WORK SITUATION AWARENESS, INCIDENCE OF ACCIDENTS AND SEVERITY & JOB SATISFACTION IN THE CONSTRUCTION INDUSTRY

by

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A dissertation submitted in partial fulfillment of the requirements for the
Degree of Bachelor of Health Sciences (Hons)
(Environmental and Occupational Health)

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CERTIFICATE

This is to certify that the dissertation entitled 'Work Situation Awareness, Incidence of Accidents and Severity, & Job Satisfaction in the Construction Industry' is the bonafide record of research work done by Nurhaniza Harun, Matric Number 109518 during the period of July 2013 to June 2014 under my supervision. I have read this dissertation and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation to be submitted in partial fulfillment for the degree of Bachelor of Health Sciences (Hons) (Environmental and Occupational Health). Research work and collection of data belong to the Universiti Sains Malaysia.

APPROVAL PAGE

This is to certify that I have read this dissertation and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation submitted in partial fulfillment for the degree of Bachelor of Health Sciences (Hons) (Environmental and Occupational Health).

DECLARATION PAGE

I hereby declare that this dissertation is the result of my own investigations, except where otherwise stated and duly acknowledged. I also declare that it has not been previously or concurrently submitted as a whole for any other degrees at Universiti Sains Malaysia or other institutions.

Dedicated to my mother, my father, my siblings, and my loved one for their love, sacrifices and inspiration

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LIST OF ABBREVIATIONS

CIDB	Construction Industry Development Board
DOSH	Department of Occupational Safety and Health
JSS	Job Satisfaction Survey
LOS	Length of Service
OHS	Occupational Health and Safety
PPE	Personal protective equipment
SOCSO	Social Security Organisation
SPSS	Statistical Packaging for Social Sciences
WSA	Work Situation Awareness

LIST OF SYMBOLS

d	Degree of Accuracy
df	Degree of Freedom
et al.	*Et alia* (and others)
N	Population size
p	*p value*
r	Correlation value
t	*t value*
X^2	Table value for the Chi-Square
%	Percentage
<	Less than
>	More than

KESEDARAN SITUASI TEMPAT KERJA, INSIDEN KEMALANGAN DAN TAHAP KETERUKAN, & KEPUASAN KERJA DI INDUSTRI PEMBINAAN

ABSTRAK

Industri pembinaan merupakan antara yang paling berbahaya, seperti yang dikadarkan dengan kematian disebabkan kerja, kadar kecederaan, dan bayaran pampasan pekerja. Objektif utama kajian ini ialah untuk mengkaji dan mengenal pasti status semasa kesedaran situasi tempat kerja, insiden kemalangan dan tahap keterukan, dan kepuasan kerja dalam kalangan pekerja di tapak pembinaan. Hubungan antara faktor-faktor ini dengan taburan data sosio demografi turut dikaji. Kajian ini dijalankan bermua dari Disember 2013 sehingga Mac 2014. Kaedah kajian yang digunapakai untuk tesis ini adalah berdasarkan soal selidik yang tertumpu kepada 369 orang pekerja am di tapak pembinaan. Responden telah mengisi soal selidik melalui pernyataan pendirian mereka dengan menanda setiap ítem soalan menggunakan skala 5-point Likert, berjulat antara sangat tidak setuju kepada sangat setuju. Set soal selidik ini merupakan kombinasi antara Skala Kesedaran Situasi Tempat Kerja, Kajian Insiden Kemalangan dan Tahap Keterukan, dan Kajian Kepuasan Kerja. Kajian mendapati bahawa pekerja am di tapak pembinaan merekodkan nilai purata min terhadap kesedaran situasi tempat kerja. Tiada impak signifikan sosio demografi ke atas kesedaran tersebut. Namun, pekerja tapak pembinaan merekodkan nilai min yang lebih tinggi terhadap pengenalpastian insiden kemalangan dan tahap keterukan, dan kepuasan kerja. Tiada impak signifikan sosio demografi ke atas keterukan insiden, namun terdapat signifikan antara kepuasan kerja dan tempoh perkhidmatan, $p<0.05$ dengan nilai ($p=0.014$). Terdapat hubungan positif yang lemah, $p<0.05$ antara kesedaran situasi tempat kerja dan kepuasan kerja dengan nilai ($r=0.133$). Berdasarkan hasil dapatan kajian, pemantauan dan penguatkuasaan keselamatan adalah perlu bagi memastikan keberkesanan kesedaran situasi tempat kerja, pencegahan kemalangan dan kepuasan kerja pekerja di tapak pembinaan.

