deadline and huge workload, leading to accidents like falling, getting hurt by machinery and slipping.

Other than that, this correlation test yielded a statistically significant moderate, negative correlation between mindfulness and stress. Thus, both  $H_2$  and  $H_{a2}$  are supported. People with higher mindfulness are usually have lower stress as they are able to aware of their emotion and cope with the situation with appropriate strategies which also a kind of self-management positively impacted by mindfulness (Leung & Ahmed, 2019; Ramli et al., 2018). This kind of mindset based on mindfulness is very important for project team members as they are usually need to work and communicate with other people all the days, this could make them easily to aware of their status in terms of mind, body and feelings, leading to correct decision based on problem-focused mindset rather than emotion-focused mindset. Similar results by Leung, Liang and Yu (2016) revealed that mindfulness can directly reduce stress.

Project team members with higher level of mindfulness are more able to regulate their emotions in order to motivate themselves and recover faster from distress, leading to low level of stress (Bao, Xue and Kong, 2015). Mindful people are most likely to have “clearer” way of thinking when encounter difficulties than the less mindful people as they will mindfully focus on their task rather than remain within the state of nervous or overthinking. This may be because when something undesired incident was happened, mindful people are more easy to aware their state of mind and reconsider the worthiness of focusing on those stress-related elements and pay fully attention back to their task with attitude of acceptance.

Furthermore, mindfulness are positive associated with work-family conflict and work-life balance satisfaction (Althammer *et al.*, 2021), where work-family conflict and work-life balance are two major stress contributors for project team members who work in construction industry. Therefore, the project team member with higher mindfulness level are more able to reduce their stress level as they can pay attention to their task, whereas taking into account their own family as well as their personal life.

Moreover, this correlation test also yielded a statistically significant strong, positive correlation between mindfulness and safety behaviour. Thus, both  $H_3$  and  $H_{a3}$  are supported. This result is in line with Zhang and Wu (2014) which suggested that mindfulness could be a good predictor of safety behaviour. Other studies also further proved the results by indicating the mindfulness could improve safety behaviour because mindfulness is able to improve employees attention, making them focus on their task while aware of the hazards in the surrounding. This will cause the employees always comply with the safety SOP and motivate them to inform or warn other workers about their safety which will eventually improve the safety climate within the organization (Kao *et al.*, 2021).

Project team member with higher mindfulness are found to have better safety behaviour as well. A possible explanation is that mindful employees have higher tendency to follow the safety regulations and engage in safety activities like meeting, reminding co-worker about the safety-related issues as mindful employees have larger attentional breadth and higher awareness on the present task (Liang *et al.*, 2022). Therefore, they are more capable in making a suitable decision and regulating their own behaviour as well as enhancing the overall safety performance.



## CHAPTER 6

### CONCLUSION AND RECOMMENDATIONS

#### 6.1 Conclusion

This research output few conclusions according to objectives that have been made earlier. Firstly, working experience was proved to has positive association with mindfulness level of project team members who work in construction industry. Mindfulness can be further developed with increasing of work experience. The experience obtained from working more years in construction industry could be the best to use as a guide for project team members to make decision and regulate their behaviour. Besides, working experience also improved the project team members' awareness of problems as well as attention on present task and thus leading to improvement of mindfulness. For instance, mindful project team member with more experience are more capable to identify problems and pay full attention to cope with it or prevent it from happening again in the future. Specifically, a more experienced mindful project team member could improve the team productivity by monitoring and mentoring other team members' performance.

Other than that, this research has revealed that stress is negatively correlated with safety behaviour. Project team members who suffered from stress-related problems or symptoms would have unsafe behaviour because their awareness and concentration on present task were distracted. Therefore, the construction firms were encouraged to deploy relevant stress management courses for their employees as stress could be a good predictor for safety behaviour. The improvement of project team members' stress management not only improve their safety behaviour but also decrease the occupational accidents or injuries as well as enhance the safety climate within workplace.

Apart from that, this research has investigated that mindfulness is positively correlated with stress. Project team members with higher mindfulness can help them to regulate their emotion effectively. Self-regulation is good for project team members because they probably will not override by emotion but mindfully focus to solve the problems. In addition, project team members with higher mindfulness are more able to cope with stress-related health

problems. On the other hand, this research has revealed that mindfulness is positively correlated with safety behaviour. Project team members with higher mindfulness are less tendency to ignore safety regulations and will become more aware of the surrounding hazards. For example, if the project team members are decided to finish the task by allowing the construction workers to work at night without wearing proper personal protective equipment. The consequences can be worse, including happening of accident and injuries, the most importantly, the entire project can be affected. Therefore, mindfulness can help project team member to pay attention on the present task and aware of the safety issues.

In a nutshell, this research expands our understanding of the relationship between stress, safety behaviour and mindfulness of construction project team members in Malaysia and the results obtained clearly indicated that mindfulness is potential in assisting the reduction of stress and improvement of safety behaviour. This research also found that a person's mindfulness level can be moderated by working experience. Based on these conclusion, our research suggested that less experience construction project team members may be more in need of mindfulness-based training to help reduce some stress-related problems and prevent unsafe behaviour as they have less experience to support them to focus mindfully when working under such harsh characteristics in construction industry, while more experienced mindful construction project team members also benefit from such mindfulness-based training as mindfulness may further improve their performance whether in work or outsider the work. However, mindfulness is not well known from public's visions although the articles about mindfulness is consistently published but the number of mindfulness-related articles for construction industry in Malaysia is zero. This research is the first to identify the effects of mindfulness on construction project team members' stress level and safety behaviour. It contribute to our knowledge of mindfulness and perhaps these findings can be applied in an industrial context to improve the occupational health and safety among construction project team members.

