A STUDY ON STRESS OF PROJECT MANAGER

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A project report submitted in partial fulfilment of the requirements for the award of Bachelor of Science (Hons) Construction Management

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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.

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APPROVAL FOR SUBMISSION

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Date : _____

Specially dedicated to
my beloved family members, supervisor and friends.

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A STUDY ON STRESS OF PROJECT MANAGER

ABSTRACT

Project managers are an important person in the construction industry who responsible to ensure a project completed on time, high quality and less cost. Due to the complex working task and environment, project managers often facing with stresses which could bring an effect to health or working performance. Stress is complex subject in the construction industry and it is not easily to determine inherent causes. Therefore, this study aim at investigate stress factors of project manager in the construction project management. Ten major factors are identified in this study, they are time issue, budget constraint, quality issue, authority issue, problem solving and decision making, cultural differences/ conflict, experience, sustainable issue and working environments. These factors are ranked to find out the most critical factors. According to the result, the three of the highest stress factors are Time Issue, Knowledge, Skill and Experience and Budget Constraint. Meanwhile, key stress factors also identified in this study so that project manager can be aware of the particular key stress factors. Few effective releasing methods are identified and ranked in this study. There are SWOT analysis, reduce stress with exercises, mindfulness-based stress reduction, emotional freedom techniques and biofeedback. After running analysis, the most significant stress releasing method is Reduce Stress with Exercise.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Construction industry is a fragmented and complex industry. It involves myriads of interrelated activities, tasks and work packages. Also, the schedule deadline is set tight. In addition to the tight schedule, the quality of the building has to meet the standards as stated in the agreements. The scenario is worsened when there are several parties involved in construction projects such as contractor, project management, architect, quantity surveyor and engineer (Chris, 2009).

Project manager is one of the key persons in construction project management. Project manager is facing explicit management practice such as decision making skill, project manager skills, cost management skill and etc. This is supported by Joshi (2014) that decision making is essential for a project manager to make decision in construction activities. According to Clear (2011), doesn't matter how talented a project manager is, if can't manage a project, the project manager is difficult to achieve success. Due to construction site often facing unforeseen problems, project manager is expected to be equipped with good problem solving skill. As a result, project managers are always stressed on making current decisions in real time construction project.

Over the decades, a lot of stress studies have been conducted to identify the causes of stress and its releasing methods. Stress is causing illness and health problem, affect performance and productivity (Smith, Segal and Segal, 2015). As

increasing demand on construction performance, project manager have normally experienced time pressure, budget constraints, quality and others. According to Campbell (2006), stress, anxiety and depression are formed under the construction working environment. It is not surprisingly that construction industry is one of the most pressuring industries (Torres, 2006). Therefore, project managers are always under stress and struggling to achieve project success. All of these would add up to one catastrophic issue in the construction site.

As a consequence, a study on project manager's stress is important to be carried out for the effort to generate a proper guidance and stress reduction plan.

1.2 Problem Statements

Construction is an industry that comprises several activities such as construction, alteration or repair (OSHA, 2015). In today's sophisticated world, construction industry becomes more complex and highly competitive in nature. The project is expected to be completed with least cost and high quality. Thus, construction company has to predict operational funding requirements and realize life-cycle cost reductions for competitive advantage (Smith, 2012). Then productivity in construction site is targeted and construction activities to be done in a smooth and correct manner in compliance with time, cost and quality criteria. Meanwhile, adoption of advance technology in construction industry also leads to increasing demand on production capabilities, productivity, and expand business services (Earl, 2002).

As today's world encounters with global warming and climate change, construction industry also focuses more on sustainability issues in means of its product, waste and environment management. According to World Green Building Trends survey (2013), 51 percent of respondent firms committed to incorporate more than 60 percent of their work in sustainability concern. Thus, most construction activities are expected to be carried out with more sustainable way. The implications

for today's construction industry, where one affects the other, stresses comes in and push project manager in this pressing working environment.

Project manager plays an important role in delivering a successful construction project. Thus, project manager is expected to be equipped with good leadership skills because he/she need to communicate with varying team members and leading them to ensure the project work smooth and completed within time. According to Levinson (2008), good project managers are able to head off problems that jeopardize deadlines, budgets and user acceptance, ability to focus on the big picture and to prioritize competing responsibilities. Meanwhile, project manager is responsible for managing a variety of projects related to the on-going advocacy, planning, and design (Verma, 1998).

As variety of roles and responsibilities, project manager seem like to manage every aspect of the projects, from resources and suppliers to project costs and equipment (Westland, 2010). Project manager is the one who is responsible for making all critical decisions. Meanwhile, he/she has to cope with many arising problems, and timely resolve it with best alternative. Furthermore, project manager is also expected to be responsible for the consequences of overall project failure. Hence, stress of project manager must be managed to ensure the project can be completed successfully. When the chain reaction of job stress be leveled up, project manager is suffering stress in terms of job performance.

Stress is a grooming and a cumulative problem to project manager. Stress is affecting project manager physically and mentally, which contribute great impact to the project manager (Flannes, 2010). Stress related physical illnesses that will bring a huge impact on human health. The physical impact such as heart attacks, chronic headaches that regulate heart rate, blood pressure and digestive system (Farlex, 2015). Moreover, stress is influencing human mental health. When stress occurred, people have difficulty thinking clearly, dealing with problems or handling the situation (Mtstcil, 2015). Stress has an adverse impact on project performance. They are suffering illness and health problems. This physical and mental effects bring long term stress to people which are affecting the work performance and health problem.

Stress can lead to mental slowness, difficult concentrating to work, difficulty thinking in a logical sequence and forgetfulness (Bressert, 2015).

If project manager distracted from work, the stress brought impact on health, such as headache, chest pain and sleep problems. The impact affecting the performance of work and increase the stress of project managers, all these are directly influencing the completion of work and causing a project delay. There is possibility of project manager commit suicide due to the stress faced from several areas (The Onion, 2005). Project manager must ensure construction work mentally and emotionally demanding and stressful (Brienza, 2012). Moreover, some of the factors such as time frame, limited budget has highly influenced a project completed on time. Around 12.8 million working days were lost in 2004/5 as a result of work-related stress, with each case of stress-related ill health leading to an average of 30.9 working days lost (HSE, 2005). So, stress factor should be identified to reduce the stress of project managers. Once stress factors are identified, it should able to avoid or to reduce rather than to worsen the stress phenomenon. Therefore, stress can be properly managed by project manager.

Due to such problems**,** a study of stress of project manager is important to be carried out. This is essential to identify factors of stress and method to release stress of project manager. By addressing out, this may help in releasing the stress of project managers.

1.3 Aim and Objectives

The aim of this study is to investigate stress factors and releasing method of project manager in Malaysia construction industry. In order to achieve the aim, following objectives are as follows:

I. To identify and rank the critical stress factors of project managers.
II. To identify the effective stress releasing method for project managers

1.4 Scope and Limitation

This study is limited to project manager which stress may affect their performance during construction management. Two targeted groups of respondents, they are project manager involved in private sector or public sector. According to Cooke and William (2016), project manager engaged by clients as their representative and principal adviser.

In order to achieve the aim and objectives of this study, the study focuses on the construction project which are located in Penang, Kuala Lumpur and Johor Bharu. because these are the largest cities in Malaysia. The rapid growth in population and construction activities as consequence of the urban development in the city. Most of these construction projects involve the mixed-use development such as residential, non-residential and high-rise building as integral part of the communities. This complex nature has potential to exert more pressure to project manager due to the substantial project size and wider project scope to meet.

1.5 Significance of Study

Stress is complex subject in construction industry and it is not easily to understand about inherent causes. This study is carried out to identify the factors that contribute to stress of project manager. The critical stress factor will directly influence project manager's productivity from work, lost focus and even can't pay full attention during working. Therefore, project manager is important to have knowledge on what causes stress. Once the factors are identified, construction project can be executed smoothly and effectively. The finding can help to find out the critical factors so that project manager can concentrate on these critical factors and manage them properly. The identification of critical factors is assumed can save their time on detecting the factors, so that they have time to focus on more important managerial activities.

Stress of project manager can be minimized but it cannot be avoided sometimes. Thus, the effective release method is needed to be carried out in this

study. Project managers can reduce the stress by using the effective releasing method. Project manager can focus more in solving other problem and focus on work. There are many forms of release method to cope with effectively. Hence, this finding is important to differentiate the methods can be used to reduce stress effectively which helps to enhance productivity, creating project harmony such as less stress working environment and minimized the stress factor faced by project managers.

1.6 Research Methodology

The research methodology has determined the phase of this study,which as followed by:

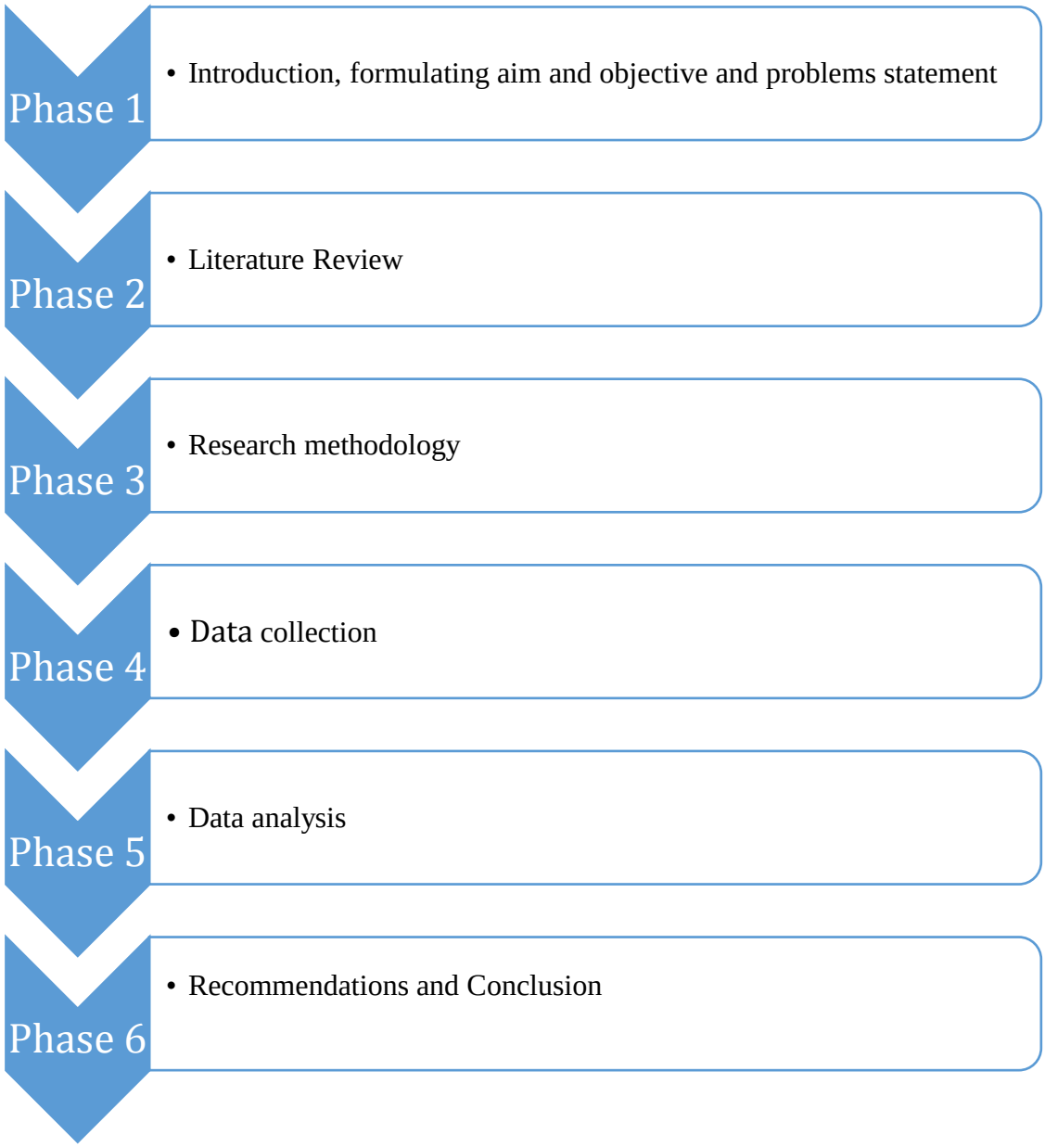

Figure 1.1: Research Methodology

1.7 Research Framework

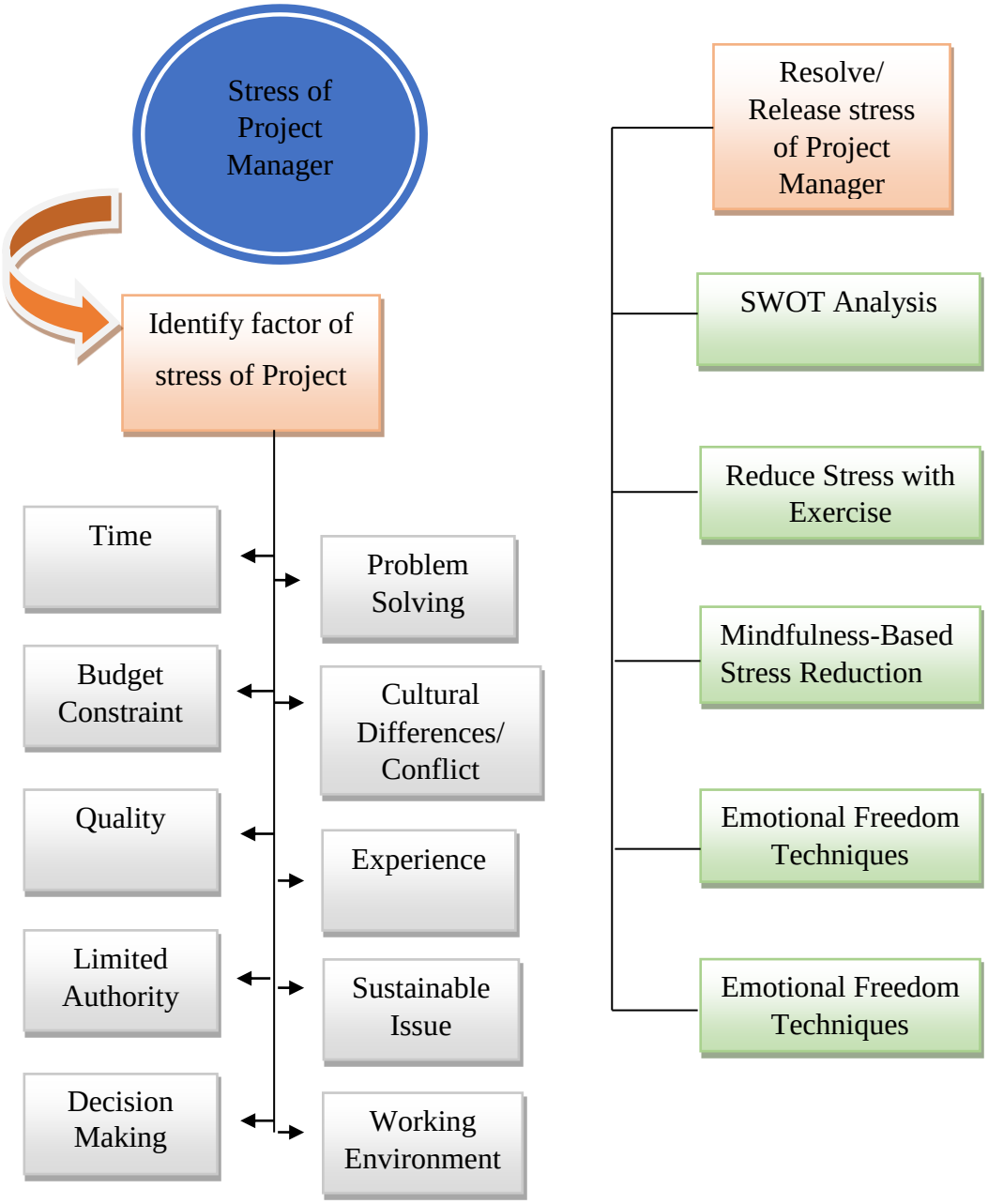

Figure 1.2: Research Flow Chart

1.8 Project Schedule

Table 1.1: Gantt Chart

Week / Activities	1	2	3	4	5	6	7	8	9	10	11	12	13	14
FYP Briefing	■													
Discuss Title with Supervisor		■												
Confirm and approval of fyp's title			■											
Introduction				■	■									
Literature Review						■	■							
Submission of FYP 1 progress report								■						
Preparation of presentation slide									■					
Oral presentation										■				
Research Methodology											■			
Submission of fop 1 final report, turning report, log report												■		
Research methodology													■	■

Chapter 2

LITERATURE REVIEW

2.1 Introduction

This chapter is mainly to discusses the definition of stress, occurrence and method to release stress experience of project managers. It also discusses gaining insights on project manager's job scope, and key characteristics in order to address the potential stress factors which are related to their job requirements. Stress can affect the performance of project managers, lower the productivity and damages reputation of the company. Through understanding the fundamental of stress in project manager, stress is expected to be captured and released.