WORK SITUATION AWARENESS, INCIDENCE OF ACCIDENTS AND SEVERITY, & JOB SATISFACTION IN THE CONSTRUCTION SITE

ABSTRACT

Construction industry is among the most hazardous, as measured by work-related mortality, injury rates, and workers' compensation payments. The main objective of this study was to investigate and identify the present status of work situation awareness, incidence of accidents and severity, and job satisfaction among the general workers at the construction site. The correlation between these factors with socio demographic data was evaluated. The study was conducted from December 2013 to March 2014. The methodology adopted in this study was based in comprehensive questionnaire targeting 369 general workers of construction site. Their preference was rated using a 5-point Likert scale ranging from very disagree to highly agree. The questionnaire set is a combination of Work Situation Awareness Scale, Incidence of Accidents Severity Survey and Job Satisfaction Survey. It was found that construction workers showed an average mean of work situation awareness. There was no significant impact of socio demographic on the awareness. In contrast, the construction workers recorded a higher mean of identification of accidents' severity and job satisfaction. There was no significant impact of socio demographic on the accidents' severity, however, there was significance between job satisfaction with the length of service, $p<0.05$ with ($p=0.014$). Result revealed a poor positive correlation significance, $p<0.05$ between Work Situation Awareness and Job Satisfaction with ($r=0.133$). Based on the findings from the study, monitoring and safety enforcement are necessary for effective construction working situation awareness, accident prevention, and job satisfaction of the workers.

CHAPTER ONE

INTRODUCTION

1.1 Current scenario of the occupational safety and health in the construction industry

Construction industry plays a major role for the development and achievement the goals of society. Navon, (2005) stated in his study that the construction is one of the largest industries and contributes to about 10% of the gross national product (GNP) in industrialised countries. The construction industry is among the most hazardous, as measured by work-related mortality, injury rates, and workers' compensation payments (Glazner et al., 1998; United States Department of Labor, 2000). Construction safety is of grave concern around the world due to its unique nature (Behm, 2005; Fang et al., 2004; Kartam et al., 2000). In construction, safety is also an integral component of a construction project that cannot be isolated from other project elements. Hinze (1997) advocated the idea that safety is no luxury but a necessity. In recent years, many construction companies have recognised this importance that the establishment of good safety culture can help controlling and reducing the construction costs and increase the efficiency of their ongoing operations in long term.

The standard on Occupational Health and Safety Assessment Series (OHSAS) 18001:1999 offers a good framework for safety in construction operations. The OHSAS 18001 specifies requirements for an organization to control its occupational health and safety (OHS) risks to improve its performance (BSI, 1999;

Pun et al., 2003). Health and safety issues are not confined to the construction phase of a project but occur throughout a project or facility's life. Many of the common health and safety problems encountered during construction and operation could be avoided if due consideration and effort were invested during the project brief and design phases (Haywood, 2004). Occupational health and safety risks should be assessed and control decisions made in the concept design, project planning, specification and tendering, and contractor selection stages of a construction project (European Construction Institute [ECI], 1996). It is important that the structure of the construction industry and the organizational processes adopted be examined in order to identify methods of achieving increased integration of occupational health and safety risk control decision-making between parties to a project.

The working environment in construction is constantly changing, sites exist for a relatively short period of time, and the activities and related hazards and risks change daily, which means that occupational health and safety vigilance and awareness is critical. In construction industry, it may be more challenging to achieve persistent intervention effect because of the dynamic and transitory nature of construction sites and workforce (Ringen et al., 1995). The complicated environment and placeless machinery and workforce on construction sites may bring great uncertainty to the intervention outcomes. The nature of the construction industry's rapidly changing conditions, associated work hazards, and the characteristics of construction organizations further aggravate the situation. Lee (1993) noted in the study that the mobility of workforce on construction sites may be much higher than that in many other industrial settings, especially under the system of labor subcontracting.

It is not unusual to observe that actual schedule and quality performances are different from planned performances (e.g., schedule delay and rework) during a construction project. Such differences often result in production pressure (e.g., being pressed to work faster) and negatively affects safety performance. As progress deviation increases, workers are encouraged by management to complete their work within the contract time. The resulting production pressure (e.g., being pressed to work faster) adversely affects safety performance (Goldenhar et al., 2003; Mitropoulos and Cupido, 2009). Rework that results from quality deviations is also a major contributor to production pressure (i.e., schedule pressure),which consequently degrades safety management (Rodrigues and Williams, 1998; Love et al., 1999; Park and Pe˜na-Mora, 2003). Safety is then affected by the turnover when the cumulative experience of on-site workers deteriorates. Mitropoulos and Cupido (2009) additionally showed that accident rates can be reduced through the prevention of errors during dangerous activities.