## **6.2 Limitations**

The limitations found when carry out this research is listed as following:

1. Shortage of knowledge for the respondents.

The development of mindfulness in Malaysia's construction industry is still remain within infancy stage and thus the respondents are very limited to the knowledge of

mindfulness as well as the number of respondents who practice mindfulness also very limited. Hence, the accuracy of the result might be affected.

2. Imbalance of respondents.

The number of respondents obtained for gender, age, working experience, profession and mindfulness practice is relatively imbalance. Therefore, the imbalance of respondents might affect the accuracy of the result.

### **6.3 Recommendations for Future Research**

There are some recommendations can be made for future research to ensure a more comprehensive research. Firstly, it is recommended to involve not only quantitative research method but also include the qualitative research method in order to obtain more subjective information through face-to-face interview. Because there are many complex relationship in studying the mindfulness topic and thus we should not only depend on the numerical results but also try to obtain and interpret the qualitative answer from respondents. Secondly, it is recommended to study another job within another industry , because mindfulness currently is not only applicable for clinical context but also largely deploy for organizational context. On the other hand, if future research still consider to study mindfulness within construction field, it is recommended to investigate the mindfulness among different profession in construction industry. In this research, the profession of respondents were asked but the mindfulness among different profession was not investigated due to limited research timeframe, perhaps this question can be considered in future research. Other than that, there is lack of research about the mindfulness in Malaysia. Therefore, carry out more research in different region of Malaysia could expose Malaysia to more knowledge about mindfulness since different country can have different culture in different industry and the mindfulness of other country people may be different from Malaysia. Lastly, it is recommended to provide at least a brief mindfulness-based practice or intervention session for respondents who willing to participate in this research. This will help the respondents to understand more about mindfulness and perhaps this can help in improve the research accuracy as well.

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## Appendix

### Appendix A

Table 6.1 : Individual Survey

Code	Item
A1	What is your gender?
A2	How old are you?
A3	Which of following best describe your highest academic qualification?
A4	Which of the following best describe your profession in construction industry?
A5	Which of the following best describe your working experience in construction industry?
A6	Do you practice mindfulness?
A7	How long have you been practiced mindfulness?
A8	How often you practice mindfulness?

Table 6.2: Mindful Attention Awareness Scale (MAAS)

Please circle most appropriate numbers. (1=almost always, 2=very frequently, 3=somewhat frequent, 4=somewhat infrequently, 5=very infrequently, 6=almost never)	
Code	Item
B1	I could be experiencing some emotion and not be conscious of it until some time later.
B2	I break or spill things because of carelessness, not paying attention, or thinking of something else.
B3	I find it difficult to stay focused on what's happening in the present.
B4	I tend to walk quickly to get where I'm going without paying attention to what I experience along the way.
B5	I tend not to notice feelings of physical tension or discomfort until they really grab my attention.
B6	I forget a person's name almost as soon as I've been told it for the first time.
B7	It seems I am "running on automatic," without much awareness of what I'm doing.
B8	I rush through activities without being really attentive to them.
B9	I get so focused on the goal I want to achieve that I lose touch with what I'm doing right now to get there.
B10	I do jobs or tasks automatically, without being aware of what I'm doing.
B11	I find myself listening to someone with one ear, doing something else at the same time.
B12	I drive places on 'automatic pilot' and then wonder why I went there.
B13	I find myself preoccupied with the future or the past.
B14	I find myself doing things without paying attention.
B15	I snack without being aware that I'm eating.

Table 6.3: Perceived Stress Scale (PSS)

Please circle most appropriate numbers. (1=never, 2=almost never, 3=sometimes, 4=fairly often, 5=very often)	
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<b>Code</b>	<b>Item</b>
C1	In the last month, how often have you been upset because of something that happened unexpectedly?
C2	In the last month, how often have you felt that you were unable to control the important things in your life?
C3	In the last month, how often have you felt nervous and “stressed”?
C4	In the last month, how often have you felt confident about your ability to handle your personal problems?
C5	In the last month, how often have you felt that things were going your way?
C6	In the last month, how often have you found that you could not cope with all the things that you had to do?
C7	In the last month, how often have you been able to control irritations in your life?
C8	In the last month, how often have you felt that you were on top of things?
C9	In the last month, how often have you been angered because of things that were outside of your control?
C10	In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

Table 4.4: Measures of Safety Behaviour

Please circle most appropriate numbers. (1=never, 2=almost never, 3=sometimes, 4=fairly often, 5=very often)

<b>Code</b>	<b>Item</b>
D1	How frequent do you put in extra effort to improve safety of the workplace (e.g. reminding co-workers about safety procedures at work)?
D2	How frequent do you voluntarily carry out tasks or activities that help to improve workplace safety (e.g., attending safety meeting, receiving safety training)?
D3	How frequent do you follow all of the safety procedures for the jobs that you perform?
D4	How frequent your co-workers follow all of the safety procedures for the jobs that they perform?