2.2 Definition of Stress

Stress is defined as a state of psychological or physiological imbalance resulting between situational demand and the individual's ability or motivation (Tripathi and Sharma, 2013). People feel pressures in their own life, to work load associated with physiological and psychological. Stress can be considered as an inevitable and unavoidable component of life (Nayak, 2008). This study is described about the stress in construction industry by project manager.

Stress in construction sector generates problem among the workers. According to The Health and Safety Execution and Campbell (2006), stress as the

adverse reaction as a direct result of a person's occupation. In the other words, Stress represented strong effort, strain, pressure, or force (Cartwright and Cooper, 1997).

Therefore, stress is a condition or feeling experienced when a person perceives that demands exceed the personal ability, especially to the project manager in construction industry.

2.3 Symptoms of Stress

Stress is a fact of life for most people. According to Smith, Segal and Segal (2015), stress affects the mind, body and behaviour in many ways. Individual have the same response to all kinds of stressor. Project manager can recognize the signs and symptoms of stress and taking steps to reduce its impact. Bickford (2005) states that stress is an ordinary and adaptive reaction to stressor, human bodies are responding to react to stress.

Human bodies have the same response to all kinds of stresses such as experiencing stress a long time. Project managers start to exhibit symptoms and signs to deal with the stress. This signal can be cognitive, emotional, physical or behaviour in essence, as shown in the following table:

Table 2.1: Stress Warning Signs and Symptoms (Smith, Segal and Segal, 2015)

Stress Warning Signs and Symptoms	
Cognitive Symptoms	**Emotional Symptoms**
• Memory problem • Inability to concentrate • Poor judgment • Seeing only the negative • Anxious or racing thoughts • Constant worrying	• Moodiness • Irritability or short temper • Agitation, inability to relax • Feeling overwhelmed • Sense of loneliness and isolation • Depression or general unhappiness

Physical Symptoms	Behavioural Symptoms
• Aches and pains • Diarrheal or constipation • Nausea, dizziness • Chest pain, rapid heartbeat • Loss of sex drive • Frequent colds	• Eating more or less • Sleeping too much or too little • Isolating yourself from others • Procrastinating or neglecting responsibilities • Using alcohol, cigarettes or drug to relax • Nervous habits

When project manager have cognitive, emotional, physical and behavioural problem as per above discussed, the project manager may facing with stress.

2.4 Types of Stress

According to CDC (1999), challenges inspire people physically and psychologically and indirectly motivate people to master jobs and gain new skill, this can improve work productivity. Feloni (2014) has common opinion about stress can be significant motivated element for individuals. Therefore, stress is a significant composition of productive works.

According to Selye (1936), stress is the non-specific response of the body to any demand. Stress can highly influence project manager's work productivity. Therefore, stress is categorized into three, namely, Eustress (Good stress), Distress (Bad stress) and the Yerkes-Dodson Principle (1908).

In short, whilst excessive stress is influencing project manager's poor performance.

2.4.1 Eustress

Eustress inspired and motivate people in eustress (Seaward, 2010). When there is positive stress, project manager feel motivate and inspire to complete a project. This helps to improve the productivity of the work. Seaward (2010) also stated that circumstances that are assorted are amiable, such as pleasurable and satisfying experience.

Eustress enhances mental alertness, increase awareness, excellent behaviours and cognitive performance. Project manager feels motivated and able to work without stress. This stress can improve work performance and the project would also complete on time. Eustress motivates an individual to create a work of art, other urgently needed medicine and scientific theory (Rice, 1999).

Eustress contributes a good stress to project manager, but project manager also experienced a distress during construction.

2.4.2 Distress

Distress is interchangeable terms (Rice, 1999). The general perspective of stress is negative. Distress can be referred to the negative impact of stress, it is damaging or unpleasant stress. For example, fear, anxiety or worry is a negative impact of distress (Selye 1956; Rice 1999). Distress is interchangeable into two categories, namely acute stress and chronic (Seaward, 2010).

Acute stress is a short term stress (Dhabhar, 2012). Because of short term, acute stress is unable to extensive damages. Acute stress comes from demand and pressure from past to now. Chronic stress is a repeated exposure to situations. According to Bickford (2005), chronic stress is elevated hormonal base levels, emotional vulnerability, hyperactivity of the autonomic nervous system and persistent negative emotions. For example, one of the family members of project manager has heart disease, diabetes or high blood; the chronic stress can flip on these

health problems. Development of illness and disease is resulting chronic stress to the project manager.

So, distress is interchangeable in terms of acute stress and chronic stress. Other than this, Yerkes and Dodson Principle (1908) bring an impact for project managers to increase their productivity.

2.4.3 Yerkes-Dodson Principle

Yerkes & Dodson (1908) described the connection between performance and stress. The Yerkes and Dodson Principle indicate to point the stress is useful, health and benefits too. The stimulus of stress response to success, this is because the performance can be increased as stress level increase.

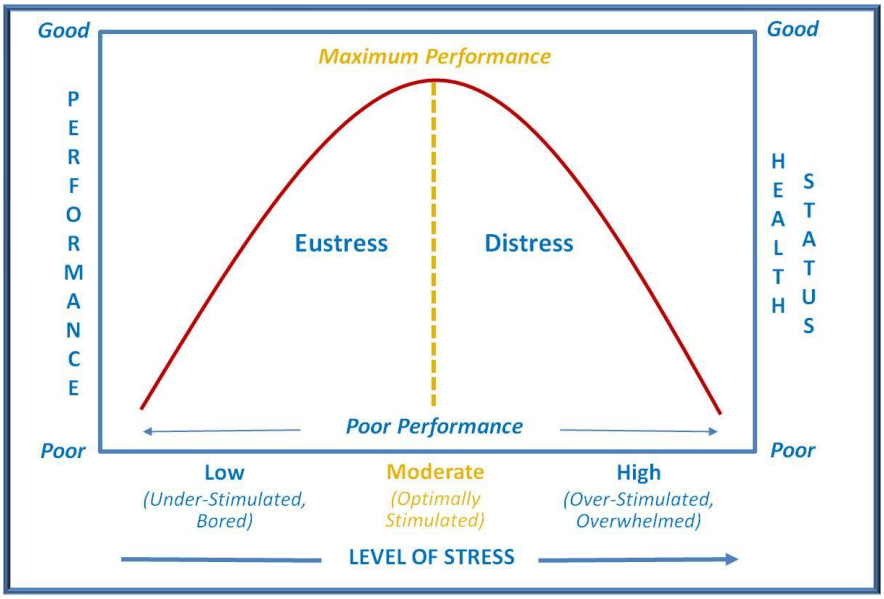

Figure 2.1: Yerkes-Dodson Curve (1908)

The Yerkes-Dodson Curve (1908) indicates that at a particular point, arousal or stress can increase performance. Rice (1999) indicates that midpoint between eustress and distress is the best when arousal is optimum. Project manager feels

motivated when the performance increases with low stress in eustress. The distress experienced by a project manager with high level of stress decreases the work productivity and performance of the project. Too little stress is just as bad as too much. Thus, the aim of stress is to manage it so an optimal level of stress.

2.5 Source of Stress in Workplace

In the workplace, project manager's stress can be the result in any situation. According to Murphy (1995), stress can be identified by the factors unique factor to the job, role in the organization, career development, relationships at work (Interpersonal), organizational structure/climate and work-life balance as shown below table:

Table 2.2: Sources of Stress (Murphy, 1995)

Categories of Job Stressors	Example of Sources of Stress
Unique factor to the job	• Workload (overload or under load) • Pace/ variety • Autonomy • Shift work/ hours of work • Skills abilities do not match job demands • Lack of training and/or preparation • Lack of appreciation • Physical environment (noise, air quality) • Isolation at the workplace
Role in the Organization	• Role conflict (conflicting job demands, multiple supervisors) • Role ambiguity (lack of clarity about responsibilities) • Level of responsibility
Career Development	• Under/over promotion • Job security

	• Career development opportunities • Overall job satisfaction
Relationship at work (Interpersonal)	• Supervisor (conflict or lack support) • Coworkers • Subordinates • Threat of violence, harassment, etch • Lack of trust • Lack of systems in workplace available to report and deal with unacceptable behaviour
Organizational structure/climate	• Participation (or non-participation) in decision making • Management style • Communication pattern (poor communication) • Lack of systems in workplace available to respond to concerns • Not engaging employees when undergoing organizational change
Work-Life Balance	• Role/ responsibility conflicts • Family exposed to work-related hazards

2.6 Stress factors of Project Manager

Project manager is a key person involved in the construction management activities which have overall responsibility for the successful project and manage the project from start to finish (Ahn, 2015). Project manager is responsible for well-developed cost effective project plan in order to ensure timely completion within budget. He/she must make sure that all the aims and quality standards of the project are met and ensure the scope of each project is defined properly. Project manager must able to implement schedules to meet deadlines and has analytical skill to solve problem and make decisions to ensure the project goes on time. Project manager is also important

key coordinator in a project team which consists of many other professionals such as architect, engineers and sub-contractors (Sokanu, 2015).

He/she also responsible to delegate tasks and maintain trust and good communication with other organizations in project team (Telegraph, 2015). The ability to effectively negotiate and use persuasion is needed to ensure the success of the team and the project. Project manager monitoring and controlling process, oversees all the tasks, review progress after initiating planning and executing a project. Project manager manage and oversee the day to day construction management of the project, keeping stakeholders up to date on progress and on-going documentation contributes to project success (Villanova University, 2015).

Construction is a most dangerous land-based work sector in the world. The general roles and responsibilities of project manager as discussed above have further causes to many stresses to project manager. From the perspective of project managers, stress can be defined as anxiety produced which it is difficult to cope with their job task. Stress happens when an imbalance of job demands on a worker and his/her capacity to meet such demands (Blaug, Kenyon & Lekhi, 2007). As project manager is key person to determine for the success or failure of a project, factors affects the project manager in stress is important to be discussed. From the literature review, stress factor can be divided into twelve sections as per below:

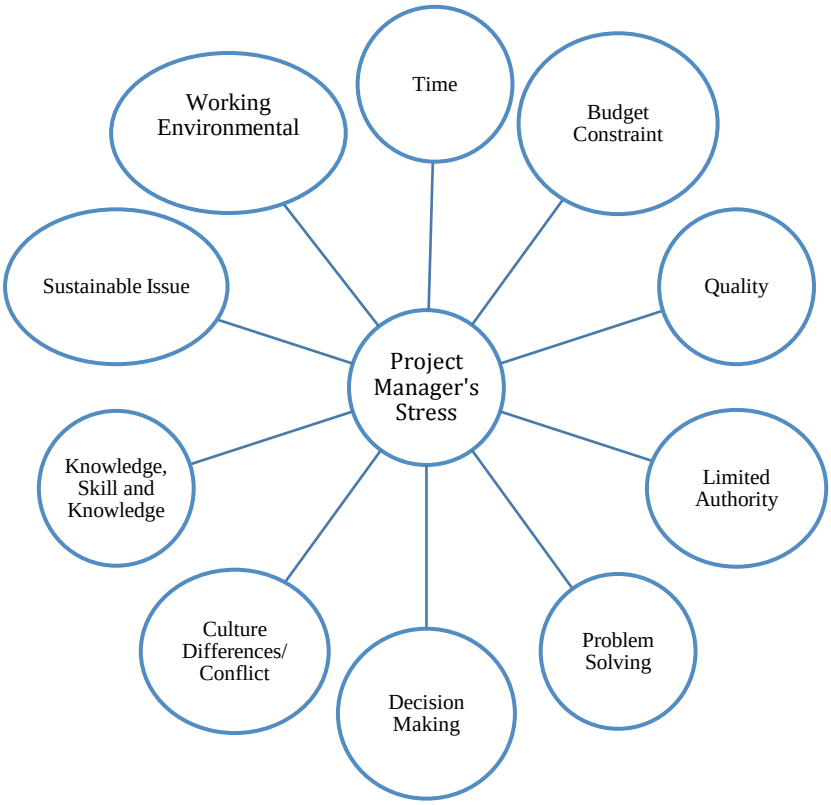

Figure 2.2: Stress Factors of Project Manager

2.6.1 Time Issues

Construction contract period is normally temporary which lasted for fewer years. There is a challenge to complete the project within the short contract period as project manager have to accomplish (Ohlendorf, 2001). Thus, time management is important issues to be managed efficiently by project manager (Sasson, 2015).

Project manager should plan the schedule with sequence and rational logic to ensure the project flow is smooth. Project manager must evaluate a proper timeline for a project as an initial effort to avoid unrealistic deadline of tasks to be planned. If project manager is unable to assign tasks on proper time, this might lead to delays and end up with stress.

Delay is one of the biggest problems and often experienced by project managers. Failure of time management leads to delay of work in construction project

(Shaban, 2008). Project manager responds to work delays and emergencies. They are also response to stress when construction project is unable to complete on time because they need to take the responsibility of the consequences. According to Tukel and Rom (1995), the majority of large-size projects are failed to meet their deadlines. Project manager stresses up with delay issue, they are unable to handover within the time constraint. Delays can cause a negative effect such as loss of productivity and increased costs.

In the construction industry, the completion of a construction is affected by the performance of the project manager. Limitation of time such as time pressure confronts the project manager. If project manager is unable to assign tasks on time, this might lead to compensation and prolong the work project, affect the reputation of the company and the quality of the project. So, time management is important in construction stage, it leads stress to project manager.

As a result, time management is important. It allows project manager to plan and control in order to accomplish goals.

2.6.2 Budget Constraint

Budget constraint is considered as one of the most stressful situations experienced by project managers. Construction industry is very competitive and high risk business. A construction business started a project with the purpose of making profit (Leslie, 2013). Budget constraints may influence project manager to manage a project and decide to proceed with project. They allocate money with the proper way to avoid any claim due to the money paid by the client is lump sum. If project manager able to manage efficiently, he/she can make more profit.

Cost of raw materials is a key element in the cost of the product. Due to economic downturn and material shortage, price of material will be increased. The unexpected material cost will result on project cost overrun, which may cause stress to project manager. As technology advance, machinery along with technological

advances will differ from previous. Project manager needs to spend more money to hire machinery to speed up and shorten project time. Machinery depends on current value and has an expensive idle time on hiring machinery (CAT, 2016). Project manager needs to consider the hire rates of machinery which may bring huge stress to him/her.

As short, budget cost affects project completion and is bringing stress to project manager.

2.6.3 Quality Issues

Stress levels among construction professionals are gradually increased from days to days result in physical, psychological and behavioural consequences (Clinic, 2013). Quality is one of the factors that bring stress to project manager.

Quality is defined as the product or service provided to meet customer requirement (Techtarget, 2015). With the high demand in the construction industry, project manager need to fulfil the requirement of client such as construction design, material use and others. Quality brings big effect to project manager because good quality resulted from a good product, this can directly boost a reputation of a firm. Once the quality is affected, it might lower customer satisfaction and damage the reputation of the company as the result of decrease in revenue, unexpected expenses and loss of market share. So, project manager is stressed when incapable to deal with other specialties which lead to the reputation of the project.

Inspection is important for project managers to monitor the work progress as the inspection is physical examination of a property or commodity. It is to ensure the project is meeting standard requirement and ensure the quality of the work (Investor, 2015). On the other hand, project manager need to recognize problem occurred on site to meet standard quality which required by clients and other professionals. These issues bring stress to project manager.

2.6.4 Limited Authority

Most projects are organized in matrix-structure systems, which are grouping different specialties to support the project manager (Kliem and Ludin, 1992). Authority of project manager may vary depending on the structures it brings an impact to project manager. Project managers with the insufficient authority are unable to give any instructions, the expectation of outcomes might lead the project quality to become lower. Project manager should be empowered to make project decisions. Authority is the power of a person to give orders or make decisions (Webster, 2015). According to Harrison (1992), the matrix form of project organization conflicts with traditional organization theory in many ways. Project manager is given authority to select resources, give instruct and monitoring and controlling the project. Limited authority causes stress on project manager.

In Malaysia, project manager has limited authority on task. The instruction might given by other authorities, which some may not understand the project progress and procedure. This problem causes to a construction delays, incur higher cost to overcome the problem. Variety of instruction given by different specialise causes the outcomes the project quality become lower. Result in less qualified project manager being delegated to a project, confusion and conflict over roles and responsibilities to preview the project performance are the most important challenges in an organization (Kuprenas, 2003). Authority can improve the possibilities of gaining control in stressful situations, influencing the work situation through relevant decisions (Zika, Sundström & Engwall, 2006). Project managers can improve the work productivity throughout correct decision and contribute high responsibility and accountability for the project's success.

Project managers often stress with low authority and reduces the project manager's incentives to distort, and hence the loss of quality of work.

2.6.5 Problem Solving

Project manager's stress with problem solving in site. Project manager needs to identify each problem with analyzing several alternatives, then choose the most alternative solution to solve the problem as soon as possible to avoid the work progress delay which may lead stress to project manager. He/she can use established tool and technique for solving the problems. Project managers good in problem solving helps to build reputation in an organization. Problem solving and provide the foundation and framework for continual improvement (Schiller, 2015). Moreover, project manager has to liaison with other professional from different background to understand the requirements of the problem solving proposal, they might disagree with the decision made by project manager. When the stress is excessive, it may lead to employee health problem and affect the performance of the project manager.