In construction, rework results from quality deviations caused by changes, errors, and omissions during design and construction (Sommerville, 2007). Rework, which means to work again, is a major contributor to schedule delays and cost overruns, which are negative factors in safety management (Park and Pe˜na-Mora, 2003; Lee et al., 2005). Love and Edwards (2004) stated that rework often requires diverting resources (e.g., overtime work, new hires, pushing workers to work fast) for the recovery, undermines the effective super-vision of other work and results in demoralization, fatigue, and absenteeism, all of which have a negative effect on project safety.

Suraji et al. (2001) found in their study that everyone involved in the construction project will have the potential to initiate inappropriate constraints that are likely to increase the risk of accident. Workers on sites are likely to work under inappropriate construction control, unsafe site condition or unreasonable work arrangement caused by their superiors. A study by Evelyn et al (2005) revealed that site accidents were more likely to happen when there were inadequate company policies, unsafe practices, poor management commitment, and insufficient safety knowledge and training of workers. Nowadays, one of the most pressing concerns for this construction industry is the occupational safety and health which is an increase in the accidents and health problem (Solicitors, 2010). Occupational safety and health issues are not limited to the construction stage of a construction project management but also arise throughout a project's life (Haywood, 2004). According to Chan et al. (2005), accidents happen due to a random combination of many contributing factors. Many studies revealed that the majority of accidents and resulting injuries are attributed to unsafe work practices of the workers rather than unsafe working conditions (e.g. Garavan and O'brien, 2001).

The majority construction fatalities in the worldwide results from fall from heights, burial by earth collapse during excavations, struck by moving vehicle, motor vehicle, etc. The poor health and safety records in construction are generally by these reasons (Fung et al., 2010) : high-risk nature in construction work, building terns decreasing, insufficient health and safety solutions in phase of construction preparation, low demands on site facility according to law, complicated contractor system with big amount of subcontractors, thin exercitation of collective protection and technical safety by reason of the building costs increasing, low level and absence

or malfunction of safety management and control systems especially in small construction companies and tradesman, as well as low knowledge and a serious lack of construction safety risk awareness of persons in industry. Individuals working for smaller contractors may be at greater risk, as safety problems are more prevalent at smaller construction companies (Cheng et al., 2010; Kines & Mikkelsen, 2003; Shalini, 2009). Worksite training is often inadequate (Hung et al., 2011), on-site safety professionals are rare, safety innovation has lagged behind commercial construction, and conventional methods of fall protection are rarely used (Kaskutas et al., 2010a,b).

Researches also showed that the main causes of the fatalities in construction are due to falls, struck-by incidents, caught in/between incidents and electrocutions. It has been also indicated that the most significant factor in construction site accidents is the unsafe behaviour (Sawacha et al., 1999). In construction, few studies have examined the mechanism through which organizational factors influence individual safety behaviour at work (Griffin and Neal, 2000). For example, researchers have examined factors associated with safety climates (Mohamed, 2002) within construction organizations and have suggested the need for a fundamental shift in one understanding of how safety is to be managed. The incident rate decreases with the reduction of unsafe behavior (Tomas et al., 1999; Choudhry et al., 2008). Safer behaviour is reflected by good attitude. Many accidents/incidents that occurred in the workplace especially in the building construction sites are due to inadequate adherence of workers to work procedures. Mullen (2004) found, when interviewing people in various occupations about what influenced their safety behavior, that when resources were inadequate, there was pressure from both

managers and coworkers to prioritize performance over safety, and that such pressure swiftly socialized individuals to adapt and consider unsafe practices as normal.

For construction sites with 50 employees or more, the contractors have to nominate a full time safety inspector on site; for sites exceeding 10,000 m^2 there must be at least 2 safety inspectors on site; wherever the sites exceed 50,000 m^2, the main contractor has to establish a safety management team (Tam et al., 2004). Safety demands planning and definition of detailed procedures to be effectively implemented in the field. Therefore, safety and health professionals need to be involved during the project's procurement and preconstruction phases. Jeffcott et al. (2006) demonstrated that if there is a tendency to assign blame for incidents and accidents, safety management tends to become increasingly proceduralised. Fang et al. (2006) stated that workers with good safety knowledge have a more positive safety climate than those with poor safety knowledge. Wallace et al. (2006) found that management–employee relations and organizational support were positively related to good safety climate, which in turn predicted a lower frequency of occupational accidents. The top skills demonstrated by superior construction mentors include the ability to communicate, share knowledge, and correct mistakes (Hoffmeister et al., 2011).