2.6.6 Decision Making

Decision made by project manager is important to construction management. Project manager has to make immediate decisions when confront with emergency situation (Verma, 1998). Project managers often stressed with decision making because they need propose a best solution to the issue.

Project manager decides rationally about different aspects of the project, and discuss the problem with his team member. Judgement is primarily based on situations, so project manager needs to gather relevant information, look out for the constraint and limitations, analysis and implement the decision. Project managers are required to identify the problem and generate possible solution and evaluate the strength and weakness of each problem (Huitt, 1992). This stage is important for project managers to identify the correct decision and setting a time to implement the decision.

Project manager should aware that the risk involved in the project is important for solving a problem. All these issues are potential causes stress to project manager.

2.6.7 Cultural Differences/ Conflict

Project in construction usually involves people from different background and culture. Conflict is always happened in such environment. Project manager has difficulties to manage the members from different cultural background. The conflict is psychological struggle, often unconscious and resulted from the opposition or simultaneous functioning of mutually exclusive impulses, desires, or tendencies (Shaw and Martin, 2010).

According to Verma (1998), project team members interact to complete their tasks and responsibilities, there is always a potential for conflict due to culture differences. It is very hard to gather all the specialties work together arising from different culture because every specialty has a different perspective. Sommerville and Langford (1994) said that cultural difference of people could be causing delays in progress, changes in functions, financial and budgetary issues, and various contractual obligations.

Conflicts arise for several reasons such as poor communication skill and different expectation. Project manager's stress is significantly related to conflicts because he is the important person to deal with conflict in the project.

Quality of the team work is important and must improve in a consistent basis (Curry, 2015). Teamwork is important to all specialties, because gather them together to produce a project in high productivity and quality of the job. According to Verma (1998), project managers must develop effective communication skills to operate the team work so that project manager must handle communicate with efficiency and effectiveness and it bring some stress to him.

In short, conflict is an important factors causes stress to the project manager because he should resolve the conflict to ensure project smoothness within constraints.

2.6.8 Knowledge, Skill and Experience

According to Project Smart (2015), an experienced project manager should handle the project until the project completed. Project manager has the responsibility for any safety measure, worker's injury and comply with project standards. An experienced project manager is inspired with shared vision, good communicate and integrity with subordinates, ability to delegate tasks to subordinates and good problem solving skills. However, project manager with less experience are likely to underperform especially productivity of work (Quinones et al, 1995). This can be explained by the growth in knowledge and skill is related to years of experience on the project management. Without sufficient experience, project manager tend to stressful because their low performance.

2.6.9 Sustainable Issue

As today's technology advance, the current construction industry is preferred to implement sustainable building to meet client standard and requirement. Sustainable is adoption of building designs, methods and materials that require fewer resources and increase the reusability of such materials and product for the same or similar purpose (Tan, 2007). Sustainable management of wastage, material and product is encouraged in construction project, hence, it brings some stress to project managers to implement them.

Waste is a serious problem in construction and harmful to the environment and human health. Project manager needs to improve waste management in more sustainable way for example, reuse and recycling the materials (Koskela, 1992).

Sustainable materials are the resource to mitigate the impact on the environment which may indirectly bring stress to project manager (CalRecycle, 2014). This is because to select appropriate materials become new responsibilities for project managers (Nassar, Thabet and Beliveau, 2003). Stress occurred when a project manager is failing to select suitable material for construction projects.

2.6.10 Working Environment

Stress is closely related to working environment in construction industry (Tolley, 2015). Environmental stress is created by several factors, such as heat stress, noise pollution, water pollution and others.

Health hazard is an important issue in the construction industry. Health problems can affect project manager influenza, depression, and heart disease, need higher medical costs to cover up. Health problem also causes a project manager can't pay full attention on a project, this might lead to lower quality of work. Heat stress is occurred when people cannot maintain a healthy temperature (Better Health Channel, 2012). Project manager who are exposed to extreme heat or work under hot environments may has heat stress. Heat stress can result in illnesses and injuries, heat stroke, heat exhaustion, heat cramps or heat rashes (OSHA, 2015).

Noise pollution is created by machines and plant on site which can be annoying, distracting, intrusive, and/or physically painful (Eco-Healthy Child Care, 2010). Construction activities such as mining, construction of the bridge, dam and others tend to make noise pollution also cause to stressor (Conserve Energy Future, 2013).

Construction activity is to renovate, refurbish or construct structures on a piece of land (NSW, 2015). Air pollution is huge problem related to working environmental and brings stress effect to project manager. According to Woodford (2014), air pollution cause the health hazard to people and project manager needs to consider this factor to his project.

As a summary, environmental lead a problem to project manager and this might result a stress effect.

2.7 Impact of Stress

According to Jensen (2015), the experience of stress is not only affecting the cognitive and behavioural performance, it can also have a negative impact on health, wellbeing, and family life. Stress can lead to health problem, either psychology or physiology.

Stress often accompanied by an array of physical reactions, our bodies has the same responses to all kinds of stress. This signal can be physical, psychology or behaviour in essence, as shown in the following table:

Table 2.3: Common Effect of Stress (Clinic, 2013)

Common Effect of Stress		
On body	On mood	On behaviour
• Headache • Muscle tension or pain • Chest pain • Fatigue • Change in sex drive • Stomach upset • Sleep problem	• Anxiety • Restlessness • Lack of motivation or focus • Irritability or anger • Sadness or depression	• Overeating or under eating • Angry outburst • Drug or alcohol abuse • Tobacco use • Social withdrawal

Based on the table, stress is affecting an individual physically, psychology and behaviour.

Headache and muscle tension happen to project manager during working hour. This can cause mild or moderate pain in the head, neck, and behind the eyes

(Higuera, 2012). Project manager cannot concentrate well during construction sites, it is very dangerous in terms of safety or completes a project. This might lead to construction delay and project manager need more money to cover it back whereby chest pain is leading to heart problem, many other, less serious conditions can also cause chest pain (Moores, 2015). It is not only related to a heart problem, but also caused problems in the lungs, oesophagus, muscles, ribs, or nerves (Pennstatehershey, 2014). Besides, fatigue makes people feel tired and lack of motivation to do anything. When project manager feels fatigue, they often give wrong instruction to the project workers (Dugdale and Wang, 2015). To avoid this, project manager is required to sleep more. According to Powell and Copping (2010), insufficient sleep is a major work-related accident, but a common problem is that individuals do not understand fatigue or its consequences or both. Hence, enough sleep is very important for project managers.

Furthermore, stress resulting from an individual's psychologically. Stress resulting from anxiety, this is a serious mental illness. People feel anxious, or nervous, when faced with a problem at work, before taking a test, or making an important decision (WebMD, 2015). Restlessness is one of the most common symptoms of anxiety resulting from panic, twitter or flurry and causing unforeseen happen. Project manager is required to rest more to avoid any unforeseen problem happen. While project manager facing with stress, they often lack motivation or lack of focus in certain task and resulting occurrence in construction. Also, irritability is one of the components that stress a project manager. Irritability is stress triggers mental and emotional problems cause a project manager feels frustrated easily and affecting individual psychological (Smith, Segal and Segal, 2015).

Stress not only resulting from physical and psychological, it also resulted from human behaviour such as overeating, angry outbursts, drug or alcohol abuse, tobacco and social withdrawal. Stress affecting health problem, put health at risk. According to Fitday and Knolls (2013), overeating affect mental health, self-esteem, social and family life which causes ill health effects, such as obesity, and health risks, including diabetes, hypertension and heart disease. When people feel psychological stress and sadness, shame, loneliness, anger or fear, they will eat non-stop to fulfil their desired. Meanwhile, an angry outburst is a normal emotion and has a significant

distress in all human beings. When people feel stress, they tend to take some drug or alcohol or tobacco to release their stress. However, drug, alcohol and tobacco very harmful to human's health problem, such as increased on-the-job injuries and loss of productivity, disability, disease and preventable death to people's health (Tobacco, 2015). Other than that, smoking also can cause lung cancer, cancer of the oral cavity (mouth), cancer of the pharynx (throat), stomach cancer and etc.

As a summary, impact of stress can damage a human's health, affect their lives and mental. The impact of stress resulted from physical, psychological and behaviour.

2.8 Resolve/ Release Stress of Project Manager

Stress can be motivated or declining the overall performance of the construction, it also can influence on health, wellbeing and life. Project manager is required to cope with stress, it is important to manage the stress before the stress is difficult to handle and manage.

Many techniques can help to manage stress of project managers, these techniques should be explored to cope with stress which facing by project manager. They require setting priority in which assign every task based on its urgency and importance. Project manager is required to use SWOT exercise and others to reduce stress.

2.8.1 SWOT Analysis

The Centre's for Disease Control and Prevention (CDC, 1999) puts the problem in insufficient sleep is a public health epidemic. Project manager can develop SWOT analysis to determine the project and human resource to reduce stress (Joshi, 2014).

SWOT analysis can reduce the stress. Strength and Weakness are internal analysis whilst Opportunity or Threat is the external environment.

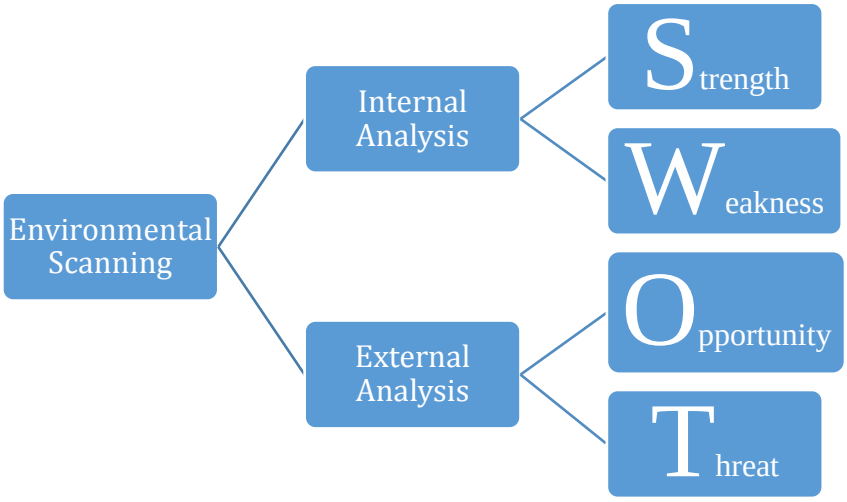

Figure 2.3: SWOT Analysis

According to MSG (2015), strengths are the qualities that enable the project team to accomplish mission. Strengths are positive of the organization, which includes competencies, process capabilities, resources, products and services, customer goodwill and brand loyalty (Kumar, 2013). The project manager is able to analyses strength and gets the point of view of others, such as employee or other specialties to reduce the stress.

Weaknesses deteriorate influences on the project success and growth, decrease in the strength (Kumar and Conrad, 2015). It is controllable, which may be depreciated machinery, insufficient research and development facilities must be minimized and eliminated (MSG, 2015). When a project manager is unable to complete the work within the time given or compliance with standard, stress exist. Project manager needs to work through to identify the stress and coping with it.

In the other hands, opportunity allows project manager to take benefit of conditions to plan and execute strategies, gain competitive advantage that are

presented by the environment or arise from market, competition, industry or technology (Society and MSG, 2015). Project manager can used opportunity to determine sufficient resources and technology used in construction site. Hence, project manager is required to advantage of these opportunities to improve stress management.

Project manager should recognize the negative consequences of managing stress poorly. In the threats section, stability and survival can be at stake. Threat arises when external environment such as material shortage jeopardize the reliability and profitability of work which affect project manager (Kumar, 2015). Project manager needs to update about the technology used and ensure sufficient material is provided, ensure sufficient skill of labour in the construction industry.

Project managers should use SWOT analysis as a guide to formulate and make decisions.

2.8.2 Reduce Stress with Exercises

There are few techniques could be effective in stress reduction, namely deep breathing, progressive muscle relaxation, and visualization/imagery. This can help project managers improve the work productivity and increase performance.

According to Ruth and CCI (2012), take a deep breath can calm someone down in a crisis. Project managers can take a deep breath and practice progressive muscular relaxation that is useful for relaxing bodies when muscles are tense. When the project manager's muscle tension, he can relax his body by relaxing muscles. Besides, visualization or imagery is a powerful method of stress reduction for project manager by creating an imagined situation in mind (Mills, Reiss & Dombeck, 2015). Project manager can release stress by imagining something that is good and positive. This can help project manager escape from a busy day or a stressful situation (Daun-Barnett and LMSW, 2014).

Therefore, project manager can reduce stress by exercising in deep breathing, to relaxing his body and imagine a positive mind set to improve performance. Meanwhile, project manager can plan for some physical activities such as jogging, cycling to work off stress. He/she can ride a bike to work to refresh the mind due to exercise can release our body machine and eliminate the stress.

2.8.3 MBSR

Mindfulness-based stress reduction is a program that incorporates techniques such as meditation, gentle yoga and mind-body exercises to help people cope with stress (Mindful, 2015).

According to Mindful (2015), mindfulness makes greater clarity on what is happening, improving problem-solving and boosting concentration. Project managers understand a problem and getting a solution to improve and reduce stress. Other than that, mindfulness can helps in pay attention and be aware of surroundings, emotions, thoughts, and body feels (WebMD, 2015). This helping project manager focus on work task, pay attention on construction stages and notice his emotion.

According to Saki (2015), MBSR can focus on the body to determine tense or pain, focus on thoughts and distractions for awareness of the unity of mind and body. Project managers can take practice to determine stress and release it.

2.8.4 EFT

Emotional Freedom Techniques or EFT is another technique used to attract attention, emotional intensity and discomfort to optimize emotional health (Energy therapy and Mercola, 2015).

According to Mercola (2015), EFT can reduce negative emotions of project manager, reduce or eliminate food cravings and pain and implement positive goals because construction industry is the most complicate industry in Malaysia. When a project manager is stressed, he will bring a bad attitude to his job. By solving this problem, EFT is recommended to reduce stress of project manager as this technique is simple to use. EFT can help in reducing the stress of project manager to avoid stresses from emotional issues.

In addition, EFT treatment involves fingertips at the end point of energy meridians and it is non-invasive of making changes as simple as possible. EFT functions to remove such disturbance and eliminate the resulting emotional response, concentrating on the specific problem whilst tapping with fingers and promotes energy system to the body's learnt response or negative emotion (Energy Therapy, 2015).

Thus, project manager needs to take stress management seriously and optimal health to improve performance. EFT is an effective technique to help project managers to eliminate stress.

2.8.5 Biofeedback

Biofeedback is another technique that helps the project manager to eliminate his stress. According to Roberts (2015), biofeedback is a method of treatment that uses a monitor to measure patients' physiologic information. Project managers can control his body’s function by using this technique. This involves training patients to control physiological processes such as muscle tension, blood pressure or tension headache (Nordqvist, 2014). Project manager is tension with huge workloads, this technique can help a project manager to eliminate the workforce by therapy.

Biofeedback is now used to treat a wide variety of conditions and diseases, including stress, alcohol and other addictions that are effective for a range of health

problems (Roberts, 2015). This can determine the type of stress of project manager and health problem such as headache, heart disease or others.

There are several types of biofeedback therapy, namely thermal biofeedback, Electromyography and others (Nordqvist, 2014). Thermal biofeedback teaches patients certain relaxation and mental exercises which can reduce stress of project manager. By using this technique, project manager are able to release the stress and tension. Meanwhile, electromyography is another technique that commonly used to eliminate the stress problems which assess the health of muscles (LMT, 2014)**.** This therapy helps a project manager to reduce his muscle tension. Project managers can reduce stress by using therapy provided by biofeedback.

Moreover, therapists can measure performance by attaching electrodes to the skin and displaying the processes on a monitor so that project manager can reduce stress by technique and increase performance of jobs (Nordqvist, 2014). According to WebMD (2015), biofeedback therapist helping in practice relaxation exercises, which allow human to fine-tune to control different body functions. Thus, a project manager might use therapy above to eliminate stress and solve problem.

Thus, project manager can reduce stress by using SWOT analysis to reduce stress with exercise, MBSR, EFT and biofeedback in order to increase the work performance and productivity.

2.9 Action Plan

Anschuetz (1999) revealed that these signs do not take place all at once, but through several phases, from the warning stage to severe/ debilitating cumulative stress reaction, which explained the following table:

Table 2.4: Action Plan (Anschuetz, 1999)

Phase	Sign/ Symptoms	Action
Phase 1- Warning Early warning sign are often more emotional than physical and may take a year or more before they are noticeable	• Feelings of vague anxiety • Boredom • Apathy • Emotional fatigue	• Talking about feelings • Taking a vacation • Making a change from regular activities • Taking time for yourself
Phase 2- Mild Symptoms Warning signs have progressed and intensified. Over a period of 6 to 18 months, physical signs may also be evident	• Sleep disturbances • More frequent headaches/ colds • Muscle aches • Intensified physical and emotional fatigue • Withdrawal from contact with others • Irritability • Intensified depression	• More aggressive lifestyle changes may be needed • Short term counseling
Phase 3- Entrenched Cumulative stress	• Increased use of alcohol, smoking, non-prescription drugs • Depression • Physical and emotional • Loss of sex drive • Ulcers • Marital discord • Crying spells • Intense anxiety • Rigid thinking • Withdrawal • Restlessness • sleeplessness	• The help of medical and psychological professionals is highly recommended

Phase 4- Severe/ Debilitating Cumulative Stress Reaction This phase is often considered "self-destructive" and tends to occur after 5 to 10 years of continued stress	• Careers end prematurely • Asthma • Heart conditions • Severe depression • Lowered self-esteem/ self-confidence • Inability to manage personal life • Withdrawal • Uncontrolled anger, grief, rage • Suicidal or homicidal thinking • Muscle tremors • Extreme chronic fatigue • Over-reaction to minor events • Agitation • Frequent accidents • Carelessness, forgetfulness	• significant intervention from professionals

2.10 Summary

This chapter had reviewed the definition of stress completed. Stress is important to be identified to avoid any unforeseen. Moreover, **t**his chapter also discussed the role carried out by project manager which playing an important role in the design team, construction project and others. Thus, stress factor is needed to be reduced to ensure project work smoothly.

However, this stress can reduce by implementing several reduce/releasing method. All of them are similar and with the same purpose to reduce the stress of project manager. Meanwhile, the impact of stress also carried out in this chapter to increase the awareness of project manager in stress. The impact will influence project manager‘s physical and mental. Thus, stress must be managed.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

In the previous chapter, the important of this study has been presented. This chapter describes the methodology used in carrying out in this study to achieve the aim and objectives of the study. Research methodology is the process used to collect information and data for the purpose of making business decisions.

In this chapter, the methodology is detailed out and explain. The objective of this study is achieved by gathering information in literature review and followed by the questionnaire survey conducted to the project manager in construction sites. There are various types of methodology such as interviews, survey questionnaire observation and other research techniques.

3.2 Research Design

Research design is a plan for connecting the conceptual research problem to the solution. It articulates data required, methods to collect and analyze data, generate more ideas and relating to the topic. Research design gives direction and systematizes the research. Burns and Grove (2009) define a research design as a

blueprint for conducting a study with maximum control over factors that may interfere with the validity of the findings.

3.3 Data Collection

Generally, the sources of data employed during the course of this study were:

- Secondary Data
- Primary Data

3.3.1 Secondary Data

Secondary data is data which were obtained from existing source examined by other researchers. This data can be collected from newspaper, journals, internet resources, books, magazines and other document which related to the study topic. Hence, the conceptual framework and theoretical are developed as secondary data is support of primary data.

However, secondary data to provide the detail information for research. (Rajasekar, Philominathan & Chinnathambi, 2013). Literature reviews are capable to identify the problem, solve problems and other which have huge information to help in this study. Project managers can obtain several advantages through the secondary data.

3.3.2 Primary Data

Primary data are the source of data that have not yet been interpreted by others which consider the first hand data and went through various methods to ensure the data

reliability. Clarke (2005) stated that the primary sources are including statistical data, art, work and others. Moreover, primary data are collected through questionnaire survey, personal or indirect interview and observation method. In addition, different types of primary data have various types of methods to obtain the result. Data such as observation method is usually used in the behavioural sciences whereby a questionnaire survey method used for collecting descriptive information (Degu & Yigzaw, 2006). In this study, techniques used to collect the primary data through questionnaire survey are selected.

3.4 Questionnaire

The questionnaire is quick and easy ways of collecting a vast amount of information. It is designed with achieving objectives of the research, easy to tabulate and interpret to analyze (James, 1987). Questionnaire survey is a familiar used method of data collection with huge population. It is a cost effective way involving large sample size and large geographic areas (Statpac, 2014). It is familiar to most people compared to face-to-face interviews.

Numerous questions are included in the questionnaire survey provided to the targeted respondent to fill in the answer. The questions set to get the most accurate answer from the respondents. The questions set will be regarding the objectives of this study. Closed-ended question will be used in this project as it is the simplest way to calculate the frequency of responses return.

Nowadays, Likert scale is commonly used in closed-end questions. The answers provided will be in the form of Likert scale contains five or more potential choices ranging from strongly agree to strongly disagree. Likert scale is defined as a method to credit the quantitative value of qualitative data to statistical analysis (Dictionary, 2015). Likert scale is provided under this study.

The questionnaire designed for this study was attached to this report. So, the collection of data is conducted through a questionnaire that focused on issue relating

to stress factors in selected construction companies which are located in Penang, Kuala Lumpur and Johor Bharu.

3.4.1 Questionnaire Design

Section A:

The respondents are required to fill in their particulars such as company name, age of the respondent, years of working experience, degree of qualification, and project value. The respondents need to tick the correct answer in each question.

Section B & C:

Close ended questions are set with Likert scales method in this section to answer the question. Likert scales are ranging from strongly agree to strongly disagree. The respondents are required to rate their opinion for the questions regarding factors contributing to stress and method of releasing stress in section B while questions for section C are the impact of stress.

3.4.2 Target Respondent

The target responds in this study focuses on the selected construction companies of contractors, which are located in Penang, Kuala Lumpur and Johor Bharu. This is mainly due to Penang, Kuala Lumpur and Johor Bharu is the largest city in Malaysia. The prospective respondent is targeted on project manager only with a sample of 97 respondents are choosing to answer the survey questionnaires.

3.4.3 Sample Size

Sample size is part of the population to be included in the research study (Evans, Hastings & Peacock, 2000). In this study, the random sampling technique is used to distribute the questionnaire to the respondents with 100 sets of questionnaire survey either by hand or online survey. Sampling size of 100 project managers is randomly choosing CIDB-G7. The respondents were project managers which from contractors from CIDB-G7.

3.5 Analysis Method

Analyses are carried out to analyse the data collected from respondent. The result of the study is presented in tables, bar charts, graphs or pie charts forms.

The quantitative data under this study are derived from a questionnaire that can be analysed using Reliability Analysis, Factor Analysis and Kaiser-Meyer-Olkin (KMO) and Bartlett's test of Sphericity, Communalities and Principal Component Analysis with the help of SPSS (Statistical Package for Social Science).

3.5.1 Statistical Package for the Social Sciences (SPSS)

SPSS is a comprehensive technique used for analysing data. This method offers highly complex data manipulation and analysis to analysis, execute and generate the table and graph based on the information obtained (Garth, 2008). In this study, SPSS is used to conduct the analysis of the factors of stress faced by project manager which allow carrying out in-depth data access and preparation, analytical reporting, graphics and modelling.

3.5.2 Reliability Analysis

Reliability analysis helps to determine the item in the questionnaire is related to each other. The Reliability Analysis procedure calculates the number of commonly used measures of scale reliability. Besides, we can also identify problem items that should be excluded from the scale which is repeatability or internal consistency of the scale. Reliability test including Cronbach's Alpha Value are applied in this study to ensure the tested item more reliable and accurate.

3.5.2.1 Cronbach's Alpha Value

The Cronbach's Alpha applied under the reliability test to measure the internal consistency of the factors. According to Laerd (2015), Cronbach's Alpha offers reliability coefficient for variables. Cronbach's Alpha value lies between0 to 1 and the value 0.6 or below in this test are considered not related with to study and will be eliminated from the study final result. Cronbach's Alpha value is above the 0.60, and then the reliability test is regarded as valid and accepted. Table 3.1 shows that the range of Cronbach's alpha. The greater number of items in the test can artificially inflate the value of alpha.

Table 3.1: Cronbach's Alpha Value (George and Mallery, 2003)

Cronbach's alpha	Internal consistency
$\alpha \geq 0.9$	Excellent (High-Stakes testing)
$0.7 \leq \alpha < 0.9$	Good (Low-Stakes testing)
$0.6 \leq \alpha < 0.7$	Acceptable
$0.5 \leq \alpha < 0.6$	Poor
$\alpha < 0.5$	Unacceptable

3.5.3 Factor Analysis

Factor analysis is a statistical method used to describe variability among observed, correlated variables that have involved hundreds of variable, items of the questionnaire with to lower the number of unobserved variables (Yong, 2013). It attempts to identify variables, or factors, that explain the correlations within a set of observed variables. Therefore, it is easier to conduct variables into meaningful categories.

Factor analysis also used to remove redundancy or duplication from correlated variables. According to Crawford and Lomas (1980), factor analysis is tool used to reduce data to identify small number factor which helps in coping with a solution. It used to generate hypotheses regarding causal mechanisms or to screen variables for subsequent analysis. The validity of questionnaires can be tested by using factor analysis. The factor analysis including Kaiser-Meyer-Olkin (KMO) and Bartlett's test of sphericity, Communalities and Principal Component Analysis. So, this study is using this method to analyze the most stressor factor among project manager.

3.5.3.1 Kaiser-Meyer-Olkin (KMO) and Bartlett's Test of Sphericity

Kaiser-Meyer-Olkin (KMO) and Bartlett's test of sphericity is conducted in this study to exploratory factor analysis. The acceptable index for KMO value is above 0.6. When the value of KMO is higher than 0.6, the test can be said to be significant and the factors can proceed to further analysis. (Tabachnick & Fidell, 1989). If the outcomes of KMO value are less than value 0.6 or below in this test are considered not desirable in this study and will be eliminated from the study. Furthermore, the Bartlett's test of sphericity is suitability and validity to determine the correlation matrix in the factor analysis.

Table 3.2: Kaiser-Meyer-Olkin Measure of Sampling Adequacy Interpretation (Source: Kaiser, 1974; Field, 2005)

Kaiser-Meyer-Olkin Measure of Sampling Adequacy	Interpretation
More than 0.9	Superb
0.8-0.9	Great
0.7-0.8	Good
0.6-0.7	Mediocre
0.5-0.6	Acceptable
Less than 0.5	Poor

3.5.3.2 Communalities

Communalities were tested under this study. The communalities are variable's variance which can explain by the principle component. It must be extracted to determine each of the variables is suitable for this study. The communalities value must be more than 0.5 (Chetty and Datt, 2015). The only variable will be considered for further analysis of value above 0.5 after the extraction in communalities. The communalities in extraction table are high indicates that each component represents the variable as well. The extracted variable no more than a value of 0.5 should be deleted on this analysis.

3.5.3.3 Principal Component Analysis

Principal Component Analysis is performed in the later stage. It is obtained to the measures he variables obtained from data collected. This analysis is to reduce variance to develop a smaller number of observed variables. According to (MacCallum *et. al*., 2001), the items in the factor must be more than 0.6 to justify the performances of sample size. It is a powerful tool for reducing a number of observed variables into a smaller number of variables.

Secondly, the extraction approaches used for structure recognition. This factor analysis will impose the theory that certain inconsistency in the data is unexplainable by the factor analysis. The solution is explained the total variance which is less significant. Nevertheless, these factor analyses become more ultimate in order to investigate the relationship among each other by the structure to the factor model (Y, 2013).

3.6 Summary

In short, the characteristics of research methodology, research design, method of data collection, questionnaire design and analysis method are applied in this study based on the determination of sampling size. The data are collected through literature reviews for secondary resources and questionnaire survey methods are obtained from the primary resources. In addition, the method used to analyse this study is SPSS.

CHAPTER 4

DATA ANALYSIS

4.1 Introduction

This chapter presents the results from data analysis and further discusses the findings of this study. It is consists of preliminary analysis of data collected, background of the respondents, reliability test and validity test of the measurement, ranking of stress factors and stress releasing methods for project manager in construction industry.

4.2 Preliminary Analysis

The survey questionnaire of this study is distributed to 100 respondents based on calculated sample size (approximately 100 sets) as per Chapter 3. The data collected through face-to-face and online survey questionnaire. From data screening, only 40 sets (40%) are useable survey questionnaires from the overall of 41 returned sets. According to Sekaran and Bougie (2010), response rate of more than 30% considered acceptable and good for research study.

Table 4.1: Preliminary Analysis

Description	Quantity	Percentage (%)
Questionnaire was distributed	100	100%
Questionnaire was returned	41	41%
Useable questionnaire	40	40%
Incomplete questionnaire	1	1%

4.3 Respondent Demographics

The targeted respondent in this study was project manager and the selection based on random sampling technique. The following subsections discuss the respondents' age, years of working experience, project value, service sector and degree of qualification.

4.3.1 Age of Respondents

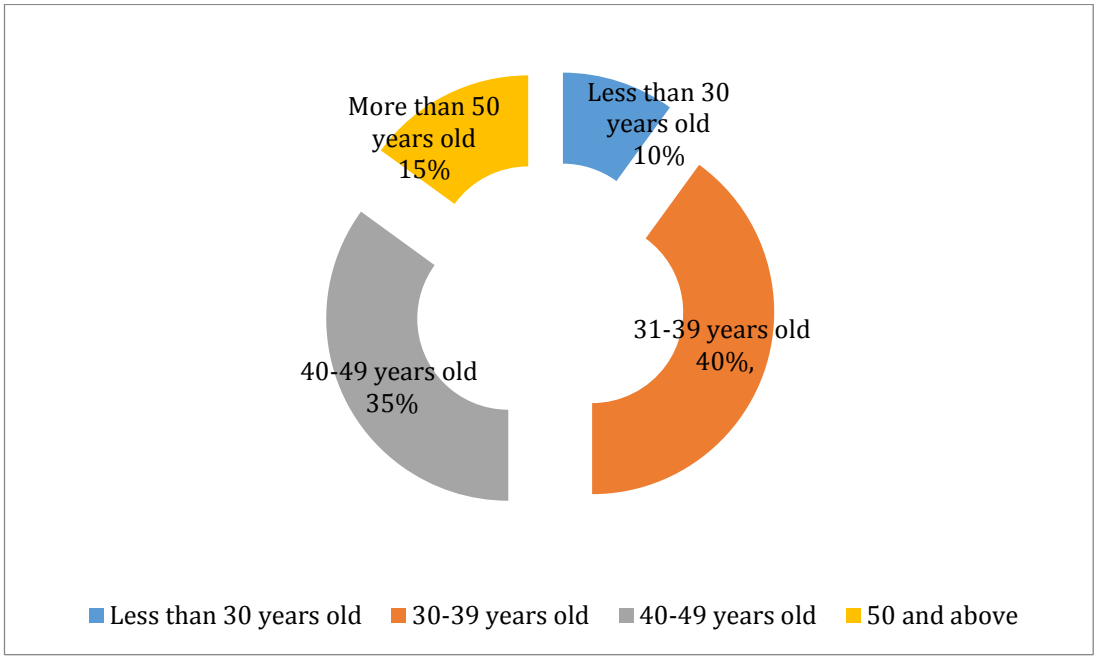

Figure 4.1: Age of Respondents

According to Figure 4.1, most of the respondents are “30-39 years old” which contain 40% from the overall samples. This is followed by the age “40-49 years old” with a total of 35%. Respondents with age of “50 years old or more” are 15% whereby the age of “less than 30 years old” only 10% from the overall samples.

4.3.2 Years of Working Experience

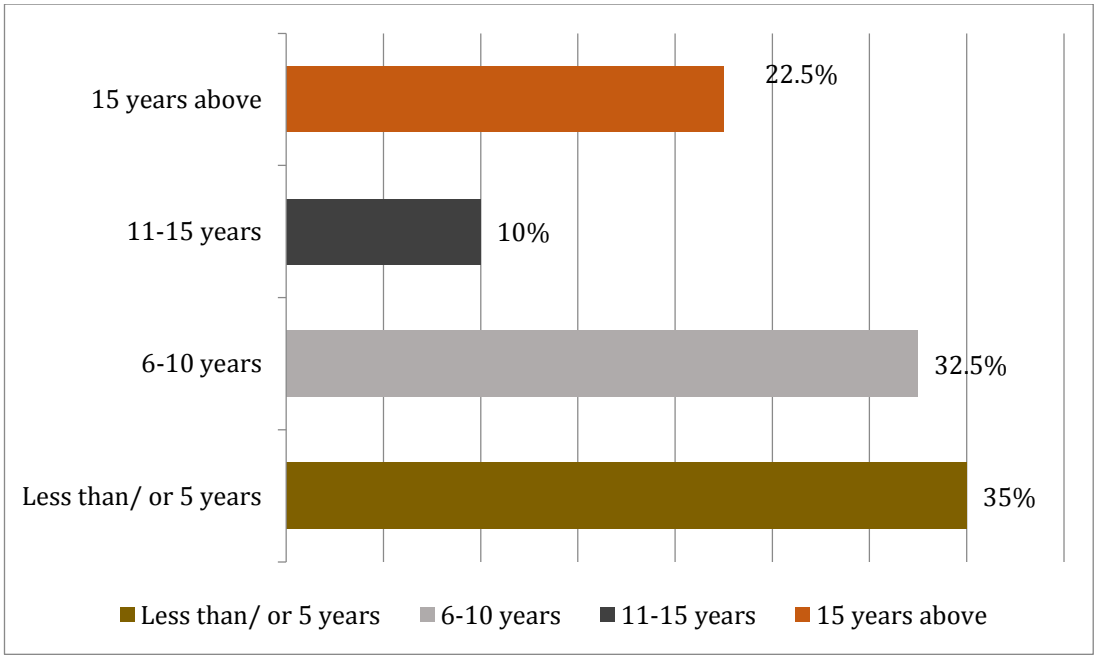

Figure 4.2: Years of Working Experience

There are 35% of respondents with “less than 5 years” working experience and it ranked as highest from the overall respondents. This is followed by the “6-10 years” working experience has 32.5%, “11 to 15 years” working experience has 10% and “15 years and above” working experience has 22.5%.