Safety programs are one of best ways in improving site safety performance (Tam et al., 2004). An effective safety programme can substantially reduce accidents because it could help management to build up safer means of operations and create safe working environments for the workers (Abdelhamid and Everett, 2000; Rowlinson, 2003). More than preventing injury to workers, successful safety

programmes can minimize damage to equipment and tools, loss of market competition, project delays, and damage to company image or reputation (Findley et al., 2004). Although the linkage between safety programs and the actual state of safety has been studied extensively, minimal effort has been made to investigate factors contributing to successful implementation of such safety programs at construction sites (Tam et al., 2004; Sawacha et al., 1999; Findley et al., 2004). Some studies (e.g. Stranks, 2000; Rue and Byars, 2001; Rowlinson, 2003; Tam et al., 2004, Abudayyeh et al., 2006) have identified several factors contributing to successful safety programmes such as worker involvement, management commitment, sufficient resource allocation and teamwork.

According to the Occupational Safety and Health Council (OSHC), PPE means any protective equipment that protects users from being exposed to a potentially hazardous environment (OSHC, 2006). Research has been conducted that using PPE is a factor which would be positively correlated ($r = 0.69$) at significant level of 0.001 to safety performance on construction sites and became the third most important factor affecting safety performance (Sawacha et al., 1999). As mentioned from accident statistics (Labour Department, 2004), the highest rate of causing fatality by single injured body part in construction accident is skull. It is thus essential to provide safety helmets to workers to wear on site at all time. Industrial helmet is made of strong and light material in order to prevent damage from falling objects (Brauer, 2006). A safety helmet will not only prevent head injury accidents, but also minimize the severity of such accidents (Labour Department, 2004).

Safety performance in construction has been associated with many factors, including top management's attitude toward safety, organizational culture (Molenaar et al., 2002), superintendent practices (Hinze & Gordon, 1979; Hinze & Parker, 1978) turnover (Hinze, 1978), job pressures and crew competition (Hinze & Parker, 1978), good working relationships, and safety meetings and safety budget (Jaselskis et al., 1996). As safety training increases, the degree of safety knowledge also increases (Goldberg et al., 1991) and positively influences worker hazard awareness and participation in safety programs (Cohen et al., 1998; Sawacha et al., 1999). Developing a proactive safety culture and safety performance may take a long time and require spending of large amount of money for planning, procedure, programming and implementing into each level within the organisation.

The importance of safety training to improve the safety performance in the construction industry has been addressed by several researchers (Huang and Hinze, 2003; Aksorn and Hadikusumo, 2008). Besides minimizing construction accidents, successful training can also minimize project delays and damage to company image (Findley et al., 2004). Effective training of construction workers can be one of the best ways in improving site safety performance (Hislop, 1991; Tam et al., 2004). Safer behaviour is reflected by good attitude. Many accidents on incidents that occurred in workplace especially in building construction sites were due to inadequate adherence of workers to work procedures. In the study of Zeng et al. (2008), it has been pointed out that some accidents such as falling from height and hit by falling materials in construction could easily be prevented from implementing training programs to employees. The safety performance of the construction industry

has been improving and health and safety has been recognized as an important business performance subject (Myers, 2003; Wilson and Koehn, 2000).

The safety level in construction sites may varies with the project size. Large projects which constructed by large firms may have better safety level and safety records than smaller ones. The implementation of a safety standard to enforce safety requirement is important at work sites. Although there are many factors affecting perception of construction workers towards safety, health and environment, the main factor perceived by the workers is organisational commitment and communication. The awareness and perception of the workers towards safety, health and environment are important aspects to enhance the building construction to the better condition to the workers themselves.

1.2 Problem statement

The construction industry has been recognized as one of the most hazardous industries with poor safety records in worldwide (Carter and Smith, 2001). Although there is an improvement of the safety performance and rising awareness in this industry, the injury rate is remain the highest across all sectors. Construction is always risky because of outdoor operations, work-at-heights, complicated on-site plants and equipment operation coupled with workers attitudes and behaviors towards safety (Choudhry et al., 2008). Workers are exposed to hazards in this industry that are difficult to quantify for reasons closely associated with the way construction work is performed. The complexity of construction work emphasizes the need not only for well-developed safety management strategies, but also for collective norms favoring safety, guiding the employees in the large number of decisions they need to make in their work.