4.3.3 Degree of Qualification

According to Figure 4.3, there are 60% of the respondents with bachelor degree while 12.5% respondents with master degree and above. Besides, there are 17.5% of respondents with diploma education level and only 5% for both SPM holder and lower education level. Results show that there is an association between education level and position in the organization because approximately 90% project managers were educated at least diploma education level. In other words, a higher education level holder has higher chances to be promoted as important position in the organization.

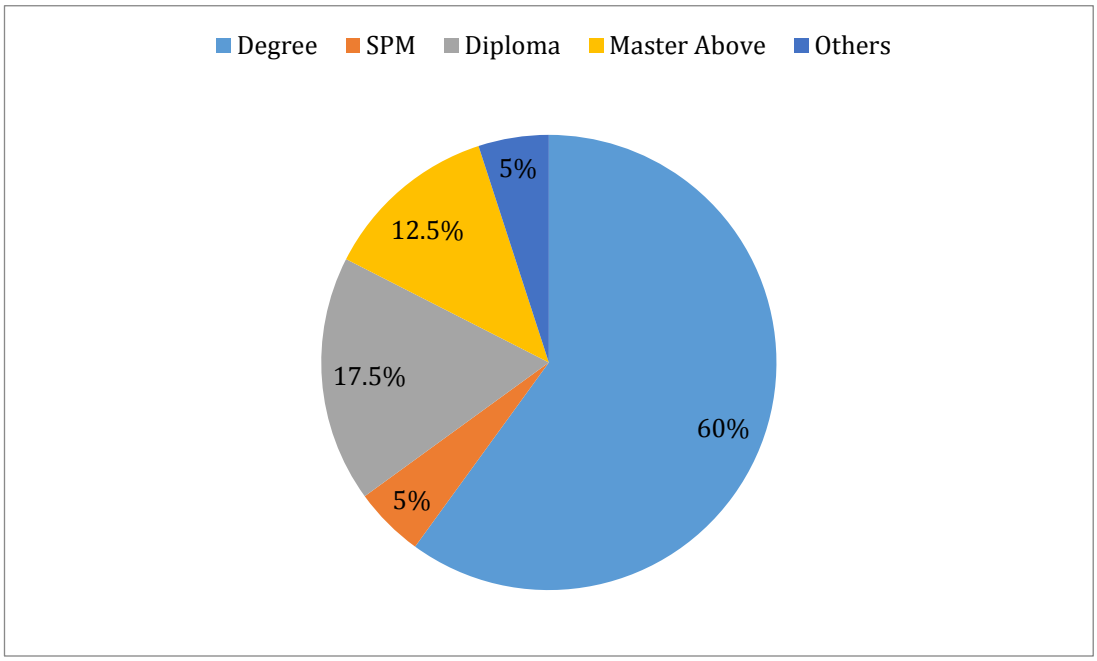

Figure 4.3: Degree of Qualification

4.3.4 Service Sector

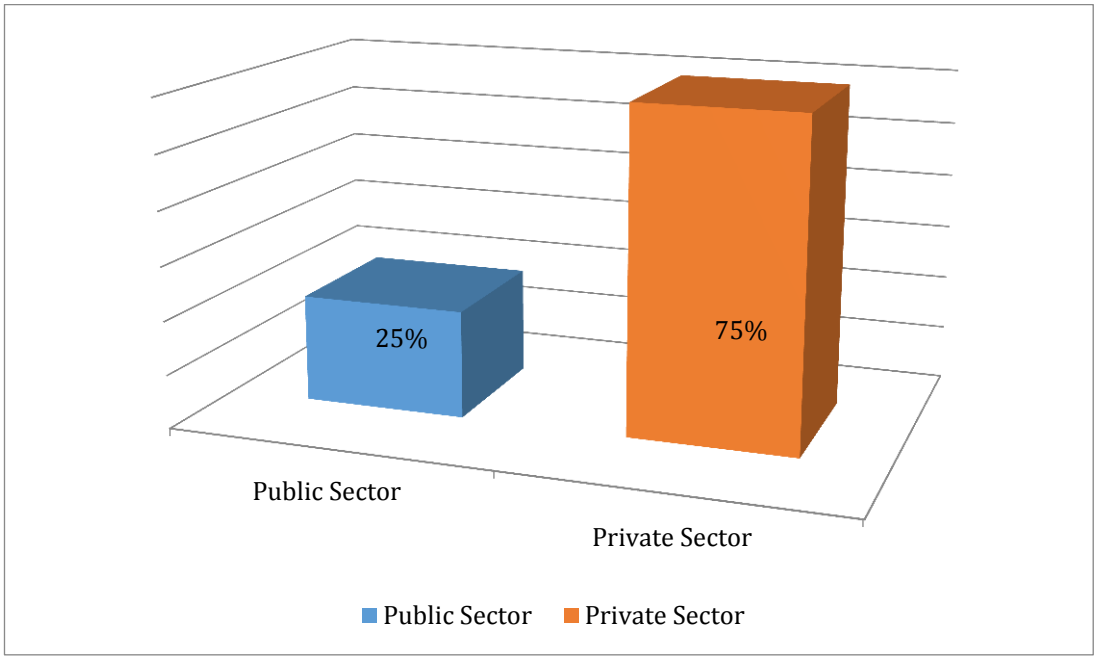

Figure 4.4: Service Sector

In the samples, respondents involved in the private sector have triple than the public sector, which has 25% and 75% respectively. This number shows that private investment in the Malaysian construction industry is still very active a part of government-leaded construction project.

4.3.5 Project Value

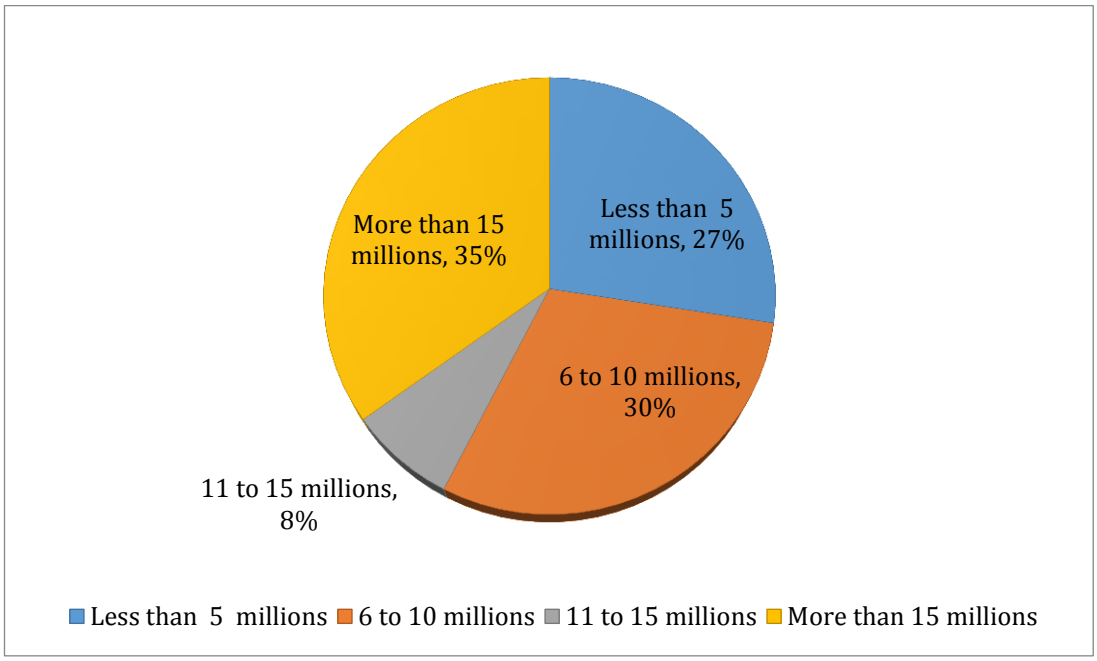

Figure 4.5: Project Value

According to Figure 4.5, 35% of construction projects have considerable size with total amount of 15 million above. It is a good sign for this study because the stress of project manager is normally influenced by higher project value. The respondents who committed to a high value construction project can provide more valid stress information for this study. This is followed by project value of "6 to 10 million" with a total of 30%, "less than 5 million" obtains 27% whereby "6 to 10 million" has only 8%.

4.4 Reliability Test and Validity Test of the Measurement

Reliability test is conducted to test the internal consistency of the measurement scale of the survey questionnaire. Cronbach alpha is used and the analysed items must obtain the value 0.6 above in order to justify the consistency of each item regardless sample size (MacCallum *et. al*., 2001).

Validity test is important to ensure the psychometric of the measurement scale, in the manner of testing how good the individual item covariate with the other items within a similar measurement nature. Validity test in this study adopts several analyses, namely Kaiser-Meyer-Olkin (KMO), Bartlett's Test of Sphericity, Communalities, and Principal Component Analysis.

Kaiser-Meyer-Olkin (KMO) and Bartlett's Test of Sphericity are used as pre-analysis procedure for factor analysis in order measure the construct, concept or trait and meaningfulness and appropriateness of sampling adequacy (Williams, 2012). Kaiser-Meyer-Olkin (KMO) value should be 0.60 or higher to achieve a mediocre level while Bartlett's test statistic should be large and significant in the analysis (Sekaran, 2003).

The communalities are variable's variance which can explain by the principle component. The communalities value must be more than 0.5 for future analysis (Chetty and Datt, 2015). The extracted variable no more than a value of 0.5 should be deleted on this analysis.

Principal Component Analysis is to reduce variance to develop a smaller number of observed variables. According to (MacCallum *et. al*., 2001), the items in the factor must be more than 0.6 to justify the performances of sample size.

4.4.1 Reliability Test and Validity Test of the Stress Factors

This section is to test reliability and validity of the measurement scale for stress factors of project manager in the construction industry. Originally, there are total of 44 sub-factors and classified into 10 major stress factors as shown below:

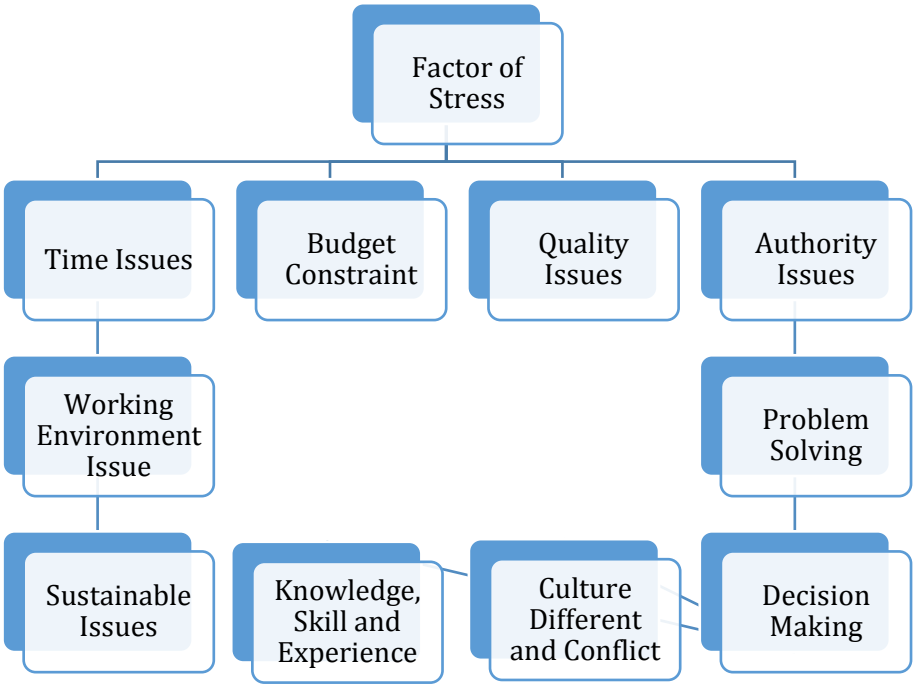

Figure 4.6: Stress Factors

The reliability and validity tests are conducted for each stress factor and only the sub-factors passed with the two tests will be considered in the computation of an average composite score of the stress factor. The findings just then considered as reliable and valid for ranking objective of this study.

4.4.1.1 Reliability Test Result

According to Table 4.2, majority of stress factors passed with threshold value of 0.6 except the "Time Issues" and "Decision Making". The section E, G, I and J passed with 'acceptable' level, whereby the section B, C, D and H passed with 'good' internal consistency. For section A and F, analysis of "Cronbach's Alpha if Item Deleted" is conducted in order to improve the reliability value if possible.

Table 4.2: Analysis of Reliability Test Result for Stress Factors

Section	Stress Factors	Cronbach's Alpha	Internal Consistency	Number of Items
A	Time Issues	0.559	Poor	5
B	Budget Constraint	0.721	Good	6
C	Quality Issues	0.716	Good	4
D	Authority	0.740	Good	5
E	Problem Solving	0.680	Acceptable	4
F	Decision Making	0.579	Poor	5
G	Cultural Different	0.672	Acceptable	5
H	Knowledge, Skill and Experience	0.746	Good	3
I	Sustainable Issue	0.668	Acceptable	4
J	Working Environment	0.636	Acceptable	3

According to Table 4.3, the reliability for Section A can be improved by deleting Time 1 (Achieve Short Project Deadline) where 0.656 is acceptable internal consistency and passed the cut-off of 0.6. This is because the Cronbach's Alpha in time issues obtained no more than 0.6, which the internal consistency not within the acceptable range. In order to reach an acceptable range for internal consistency of the time issue, Time 1 should be omitted. Because a short project period is commonly accepted in t construction industry, thus, it does not show similar agreement with other sub-factors that contributing to stress of project manager in the aspect of time issues. For section F, the internal consistency for the Decision Making was under a poor internal consistency, the Cronbach's Alpha value is under 0.6. In order to reach the minimum acceptable range for consistency, item in decision making 4 should be omitted. The Cronbach's alpha will increase to 0.652 if the item of decision making 4 (Prioritization issue in decision) is deleted for the stress factor. This is because prioritization is a very subjective issue and every respondent might has different priority in their decision making especially in different project characteristic and nature, so that the sub-factor might not consistency with other sub-factors of the decision making affecting stress of project manager.

Table 4.3: Item- Total Statistic for Section A and Section F

Section A		
Item	Descriptive	Cronbach's Alpha if Item Deleted
Time 1	Achieve Short Project Deadline	0.656
Time 2	Response for deadline delay	0.372
Time 3	Plan realistic schedule	0.395
Time 4	Implement the Schedule	0.549
Time 5	Responsible for schedule delay	0.460
Section F		
Item	Descriptive	Cronbach's Alpha if Item Deleted
Decision 1	Decision in broader sense of managerial discipline	0.406
Decision 2	Make immediate decision	0.463
Decision 3	Make thoughtful decision	0.477
Decision 4	Prioritization issue in decision	0.652
Decision 5	Directed decision from top management without prior knowledge	0.568

Based on the findings, two items are omitted in order to ensure the stress factors passed with the reliability test. Thus, only the remaining 42 items will be used for further analyses.

4.4.1.2 Validity Test Results

According to Table 4.4, all sections for stress factor passed the KMO and Bartlett's Test of Sphericity, where KMO value more than 0.5 and Bartlett's tests are significant in which p-value equal and less than 0.01. Based on the pre-analysis procedure, the results indicate that stress factors are meaningful and appropriate to be analysed through a factor analysis. Then, Principal Component Analysis can be conducted to validate the measurement scale.

Table 4.4: Analysis of Kaiser-Meyer-Olkin Measure of Sampling Adequacy and Bartlett's Test of Sphericity

Section	Stress Factors	KMO	Bartlett's Test of Sphericity		
			Approx. Chi-Square	Sig.	df
A	Time Issues	0.584	31.335	0.000	6
B	Budget Constraint	0.634	66.831	0.000	15
C	Quality Issues	0.705	29.367	0.000	6
D	Authority Issue	0.743	50.583	0.000	10
E	Problem Solving	0.649	26.375	0.000	6
F	Decision Making	0.607	38.091	0.000	10
G	Cultural Different	0.567	38.822	0.000	10
H	Knowledge, Skill and Experience (KSE)	0.611	33.479	0.000	3
I	Sustainable Issue	0.689	21.635	0.000	6
J	Working Environment	0.557	20.816	0.000	3

For the validity analysis, the cut-off value for communalities is 0.5 and principal component loading is 0.6. According to Table 4.5, there is a total of 6 items to be deleted omitted based on the predetermined threshold value. The item deletion of each section will be elaborated in detail.

Table 4.5: Communalities and Principal Component Loading

	Items	Description	Communalities	Component Loading
A	Time2	Response for deadline delay	0.719	0.625
	Time3	Plan realistic schedule	0.731	0.846
	Time4	Implement the Schedule	0.874	0.721
	Time5	Responsible for schedule delay	0.795	0.568
B	Budget Issue 1	Achieve constraint project budget	0.633	0.612
	Budget Issue 2	Responsible for budget overrun	0.595	0.719
	Budget Issue 3	Lack of fund to support the job execution	0.821	0.712

	Budget Issue 4	Allocate sensible task cost	0.335	0.389
	Budget Issue 5	Task cost control	0.798	0.680
	Budget Issue 6	Fluctuation of market price	0.761	0.726
C	Quality 1	High expectation in work quality	0.674	0.821
	Quality 2	Tedious quality inspection	0.589	0.767
	Quality 3	Overload of remedial proposal	0.467	0.684
	Quality 4	Recurring remedial proposal	0.429	0.655
D	Authority 1	Limited authority in project team	0.721	0.849
	Authority 2	Lack of top management support	0.737	0.858
	Authority 3	Lack of power at operational level	0.591	0.769
	Authority 4	Team failed to obey instruction	0.384	0.620
	Authority5	Autonomy in functional manager	0.047	0.216
E	Problem 1	Endless problem resolution	0.647	0.804
	Problem 2	Tedious problem identification	0.666	0.816
	Problem 3	Solve complex problem	0.428	0.655
	Problem 4	Make strategic solution	0.284	0.533
F	Decision 1	Decision in broader sense of managerial discipline	0.626	0.791
	Decision 2	Make immediate decision	0.954	0.606
	Decision 3	Make thoughtful decision	0.725	0.801
	Decision 5	Directed decision from top management	0.723	0.607
G	Cultural 1	Communication problem	0.901	0.721
	Cultural 2	Diversity of perspective	0.509	0.596
	Cultural 3	Confliction expectation/ outcomes	0.763	0.790
	Cultural 4	conflict in job roles and responsibilities	0.686	0.656
	Cultural 5	Conflict resolution	0.389	0.481
H	KSE 1	Lack of practical experience	0.860	0.927
	KSE 2	Short of specific knowledge and skill	0.785	0.886
	KSE 3	Wider and deeper knowledge, skill and experience are required	0.333	0.577
I	Sustainable 1	Rising of environmental concern in construction industry	0.503	0.709
	Sustainable 2	New requirement and standard on sustainable building	0.463	0.680
	Sustainable 3	Procurement of sustainable resources on site	0.443	0.665

	Sustainable 4	Sustainable way of waste management on site	0.598	0.774
J	Working 1	Safety performance on site and surrounding	0.175	0.419
	Working 2	Health hazard on site and surrounding	0.713	0.845
	Working 3	Pollution on site and surrounding	0.847	0.920

At the Section B, 1 item is omitted from the total of 6 items, namely Budget Issue 4 (Allocate sensible task cost). The communalities value is 0.335 and component loading with only 0.389, which meant that the item is not covariance with other items within the same measurement scale. This is because the extraction communalities acquired at least 0.5 to proceed for further analysis. Budget Issue 4 does not comply with the minimum requirement of communalities. The Budget Issue 4 should be eliminated to ensure the item is covariance with other items. For the budget issue 4, the "sensible" word used in the questionnaire is quite improper because it is a challenge to interpret the meaning in a consistent way by respondents. Thus, the item score will be omitted for computation of the average composite score for the stress factor in order to reflect more accurately phenomenon in the study.

For Section D, the Authority 5 (Autonomy in functional manager) has factor loading less than 0.6, it obtained 0.047 and 0.216 for communalities and PCA value which is lower than cut off value. The variable for Authority 5 under this category was not covariance with other's items. For Section E, item for problem solving 4 (make strategic solution) is omitted under this section. The value of communalities is 0.284 and 0.533 for the PCA value, which did not pass the threshold of the minimum range of 0.5 and 0.6 for communalities and principal component loading which are not under same measurement scale with other items. The "strategic" word used in the questionnaire is quite improper because it is a challenge to interpret the meaning in a consistent way by respondents. Thus, the item score will also be omitted for computation of the average composite score for the stress factor.

For the Section G, item for Cultural Conflict 5 (Conflict resolution) did not pass the factor loading which obtains 0.389 and 0.481 communalities and PCA.

Conflict resolution is not bringing similar stress effect to project manager if compared with other sub-factors which mostly are the causes of the conflict. So that it is not consistent answer within the conflict stress factor and it should be omitted from the computation of the average composite score.

Section H, Knowledge, Skill and Experience 3 (Wider and deeper knowledge, skill and experience are required) is omitted because it scored 0.333 and 0.577 for both communalities and PCA value. The "wider and deeper" words used in the questionnaire are very abstract because every respondent might interpret the meaning in different ways. This is especially for inexperienced project manager a they still lack of confidence in their competencies and interpret it as serious but it might not consistently for an experienced project manager who has sufficient of it and it would not bring stress to them. Thus, the item score will be omitted for computation of the average composite score for the stress factor in order to reflect more accurately phenomenon in the study.

Lastly, the item was omitted at least was the section J, working environment 1 (Safety performance on site and surrounding). Working Environment 1 scored PCA value of 0.419 with communalities of 0.175. Both failed at cut off value of Communalities and PCA. Safety issue is actually higher mean score if compared with other two sub-factors within the working environment factor, which considering the health and environment issues on construction workplace brings stress to project manager. From the lesson learned, safety issue would bring more stress effect to project manager but it caused to inconsistent variance with the two sub-factors. So that the deletion of the safety item is considered as limitation of this study in order to reflect more accurately phenomenon of working environment in bringing stress to project manager.

4.5 Ranking of Stress Factors

4.5.1 Ranking by Categories

The analysed stress factor will be ranked with two different ways, which ranking by category and ranking by each factor. This ranking shows the importance stress factors which could insist a stress to project managers.

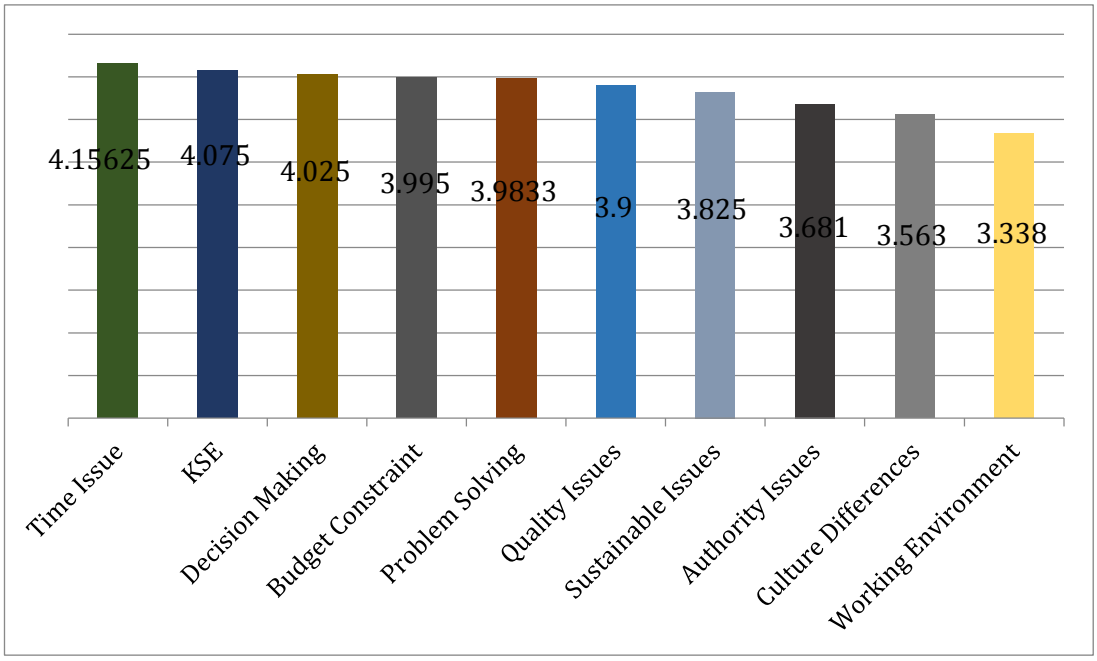

Figure 4.7: Stress Factors Ranking

Table 4.6: Analysis for Ranking Factors of stress

Ranking	Factor	Average Mean	Standard Deviation
1	Time Issues	4.156	0.826782148
2	Knowledge, Skill and Experience	4.075	1.033103978
3	Decision Making	4.025	0.822444570
4	Budget Constraint	3.995	0.880973280
5	Problem Solving	3.983	0.930156422

6	Quality Issues	3.900	0.825554454
7	Sustainable Issues	3.825	1.654951421
8	Authority Issues	3.681	1.113800731
9	Cultural Differences	3.562	1.080950931
10	Working Environment	3.337	1.077275891

According to Table 4.6, the time issue is ranked as the first stress factor among the others. According to Table 4.7, most of the respondents have same agreement that delay occurred on construction project has brought severe stress to project manager. This is because deadline overruns time went into liquidated damages which is explicitly agreed in the contract, then it will cause to company to loss of profit. Reputation also would be affected by the failure to complete the project on time, indirectly affect the organization's image. If all of the sub-factors are considered, it brings up the most impact of stress to project manager.

Meanwhile, budget constraint was the fourth ranking in this analysis test. Construction work was being carried out into business for the purpose of making profit. Project manager carried big responsible in construction, they need to achieve constraint budget and avoid cost overrun. Moreover, Lack of fund is difficult for project manager to execute the work. According to the data, lack of fund has less stress than achieve constraint budget and avoid cost overrun. This is because every construction materials and workmanship are very expensive, it is difficult to carry out the work without sufficient funds. Besides, fluctuation of the market price and task cost control brought stress to project managers. If the material cost is inconsistent due to the fluctuation of market rate, project are difficult to estimate the overall cost which lead stress to project managers. Project needs more money to cover up the expenses. All the budget sub-factors may affect the construction work which added stress to project managers.

However, quality issue was in the six ranking under this study. The Project is expected to complete with the least cost and high quality to ensure the project is meeting standard requirement. Due to the different requirement and satisfaction, the qualities of work raise the difficulties to the project manager to do on task especially

in high expectation in work quality. Respondent had an opinion that high expectation on the work quality will bring pressure to them as they need to examine the work step by step with tested and inspected frequently to ensure the quality have reach satisfaction. Other than this, overload of remedial proposal also brought stress to project managers. Respondent think that inspection and expectation are more stress comparable to overload o remedial proposal. Although the quality issue brought stress to project manager, but the stress level is lower compared to time issues and cost issues. When all of this summarized out, respondent has an agreement that this three golden traditional stress affects the project managers.

Knowledge, skill and experience is ranked as second stress factors in this study. Knowledge, skill and experience is significantly causing the stress the project manager as half of the respondents in this study were fresh for construction project management. Most of them having working experience in construction no more than 5 years. They felt that lack of practical experience brought stress to them. Meanwhile, they don't have sufficient in specific knowledge and skill in dealing with management problems and issues happen on construction sites. So, respondent has an agreement that Knowledge, Skill and experience brought stress to them.

Decision making was ranked in third under this analysis. Making a decision and solving problem become a daily task for project manager. Respondent think that make thoughtful decisions brought a lot of stress to them as the need for brainstorming for the problem. Other than that, they feel stress to receive a decision from top management. This is they have different perspective in making some decision. Some of them lack of knowledge dealing with certain construction works problem and issues which might arise a lot of construction problem, that causing stress to project managers. Meanwhile, the project manager needs to make immediate decisions in a broader sense, the answer may be varied depending on the situation.

Respondent give opinion that the decision making brought more stress compare to solving problems. Problem solving is a fifth ranked under the data collection. Project manager are tension when they need to solve complex problem, endless problem and identify tedious problem. Project manager needs to identify each problem occurred in construction and solve it carefully. Project manager is

tension when the problem is unable to solve in shortening time. Authority issue is faced by almost all of the organization in Malaysia.

From the finding, the authority issue was ranked as eighth in overall factors. The Project manager has limited authority. Key players in construction have different background and have own opinion, it is hard for them to follow the instruction given by project manager. Lack of influencing power at operational level, project manager is difficult to allocate task effectively. It may lead to delays of work and incurred extra cost to complete it. Also, respondents agreed that lack of top management support can cause stress to them as project have difficulty in the project completion.

However, cultural different was the 9^{th} in the overall ranking. It is hard to gather different culture of professional to work as a team due to the diversity of perspective. The entire professional in the construction industry having different culture and background, they might not understand certain process or work with the same sequence. They are strong in self- centeredness and always cause to communication problem. Due to the different culture, team members have different expectations for the outcome which could cause a conflict in the project. Some of the members are conflicted about their job and responsibilities, they not sure which task needs to be handled and complete. To manage them, project manager is feeling stress.

Furthermore, there was seventh ranking for sustainable issue. Sustainable way of waste management on site and procurement is brought stress to project manager as Malaysian not familiar to manage waste and brought material in green procurement. In Malaysia, the sustainable issue was not being populated and most of the people are not familiar with the green management. The new requirement and standard on sustainable building brought stress to project manager due to limited knowledge in the green sustainable building in the construction industry. Some of the construction material still not available in Malaysia, they need to import from other country. This could lead a higher cost to complete the construction cost as a project manager will be hard in financing the project.

Lastly, working environment was ranked at least of the overall factors. Respondents think that dusty and noisy environment will result a health problem to

project managers and indirectly impose stress to them. Pollution on site and surrounding will cause a nuisance to neighbour so that it must be arranged and managed properly.

Above discussions follow the flow of traditional stress factors, psychological stress factors and contemporary stress factors. These stress factors must be identified so that project managers put more concentration on other task.

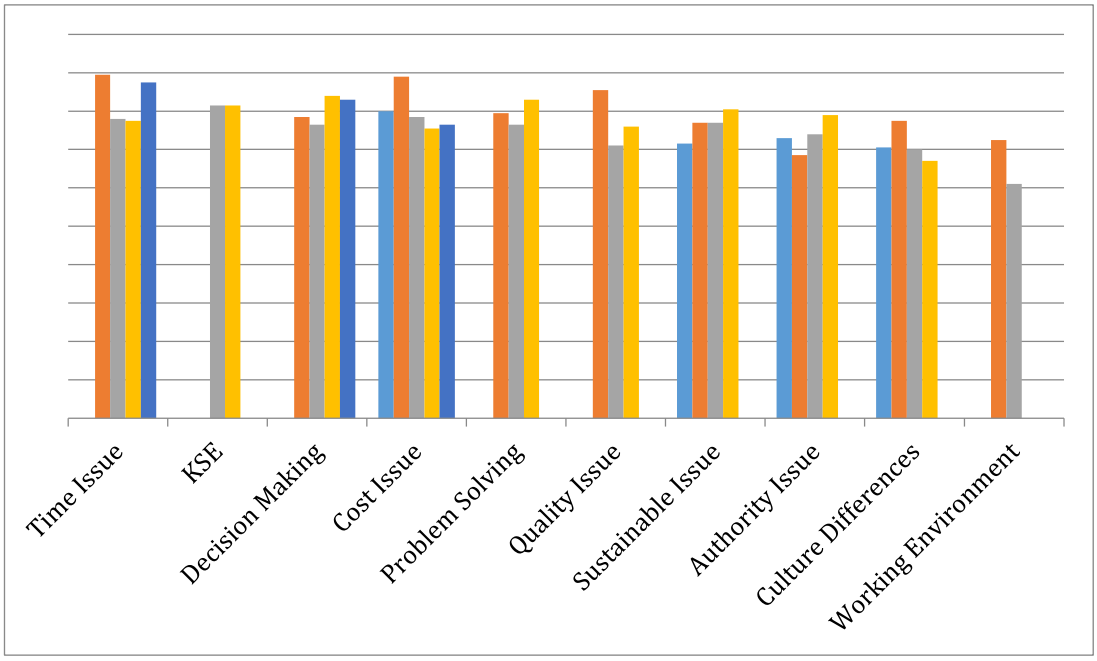

Figure 4.8: Ranking of Each Item for Stress

Table 4.7: Ranking of Items within Each Stress Factor

Ranking within Factor	Items	Description	Mean
Time Issue			
1	Time 2	Response for deadline delay	4.475
2	Time5	Responsible for schedule delay	4.375
3	Time3	Plan realistic schedule	3.900
4	Time4	Implement the Schedule	3.875

Knowledge, Skill and Experience (KSE)			
1	KSE 1	Lack of practical experience	4.075
2	KSE 2	Short of specific knowledge and skill	4.075
Decision Making			
1	Decision Making 3	Make thoughtful decision	4.200
2	Decision Making 5	Directed decision from top management without prior knowledge	4.150
3	Decision Making 1	Decision in broader sense of managerial discipline	3.925
4	Decision Making 2	Make immediate decision	3.825
Budget Constraint			
1	Cost2	Responsible for budget overrun	4.450
2	Cost1	Achieve constraint project budget	4.000
3	Cost3	Lack of fund to support the job execution	3.925
4	Cost6	Fluctuation of market price	3.825
5	Cost5	Task cost control	3.775
Problem Solving			
1	Problem Solving 3	Solve complex problem	4.150
2	Problem Solving 1	Endless problem resolution	3.975
3	Problem Solving 2	Tedious problem identification	3.825
Quality Issue			
1	Quality Issues1	High expectation in work quality	4.275
2	Quality Issues3	Overload of remedial proposal	3.800
3	Quality Issues2	Tedious quality inspection	3.550
Sustainable Issue			
1	Sustainable	Sustainable way of waste	4.025

	Issues4	management on site	
2	Sustainable Issues2	New requirement and standard on sustainable building	3.850
3	Sustainable Issues3	Procurement of sustainable resources on site	3.850
4	Sustainable Issues1	Rising of environmental concern in construction industry	3.575
Authority Issue			
1	Authority Issues 4	Unfollow instruction by internal team	3.950
2	Authority Issues 3	Lack of influencing power at operational level	3.700
3	Authority Issues 1	Limited authority in project delivery team	3.650
4	Authority Issues 2	Lack of top management support	3.425
Cultural Differences			
1	Cultural Differences2	Diversity of perspective	3.875
2	Cultural Differences1	Communication problem	3.525
3	Cultural Differences3	Confliction expectation/ outcomes	3.500
4	Cultural Differences4	Conflict in job roles and responsibilities	3.350
Working Environment			
1	Working Environment2	Health hazard on site and surrounding	3.625
2	Working Environment3	Pollution on site and surrounding	3.050

4.5.2 Key Stress Factors

Key stress factors were undertaken to examine the factor which influence the most in in consideration of each sub-factors. This is because it might not be completely explained through the factor ranking by categories without considering the score by individual sub-factors.