The construction industry has faced a wide range of challenges, one of which is the frequent occurrences of accidents at the workplace. The risk of a fatal accident in the construction industry is five times more likely than in other industries (Sorock et al., 1993; Sawacha et al., 1999). Despite efforts by workers, unions, employers, safety professionals, researchers, and governmental agencies, falls in construction continue to be a significant source of mortality and morbidity. In 2010, falls accounted for one-third of all construction worker fatalities (Bureau of Labor Statistics, 2010). The actual injury burden from falls is likely much higher than statistics reflect (Azaroff et al., 2002; Glazner et al., 1998; Shishlov et al., 2011; Welch et al., 2007).

In the construction sector, workplace accident rates are very high compared to other sectors (Mitropoulos et al., 2005; Abdelhamid and Everett, 2000; Loosemore and Andonakis, 2007; Hinze and Appelgate, 1991; Martínez Aires et al., 2010). The costs associated with these accidents are both human (not directly measurable) and financial, for companies and for society as a whole (sick leave, medical treatment, etc.) (Dorman, 1998). Other costs also arise, such as delays in project implementation, impaired company image or loss of market (Gosselin, 2004; Jallon et al., 2011). Occupational injuries and illnesses impact not only on safety and health, but also economics, because of high costs related with work injuries. Hinze et al. (2006) observed that construction safety has gained attention because of the increasing workers' compensation insurance premiums that resulted from a great increase in work injuries medical costs and convalescent care. Studies across industries suggest that injury rates and costs are higher than average in the construction industry (Dong et al., 2007). Several studies have analysed the economic aspect of health and safety at work and some have shown that employers do not consider investing in safety is financially profitable; in other words, the costs associated with workplace accidents are not considered to be so high that the company need invest in health and safety for the sole purpose of avoiding these costs (Brody et al., 1990; Andreoni, 1986; Gosselin, 2004; Jallon et al., 2011).

A successful construction project must meet with the performance and delivery requirements for time, cost, quality, and safety. Achieving these diverse goals usually creates the complexity and coupling of management elements in a project's execution. In an interview study of the Australian construction industry, Holmes et al (1999) found that risk was largely attributed to the nature of the work,

poor individual work practices, ignorance, and work pressure due to budgetary and time constraints. Constantly changing worksite has marked effect on safety and health, unlike other industrial setting, where tasks are often repetitive and controlled by the location of machinery. The nature of the construction project related to the physical structure being built, the physical possibilities at the worksite for securing the work area, related to the physical situation of the structure, and the complexity of construction work as such. All these conditions create restrictions that "set the stage" on which the work is performed and thus define the limiting conditions according to which all parties involved must adjust safety management. Production pressure is an essential factor in understanding scheduling and quality performances (Nepal et al., 2006) as well as in safety performance in construction operations. A review of the relevant literature reveals that perceived production pressure affects worker productivity and can result in a degradation of safety, which eventually has an impact upon both safety management and accident rates (Hinze,1997; Rundmo et al., 1998; Brown et al., 2000; Mohamed, 2002;Seo, 2005; Mitropoulos et al., 2005).

Production pressure is closely related to scheduling. Hinze (1997) demonstrated that the schedule status of projects is correlated to the frequency of injuries; for instance, subcontractors who were ahead of schedule had a smaller number of injuries, while sub-contractors who were behind schedule obviously had more injuries in their projects. When perceiving production pressure (e.g., excessive workload, required work pace, and time pressure), workers perceive increasing risk and barriers, leading to a higher chance that they will work with unsafe behaviour (Seo, 2005). The customer requests that high safety standards be met, and demands that the contractor specify in the proposal the money to be allocated for safety

measures. Work to be performed is thoroughly planned in advance: risk inventories are taken and work environment and safety are seriously accounted for in planning the work. Enough time is allowed for a "run-in period" in a new project and to perform work, and enough money is allocated to supply adequate equipment. One can count on the support of project management for safety measures, even if it costs money. Sufficient resources are allocated for safe equipment.

Toole (2002) listed the main causes of construction accidents. These are lack of proper training, deficient enforcement of safety, lack of safety equipment, unsafe methods or sequencing, unsafe site conditions, not using provided safety equipment, poor attitude toward safety, and isolated, sudden deviation from prescribed behaviour. Unsafe work practices are common in residential construction (Kaskutas et al., 2009), and controlling hazards to reduce falls is especially challenging in this sector of the construction industry. In an interview study of the Australian construction industry, Holmes et al. (1999) found that some informants cited the nature of the work as a major source of risk in relation to falling, while others attributed this risk to poor work practices, such as working without rails. This finding indicates two different attitudes toward the conditions encountered in construction work, risk acceptance and risk mitigation. The older workers serve as good role models to the younger ones. Safety is highly prioritized by the company and this is expressed, for example, via company safety policy, which is actually enforced. Developing a safe corporate culture is encouraged and the company strives to be a good safety role model in the construction industry.