Analysis of this key factor must be accessed 4, agree and strongly agree. This is due to scored 4 and above show that the respondents are greatly agreed this key stress factor to project manager. The Hypothesis was shown at below:

H0: Respondents do not greatly agreed this key stress factor as sample values are equal or less than 4 “Agree”.

H1: Respondents do greatly agree these key stress factors as score value are greater than 4 “Agree”.

Table 4.8: Key Stress Factors

Sub-factor	Mean	Std. Dev.	95% CL Std Dev		t value	P-Value
Time 2	4.4750	0.7506	0.6149	0.9638	4.000	0.0001
Time5	4.3750	0.7742	0.6342	0.9941	3.060	0.0020
Cost2	4.4500	0.7143	0.5851	0.9172	3.980	0.0001
Quality1	4.2750	0.8469	0.6938	1.0875	2.050	0.0234

According to Table 4.8, respondents have greatly agreed that Time 2 (Responses for deadline delay) is one of key stress factors in this study. The p-value for Time 2 is 0.6149. According to the graph below, Time 2 has higher percentage more than 20% in 4 (agreed) and 60% in 5 (strongly agreed) for confidence interval. Most of the respondents think that response for deadline delay brought stress significantly to them as this may incur more cost and time to complete it. Therefore, the hypotheses 1 are accepted. Respondent was agreed Time 2 is a key stress factors.

Meanwhile, respondents have greatly agreed that Time 5 (Responsible for schedule delay) is one of key stress factors in this study. The p-value for Time 5 is 0.6342. According to the graph below, Time 5 has high percentage, which obtained more than 20 in 4 (agreed) and 5 (strongly agreed), increase in confidence interval shown in the graph. Most of the Respondent in the opinion that responsible for schedule delay is stressed, especially when the project manager needs to liaise with others, arrange work depending on weather condition and workmanship. This could cause the overall construction went into liquidation. Therefore, respondent was agreed Time 5 is a key stress factors.

Respondents have greatly agreed that Cost 2 (Responsible for budget overrun) is one of key stress factors in this study. The p-value for Cost 2 is 0.5851. According to the graph below, cost 2 has high percentage having more than 30% in 4 (agreed) and 50% in 5 (strongly agreed) for confidence interval. If the cost overrun, project manager has difficulties in financing the project. This could bring to more time with cost. Therefore, Respondent has an agreement that Cost 2 is a key stress factors.

Moreover, respondents also agreed that Quality 1 (High expectation in work quality) is one of key stress factors in this study. The p-value for Quality 1 is 0.6938. According to the graph below, quality 1 has higher percentage more than 30% in 4 (agreed) and more than 50% 5 (strongly agreed) confidence intervals. This is due to different client have different expectation, they might not accept the level of satisfaction for work as project manager. Therefore, the hypotheses 1 are accepted. Respondent was agreed Quality 1 is a key stress factors.

In short, 95% of confidence intervals are agreed that these key factors brought stress to project manager. Although there are a lot of factors might bring stress, but the most critical stress factor is traditional stress factors based on the above findings.

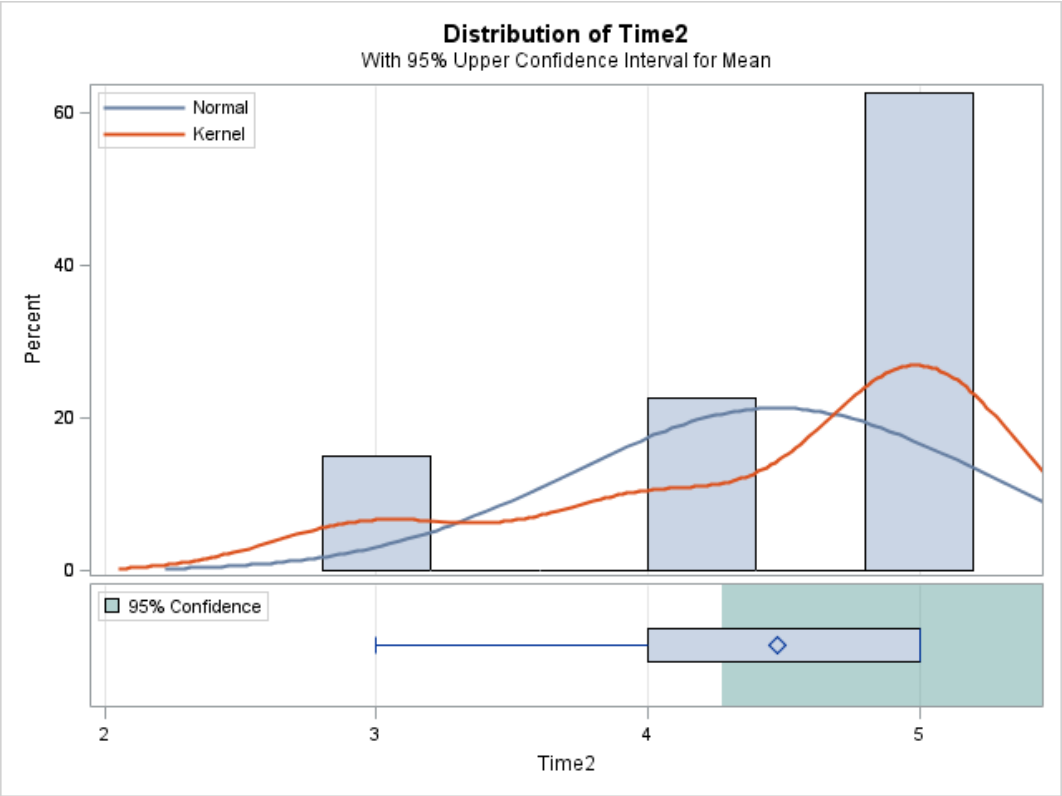

Figure 4.9: Distribution of Time2 for Stress Key Factor

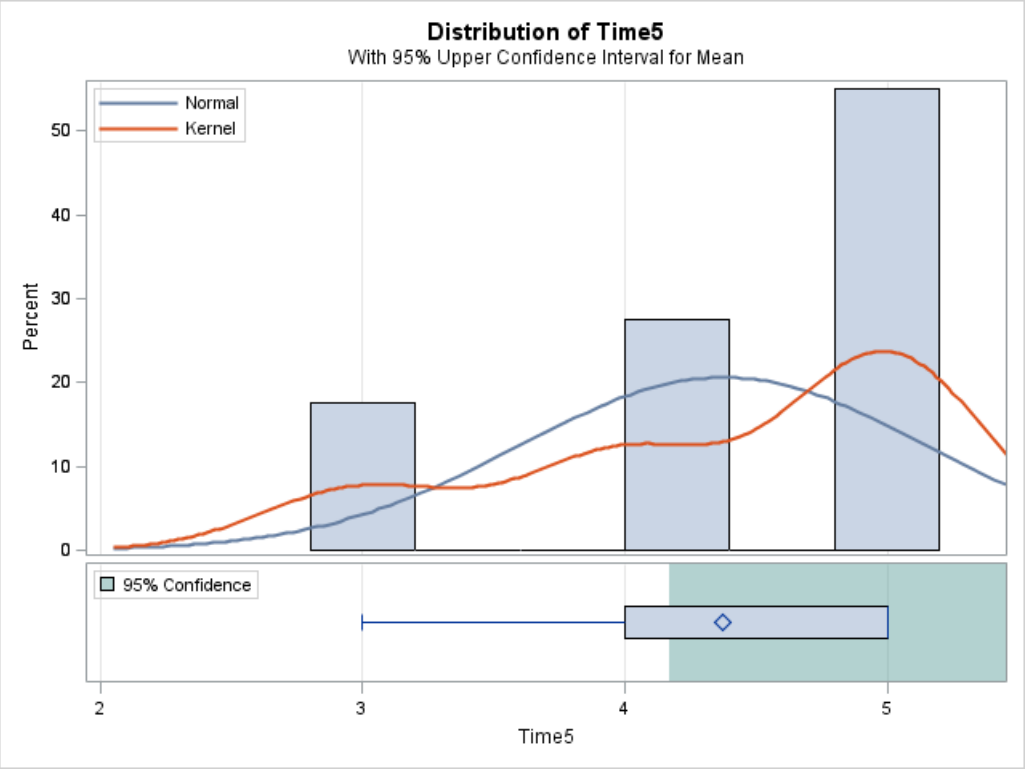

Figure 4.10: Distribution of Time5 for Stress Key Factor

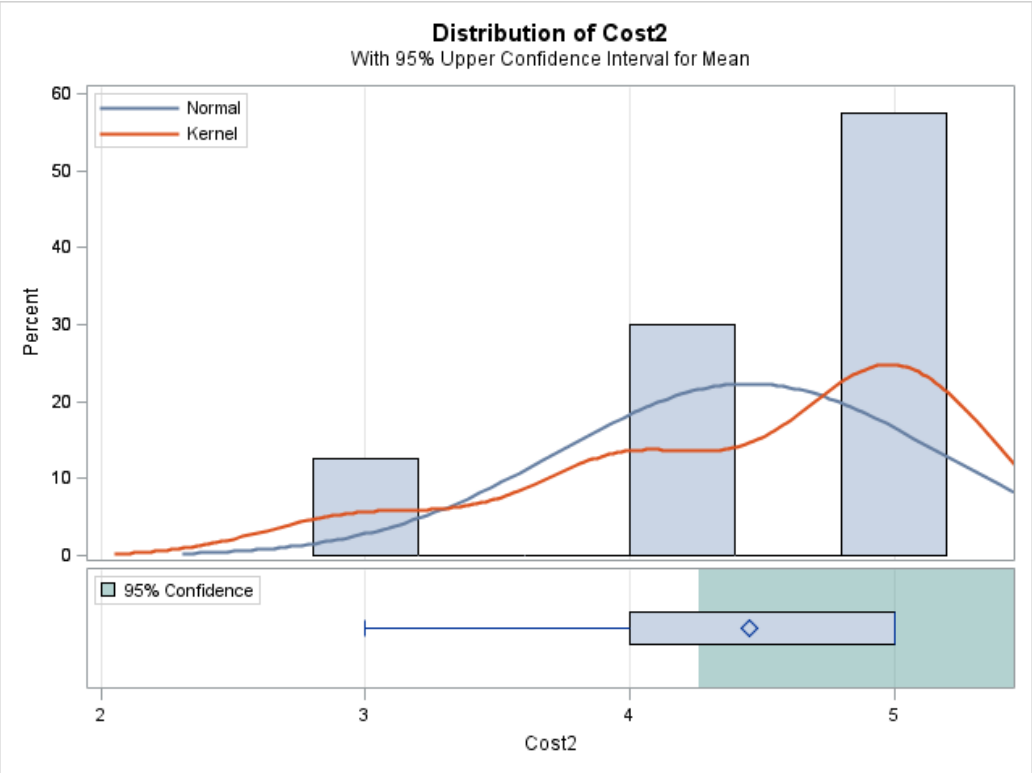

Figure 4.11: Distribution of Cost2 for Stress Key Factor

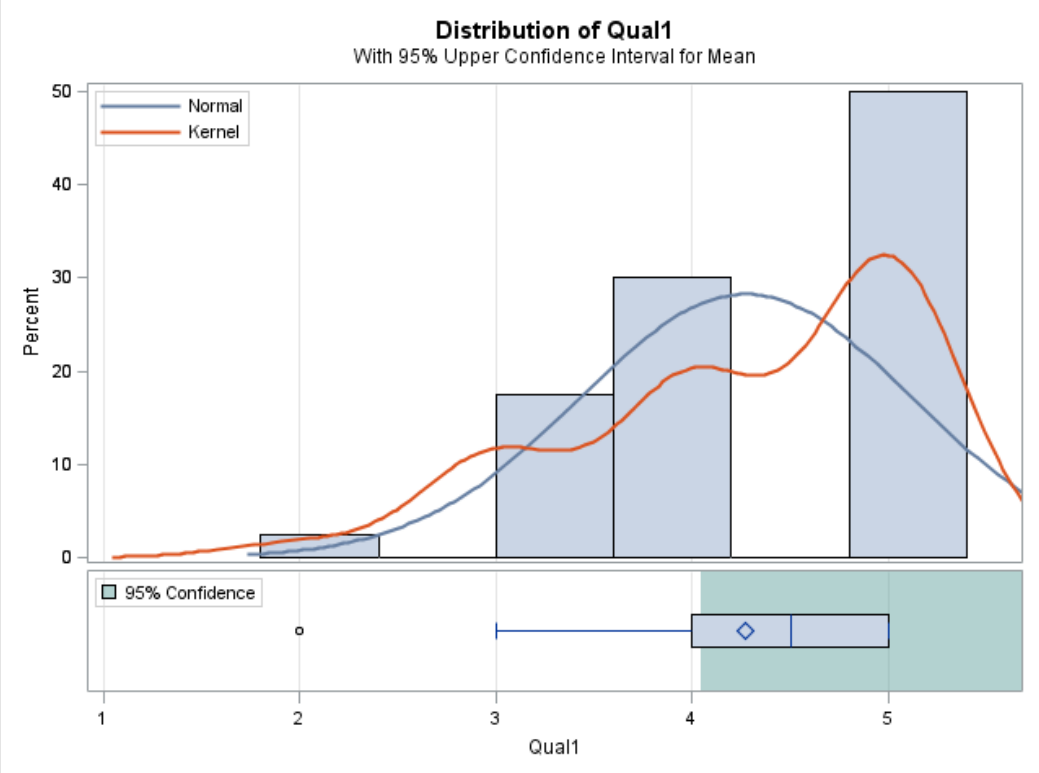

Figure 4.12: Distribution of Quality1 for Stress Key Factor

4.6 Releasing Method

Under this category, there are several releasing methods in this study. This is to investigate the effective releasing method get from survey questionnaire. There are five releasing methods under this study, which are shown in the graph below:

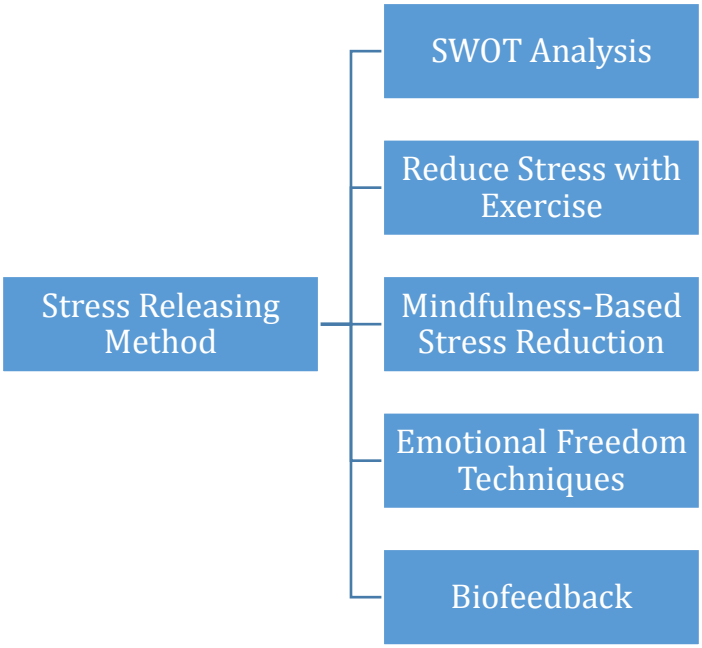

Figure 4.13: Stress Releasing Method

All of the releasing methods will be analysed by using reliability and validity test.