There are four main types of pollution (i.e. air, noise, waste and water) generated on construction sites had seriously affected labors' health (Mohamed, 1999; Spangenberg et al., 2003). The health hazards affecting construction equipment operators include: vibration to body, awkward postural requirements, dust, noise, temperature extremes, and shift work. Some serious accidents are fatal to the workers including falling from height, electrocution, hit by falling materials and collapse of earthwork (Larsson and Field, 2002; Mu¨ngen and Gu¨ rcanli, 2005; Yassin and Martonik, 2004). Most construction companies are small enterprises, hence it is difficult to ensure internal knowhow about safety maters and usually they also have limited budgets for health and safety measures implementation. Sørensen et al. (2007) pointed out that the size of the enterprise will influence the complicity of the system. It was found that small enterprises are more hazardous, and Kongtip et al. (2008) and Cheng et al. (2010) found that important factors influencing occupational accident in such enterprises included management skills, employers' values, and compliance with laws and regulations.

According to the study conducted by McDonald (2003) at 18 construction site in Ireland stated that safety training is carried out without systematic schedule which primarily to "cover themselves" and protect company if something goes wrong with little expectation that it would influence the knowledge and behaviour of employees. Thus, it seems very clear that majority of employees have to gain knowledge of risks of their work through their experience of work itself. Insufficient safety training between the employees are general root cause of accidents in the construction sites because they did not have the knowledge, education and skills to recognized potential hazards at site.

A study by McDonald (2003) to construction sites recommend that all site should have the safety and health officers which demonstrate potentially strong role of safety and health officer can influence both behaviour and compliance of employees with safety requirements. The study stated that the strongest relationship with safety compliance is the presence of safety and health officer with better safety management performance for example response to audits and reporting the hazard to ensure it leads to better safety compliance on site in future. Thus, it is agreed that safety and health officer is highly empowered to change or improve the company's safety performance. The supervisors in construction sites must fully aware of their responsibility for safety. The safety representative has a mandate to act. The supervisor follows up to ensure that safety measures have actually been implemented. The employer also has to supervise employee from time to time to ensure they will always follow the rules to wear safety tools to keep their safety is always a priority when perform jobs at construction sites.

Construction industry is an aggregate of many specialized groups working together in the same space. Construction projects typically involve multiple employers and a variety of trades, which carry on a diversity of tasks on project sites. The huge challenges faced by employer is majority of the construction employees in Malaysia especially in Klang Valley area is foreigner where some of them brought the behaviour by their culture of their home country which agricultural base for example not used to wear personal protective equipment. Poor communications can influencing safety performance in the construction site, for example, in many countries a high proportion of the workforce does not speak the native language,

hence it is difficult for safety managers to communicate the potential hazards that may occur.

In industry, safety interactions between supervisors and employees have been reported to decrease unsafe behaviors and improve the safety climate (Zohar & Luria, 2003). Despite findings that construction supervisors knew more about safety and had higher risk perception ratings than their workers, first line supervisors rarely corrected their workers' unsafe behaviors (Hung et al., 2011). If safety systems are too elaborate, there is a risk they could lead to complacency or overreliance on the safety systems. Loukopoulou (2008) demonstrated that even in highly standardized work tasks it is impossible to rigidly follow procedures, since circumstances even in such work vary substantially and a large number of ad hoc adjustments must be made.

1.3 Significance of the study

The major significance of this research through work situation awareness, accidents' severity and job satisfaction among workers in the construction industry can be related as follows. First, it is important to implement and practice occupational safety to manage hazard and safety risks associated with construction site work processes. The implementation and comprehension of the importance of occupational safety is not only to secure work and make profit, but it also means to encourage workers to act responsibly and to provide a safe work environment to the employees.

Second, the analysed data on work situation awareness, accidents' severity and job satisfaction can be adopted by the construction industry to continuously improve their safety performance among workers, specifically on general workers. The study is able to act as an indirect evaluation of the occupational safety practices among workers in the industry. Third, the development and demand of construction industry has put the role of occupational safety practices into focus. For the past few years, construction leaders have witnessed an industry in peril. Nowadays, the standards of quality and productivity have been raised without a corresponding increase in price. This research was undertaken to assess work situation awareness, accidents' severity, and job satisfaction in order to achieve and sustain the goal of zero accidents, while improving the quality, productivity and the competitiveness of the construction industry as it moves forward.

1.4 Conceptual framework

In this study, descriptive research was used to describe the characteristics of work situation awareness, severity of accidents and job satisfaction among the general workers in construction industry. By using this framework, it aimed to explore the understanding of human behaviour and the reason that govern such behaviour. Hence, this study cannot describe what caused a situation, and cannot be used to as the basis of a causal relationship, where one variable affects another.

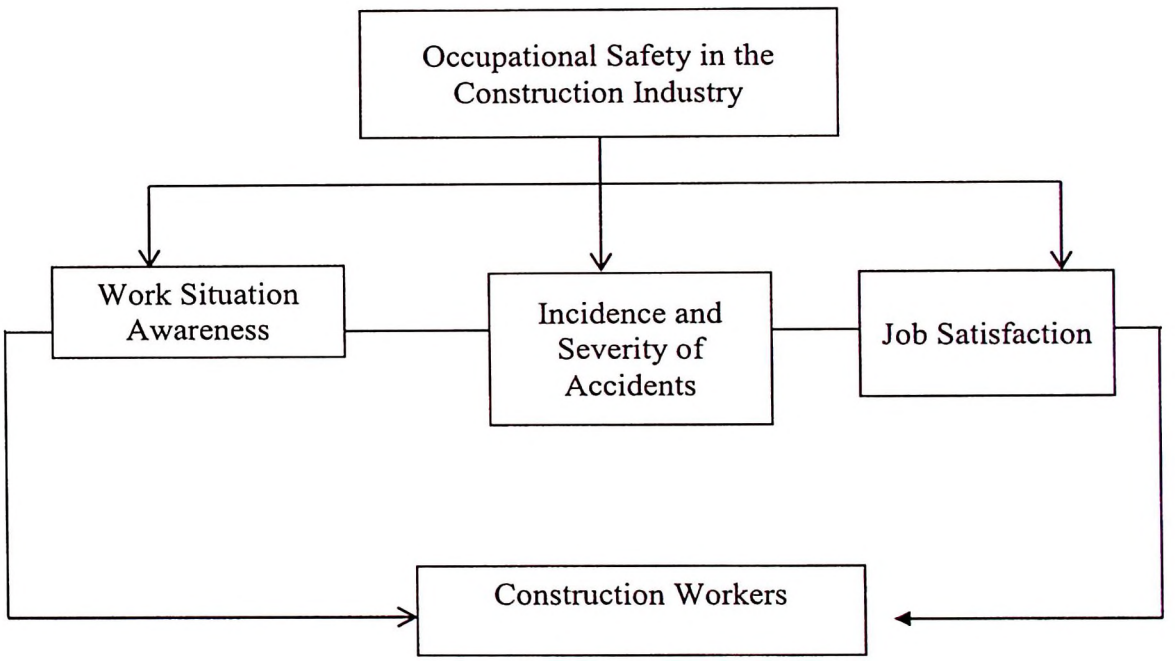

Figure 1.1 : Conceptual framework of this study

1.5 Research objectives

1.5.1 General objective

The general objective of the study was to identify the occupational safety approaches and practices implemented by the construction industry.

1.5.2 Specific objectives

1. To assess the working situation awareness among the general workers in the local construction industry.
2. To evaluate the incidence of accidents' severity in the local construction industry.
3. To examine the job satisfaction among the general workers in the local construction industry.
4. To establish the relationship between work situation awareness, incidence of accidents' severity and job satisfaction in the local construction industry.

1.6 Scope of the study

Although equally applicable to other construction industries, the study was limited itself to one of the local construction site in Selangor, Malaysia owing to the limited timeframe of the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Construction industry

2.1.1 Development and demand of the construction industry

The construction industry is vitally important due to its mega size and huge output, which underpins various economic activities and contributes to the delivery of social and environmental objectives of a nation (HSE, 2009). Researchers have noted that safety in construction is complex due to the industry's unique work hazards, rapidly changing conditions and the characteristics of construction organizations (Choudhry and Fang, 2008; NORA Construction Sector Council, 2008). Both in construction and other industries, the consideration of safety and health requirements since the early stages has been widely recognized as a beneficial approach for the occupational safety and health management (DOSH, 2008). The construction industry in the United States accounts for about 10 percent of the gross domestic product, with an annual dollar volume of USD450 billion. The industry employs five percent of the nation's work force—yet that five percent experiences a disproportionate 20 percent of all traumatic occupational fatalities and 12 percent of the total number of disabling injuries (BLS, 2010).