4.6.1 Reliability Test Result for Stress Releasing Methods

Table 4.9: Analysis for Reliability Test for Stress Releasing Method

Descriptive	Cronbach's Alpha	Number of Items
• SWOT Analysis • Reduce Stress with Exercise • Mindfulness-Based Stress Reduction • Emotional Freedom Techniques • Biofeedback	0.694	5

According to the result above, the threshold of the releasing stress method is acceptable and would bring forward to the validity test. The releasing method from 1 to 5 (5 Item) consisted 0.694 for Cronbach's Alpha. The internal consistency of stress releasing methods is acceptable since it had more than 0.6.

4.6.2 Validity Test

Table 4.10: Analysis for Validity Test for Stress Releasing Method

Descriptive	KMO	Bartlett's Test of Sphericity		
		Approx. Chi-Square	Sig.	df
• SWOT Analysis • Reduce Stress with Exercise • Mindfulness-Based Stress Reduction • Emotional Freedom Techniques • Biofeedback	0.620	47.014	0.000	47.014

The KMO value of the stress releasing method was 0.620 which more than requested, so the KMO value had been accepted and bring forward to the suitable reliable factor analysis.

Table 4.11: Analysis for Communalities and Principle Component Analysis of items for Stress Releasing Method

Description	Communalities	Component
SWOT Analysis	0.596	0.743
Reduce Stress with Exercise	0.659	0.628
Mindfulness-Based Stress Reduction	0.845	0.803
Emotional Freedom Techniques	0.740	0.728
Biofeedback	0.711	0.798

The Communalities and Principle Component Analysis of items for stress releasing methods is passed. All the items exceed 0.5 for both communalities and Principle Component Analysis which mean to be passed. Therefore, all the releasing method can be used under this study.

4.7 Ranking of Releasing Method

This sub-chapter is studying the ranking of stress releasing method which are obtained from questionnaires distributed. The ranking was followed by the data collected from respondent, for the purpose of reducing the stress of project managers.

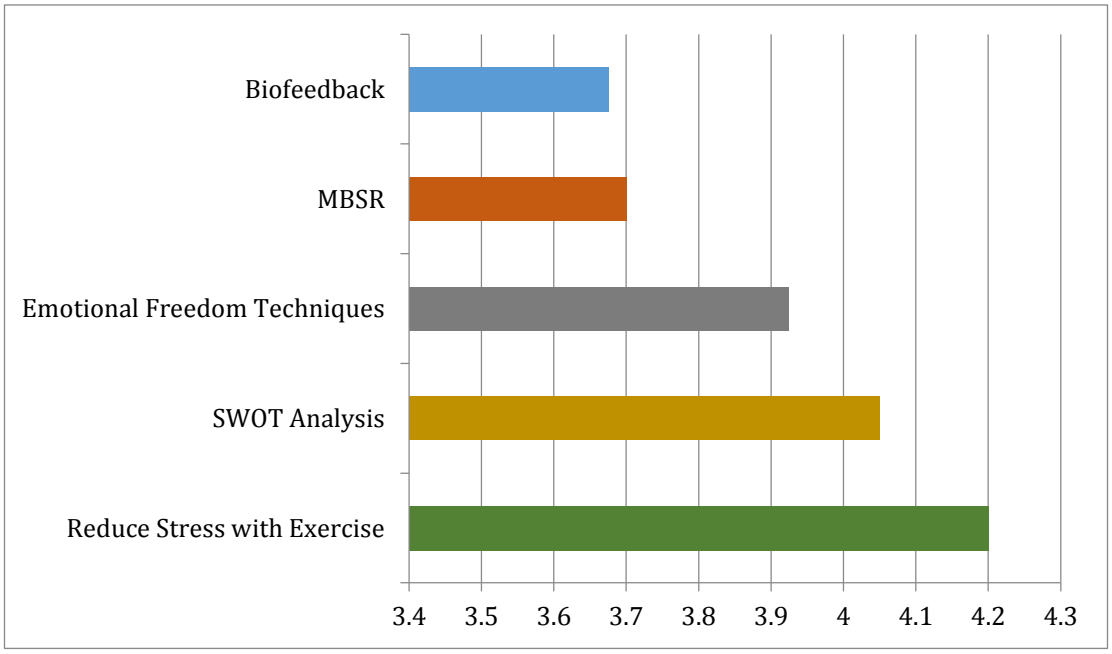

Figure 4.14: Graphs for Ranking for Stress Releasing Method

Table 4.12: Ranking for Stress Releasing Method

Ranking	Releasing Method	Average Mean	Standard Deviation
1	Reduce Stress with Exercise	4.200	0.911465
2	SWOT Analysis	4.050	0.814925

3	Emotional Freedom Techniques	3.925	0.888314
4	Mindfulness-Based Stress Reduction	3.700	0.966092
5	Biofeedback	3.675	1.022503

According to the Table 4.12, Reduce Stress with Exercise was ranked into highest in this study. It indicates 4.2 mean with 0.911465 of a standard deviation. Respondents agree that exercise not only can relax their body physically, it also can relax mentally by refreshing their mind. However, SWOT Analysis has second highest ranking over the overall stress releasing methods. It obtained mean with 4.05 and 0.814925 of standard deviation. Most of the respondents think that they need to identify Strength, Weakness, Opportunity and Threat of each project to track the construction problem which could reduce the stress of them. Emotional Freedom Techniques was ranked as third in this study. It obtained 3.925 of mean with 0.888314 of standard deviation. It is the techniques used to attract attention, emotional intensity and discomfort to optimize emotional health (Energy therapy and Mercola, 2015). Respondent agrees that by using EFT can reduce negative emotions, reduce or eliminate food cravings and pain and implement positive goals which can bring efficiency to the works.

Mindfulness-Based Stress Reduction was ranked at fourth in the releasing methods. It obtained the value of 3.7 for mean and 0.966092 for the standard deviation. MBSR makes greater clarity on what is happening, improving problem-solving and boosting concentration to reduce the stress level they are faced with (Mindful, 2015). MBSR can focus on the body to determine tense or pain, focus on thoughts and distractions for awareness of the unity of mind and body. Thus, project manager can reduce their stress by using MBSR methods. Lastly, the respondent has a consistence agreement that Biofeedback can release stress. Biofeedback obtained 3.675 of mean with 1.022503 of standard deviation. Project managers can reduce stress by attending training patients to control physiological processes such as muscle tension, blood pressure or tension headache (Nordqvist**,** 2014). They also can go for therapist helping in practice relaxation exercises.

4.8 Summary

This chapter presents the data analysis. 40 sets of valid questionnaire survey are collected, with project manager as respondents. Reliability test, factor analysis such as Principal Component Analysis, Communalities, and KMO are used to achieve the objective of the research. From the analysis, it is found that time issues, knowledge, skill and experience and decision making have significant influences in stress of project managers. The hypotheses of this study were established.

CHAPTER 5

RECOMMENDATION AND CONCLUSION

5.1 Introduction

This chapter conducts recommendations and make conclusion based on discussion through the data analysis. Recommendations will be given under this study in order to resolve the stress facing by the project manager to ensure the work performance is good and increase the efficiency and effectiveness of a project. Recommendation will be released or resolve of stress for future study. In the conclusion, there will be summarized findings under this study to determine the objective outline had been established.

5.2 Summary of Finding

This section presents the summary of the findings. The first objective is to identify and rank the stress factors of construction project managers. The factors of stress were categorized into three types, namely traditional stress, contemporary stress and psychology stress, for the purpose of easier data interpretation. Traditional stress refers to time, budget constraint and quality; contemporary stress refers to sustainable issue and working environment; psychology stress refers to authority issue, problem solving, cultural differences, knowledge, skill and experience.

Time, knowledge, skill and experience (KSE) and budget constraint have been identified as three highest stress factors respectively. From the finding, these factors allow the project manager to concentrate on other task and resolve it by using suitable releasing methods. The stressor factor identifies to reducing the project manager's emotional and physical burden. It can impact to work directly and affect the whole construction process which may lead to completion delay. Other than that, it can also impose a danger to health. Thus, the stress factor must be reduced to avoid any harmful effect. Besides, each stress factors items are ranked in this study as it allows project manager take attention on the specific factors. By taking attention on the specific factors, the project manager can put more effort to complete other stressful task instead of stressing in those factors.

The second objective is to identify the effective stress releasing method for project managers. Reducing stress with exercise is ranked as highest among the stress releasing methods. Those who exercise regularly are 25% less likely to develop stress (Michael and Jasper, 2011). This is because exercising releases endorphins – hormones that make us feel good. The number two best releasing method is doing SWOT analysis. By doing SWOT analysis, the project managers are more likely to identify the strength and weaknesses of a project and take better preventive measures.

The finding is able to help project managers to identify and finally seek out best alternatives to reduce stress to allow the project managers to be more focused on their task.

5.3 Limitation of Study

This study has limitations as due to the time constraint, there is very less amount of respondent is responding to this questionnaire. Data collected from respondents may consist slightly inaccurate and inconsistent as the entire respondent having their stress in different ways. Moreover, the data collected from the questionnaire were not ideal since the 100 questionnaire distributed, there are only 40% or 40 sets of questionnaire was return only. I only able send the second reminder to the respondent,

don’t have sufficient time to send a second reminder for those ignore or forget to return.

Besides, this study was conducted in Penang, Kuala Lumpur and Johor only because three of this big city having a lot of project, keep project manager in stressful path. Due to the resources limitation, there was few questionnaire distributed by face to face. Thus, the data collected from this study cannot represent whole Malaysia.

This study emphasized on stress factors which affecting project managers in construction field only as project manager carried most critical task during construction time. Therefore, this study is not suitable for manager position in another field.

5.4 Recommendation for Future Study

Stress of project manager is getting more due to lack of study on the appropriate releasing methods. There are a lot of scope in stress factor and its impact which can be conducted. Thus, the future recommendation in this study can be undertaken as below:

- To study another field manager position

The next researchers are required to study another field manager’s position as they have their stress in different way. Throughout this, we can understand the problem of the other field and stress level faced by them. The future study is to overcome the stress problem which may lead stress from several aspects.

- To identify the new stress factor on BIM project or highly collaborative project

Stress can bring a huge impact to a person which may influence the health of a person. This will indirectly affect the construction project as stress is out of control sometimes. Researcher is recommendation to identify the new stress factor on BIM project or highly collaboration project to ensure the project can be delivered in the best way. Thus, the stress factor should be determined to prevent any problem which may cause the performance of the work drop down and allow paying more attention on critical work.

5.5 Conclusion

Stress of project manager is a cumulative problem in construction industry. The factors of stress have been identified in Chapter 2.6 with ten major stress factors. Each factor has been going through the reliable and validity test in Chapter 4.4. Meanwhile, after run out the analysis, the factors of stress have been ranked from top to last with mean. Figure 4.7 is a ranking of the major stress factors meanwhile the Figure 4.8 is a ranking of sub-factors for stress. The first most significant factor is time issue. When a project faces delay, the project manager will be fined with liquidated damage which reduces their profit margin. The second most important factor is knowledge, skill and experience. Some of the respondents in this study having working experience of less than 5 years. These project managers are not exposed much to site yet and are incompetent in skills and knowledge. They may not be able to optimize the usage of time because they cannot predict the work programme well. The third significant stress factor is decision making. Due to their position as project managers, they have to often make immediate and crucial decision. For example, changing to a cheaper tile may be wise to save cost but will affect quality. This proves that traditional stresses (time, budget constraint, quality) are still the most prevalent stress factors even though there are many other stress factors (sustainable issue, working environment and etc) out there.

The result of sub-factors reduces from 44 to 35 items after carrying out the analysis. Moreover, four key stress factors are identified under chapter 4.5.2 to examine the most critical factors collected from respondent. Most of the respondents agree that the four key stress factors affected them. The distribution of key stress factors are under Figure 4.9, Figure 4.10, Figure 4.11 and 4.12.

In order to reduce stress, several stress releasing methods are identified under this study. There are five releasing methods that were investigated in this study. All the methods have passed the threshold of the analysis. Besides, a ranking of the stress releasing methods has been examined in figure 4.14 from top to five. The number one releasing method is to exercise. This is because exercising pumps up our endorphins and improves in our moods. The second releasing method is to identify SWOT analysis. Through SWOT analysis, the project manager is able to identify more clearly work task and be confident to finalize his decision.

As a conclusion, the aim and objectives of this study have been achieved. Project manager can take more attention on the stress factors and reduce the stress by releasing methods.

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APPENDICES

APPENDIX: Survey Questionnaire

A Study of Stress of Project Manager in Construction Project

All information to be given will remain confidential and use for study purpose only.

Section A: Respondent Profile

Company Name:

Company Address:

Age of Respondent:

Years of Working Experience:

- Less than 5 years
- 6 to 10 years
- 11 to 15 years
- More than 15 years

Degree of Qualification:

- Technical Certificate
- Diploma
- Degree
- Master above
- Other:

Service Sector:

- Public Sector
- Private Sector

Project Value:

- Less than 5 millions
- 6 to 10 millions
- 11 to 15 millions
- More than 15 millions

Section B: Factors Causing Stress to Project Manager

In your opinion, which are the factors causing stress to you in construction project management: Please rank the level of agreement for statement below:

Strongly disagree = 1 Disagree = 2 Less agree = 3 Agree = 4 Strongly agree = 5

Time Issues

Achieve short project deadline

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Resposible for deadline delay

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Plan realistic schedule

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Implement the schedule

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Response for schedule delay

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Cost Issues

Achieve constraint project budget

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Resposible for budget overrun

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Lack of fund to support the job execution

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Allocate sensible task cost

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Task cost control

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Fluctuation of market price (i.e.labour, material, machinery)

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Quality Issues

High expectation in work quality

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Tedious quality inspection

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Overload of remedial proposal

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Recurring remedial work

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Authority Issues

Limited authority in project delivery team (in conjunction with Client, architect, engineer, etc)

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Lack of top management support

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Lack of influencing power at operational level

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Unfollowed Instruction by internal team

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Autonomy in functional manager

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Problem Solving

Endless problem resolution

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Tedious problem identification

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Solve complex problem

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Make strategic solution

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Decision Making

Decision in broader sense of managerial discpline

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Make immediate decision

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Make thoughtful decision

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Prioritization issue in decision

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Directed decision from top management without prior knowledge

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Culture Difference and Conflict

Communication problem

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Diversity of perspectives

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Conflict in expectation/ outcomes

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Conflict in job roles and responsibilities

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Conflict Resolution

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Knowledge, skill and experience

Lack of practical experience

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Short of specific knowledge and skill

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Wider and deeper knowledge, skill and experience are required

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Sustainable Issues

Rising of environmental concern in construction industry

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

New requirement and standard on sustainable building

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Procurement of sustainable resources on site

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Sustainable way of waste management on site

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Working environment Issues

Safety performance on site and surrounding

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Health hazard on site and surrounding

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Pollution on site and surrounding (i.e. noise, water, air)

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Section C: Stress Impacts

In your opinion, which are the stress symptoms you are Experienced or Experiencing: Please rank the level of frequency for statement below:

Never = 1 Seldom = 2 Sometimes = 3 Often = 4 All the time = 5

Headache

	1	2	3	4	5	
Never	○	○	○	○	○	All the time

Chest pain

	1	2	3	4	5	
Never	○	○	○	○	○	All the time

Fatigue

	1	2	3	4	5	
Never	○	○	○	○	○	All the time

High blood pressure

	1	2	3	4	5	
Never	○	○	○	○	○	All the time

Stomach Upset/ Ulcers

	1	2	3	4	5	
Never	○	○	○	○	○	All the time

Restlessness

	1	2	3	4	5	
Never	○	○	○	○	○	All the time

Sleep problem

	1	2	3	4	5	
Never	○	○	○	○	○	All the time

Angry outburst

	1	2	3	4	5	
Never	○	○	○	○	○	All the time

Anxiety

	1	2	3	4	5	
Never	○	○	○	○	○	All the time

Low self esteem/ confidence

	1	2	3	4	5	
Never	○	○	○	○	○	All the time

Lack of motivation

	1	2	3	4	5	
Never	○	○	○	○	○	All the time

Tobacco use and incease in intensity

	1	2	3	4	5	
Never	○	○	○	○	○	All the time

Social withdrawal

	1	2	3	4	5	
Never	○	○	○	○	○	All the time

Increase in consumption of alcohol

	1	2	3	4	5	
Never	○	○	○	○	○	All the time

Section D: Stress Releasing Methods

In your opinion, which are the effective stress releasing methods that can be used to release the stresses as identified in section B:

Please rank the level of agreement for statement below:

Strongly disagree = 1 Disagree = 2 Less agree = 3 Agree = 4 Strongly agree = 5

SWOT analysis

(improve ability of employee to deal with difficult work situation)

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Exercise technique

(deep breathing, progressive muscle relaxation, massage therapy, etc)

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Mindfulness-based stress reduction

(meditation, gentle yoga and mind-body exercise)

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Emotional freedom techniques

(attract attention, emotional intensity and discomfort and psychological acupressure techique)

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Biofeedback

(control physiological processes such as muscle tension, blood pressure or tension headache))

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Section E: Others

Please specify the answers that are not mentioned **in Section B, Section C and Section D.**

Please specify other factor(s) causing stress to project manager

Please specify other stress impact(s) you are experienced or experiencing

Please specify other effective stress releasing method(s)