Due to the development of the construction industry, it is important to implement safety and being accepted as a principle to reduce injuries. Large company are dedicating more manpower, time, and resources to safety than in the past. The safety practices and performance are important to the entire industry. Large

construction companies have the greatest impact on the overall safety record of the construction industry. The construction industry poses a particular challenge for the attainment of consensus and the making of risk control decisions that are equitable and acceptable to all parties involved in the construction process. The industry is fragmented with different mixes of professional practices, contractors, and subcontractors on each project (Walker, 1996). In another study of construction firms in Victoria, larger business employers were found to view occupational health and safety as something to be integrated into their management systems, whereas small business employers did not focus on systems of management and believed occupational health and safety risks to be created by employees and therefore viewed risk control as the responsibility of employees (Holmes 1995; Holmes & Gifford, 1996, 1997).

In Malaysia, the construction industry plays an instrumental role in the country's development. It acts as a catalyst to spur the growth of other sectors in the nation's economy and as such, the industry has often been referred to as the `engine of growth'. The construction industry provides the economic and social infrastructure for the country's development needs. The establishment of the Construction Industry Development Board (CIDB) in 1994 is another important step taken by the government to spur and monitor the overall improvement and development of the industry. It is hoped that the CIDB will be the facilitator and enabler of the development of the Malaysian construction industry. The construction industry in Malaysia is one most contributor to create wealth for the country's economic growth. Improving safety remains a priority in every country around the world because it is

one main contributor which ranks high in the rates of severe and fatal occupational injuries compare to other industries (Bhattacharjee and Gosh, 2011).

The government realised that a healthy construction sector is vital in order to spur growth in the economy, a pre-requisite for achieving the objectives of Vision 2020. An important measure taken by the government is the establishment of the CIDB whereby its main objective is to develop the construction industry to be a major contributing sector to the national economy and capable of producing and delivering high quality construction works, with value for money and responsive to the nation's needs. Malaysia aims to match developed nations, such as the United Kingdom, the United States of America and Japan, which already maintain their accident rates to three per 1000 workers (CIDB, 2009). This target, however, is very hard to achieve without the full participation and commitment of the parties involved. There has been massive financial investment, plans and strategies, and several authorities have been created to ensure that all the programmes related to safety are working.

Table 2.1 presents the number and value of projects awarded by category in year 2013, which divided into residential, social amenities and infrastructure categories. The number of projects by project value range is presented in Table 2.2, range from exceeding RM 1 million to exceeding RM1,000 million. While projects awarded by site location is showed in Table 2.3. These show an increase of development and demand of construction industry in Malaysia.

Table 2.1 : The number and value of projects awarded by category in Year 2013 (CIDB, 2013)

Month	Project Category					
	Residential		Social Amenities		Infrastructure	
	Number	Value (RM m)	Number	Value (RM m)	Number	Value (RM m)
Jan	164	2,610.98	65	589.63	169	1,765.16
Feb	134	1,882.62	75	746.29	184	1,363.01
March	193	2,372.13	57	1,724.05	176	3,175.74
April	184	2,690.36	63	1,614.12	162	3,927.14
May	204	3,633.55	64	162.08	153	1,966.72
June	131	1,992.39	42	266.06	145	1,450.04
July	172	2,069.00	60	1,001.33	159	848.62
Aug	146	3,716.91	22	160.64	110	1,354.11
Sept	150	3,380.57	37	346.00	105	1,079.81
Oct	92	1,772.02	30	279.21	116	1,336.39
Nov	63	1,524.39	22	158.30	44	505.52
Dec	3	49.07	3	3.20	20	48.07

Table 2.2 : The number and value of projects awarded by status of contractors and project value range in Year December 2013 (CIDB, 2013)

Project Value Range (RM million)	Total No of Projects	Government Project		Private Project	
		Number	Value (RM m)	Number	Value (RM m)
Exceeding 0.5 to 1	1,013	250	189.20	762	566.23
Exceeding 1 to 5	2,759	766	1,897.98	1,993	5,076.97
Exceeding 5 to 10	820	178	1,239.61	642	4,629.13
Exceeding 10 to 50	1,042	200	4,631.03	842	18,337.46
Exceeding 50 to 100	195	48	3,429.33	147	10,507.68
Exceeding 100 to 300	130	34	5,643.59	96	16,299.05
Exceeding 300 to 500	17	3	1,353.89	14	5,319.30
Exceeding 500 to1,000	7	2	1,530.45	5	3,662.64
Exceeding 1,000	2	-	-	2	7,990.51