

EVALUATION ON MALAYSIA SAFETY AND HEALTH INDUCTION
COURSE FOR CONSTRUCTION WORKER

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To my beloved
friends and family

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ABSTRACT

Workplace safety is the main concern of facilities managers due to high fatality rates in Malaysia construction industry. In order to improve the safety performance of the worker, Safety and Health Induction Course for Construction Worker (SICW), the only mandatory safety training in Malaysia construction industry has been introduced to improve the employees' safety knowledge and awareness. However, SICW has never been evaluated in term of its effectiveness in delivering safety knowledge and awareness to the workers since it was introduced. Therefore, the objectives of this research were to evaluate the effectiveness of SICW in delivering safety knowledge and awareness to the workers and to suggest the factors that will improve its effectiveness. Pre-test (before training) and post-test (after-training) evaluation method has been employed in this research to evaluate the effectiveness of SICW. Two sets of questionnaire were employed, one was distributed before the training started and another was distributed after the training ended. The data obtained from two sets of questionnaire were then compared to analyse the changes in terms of safety knowledge and awareness after attending SICW. The results showed that both participants' safety awareness and safety knowledge have some improvements after the training, however only safety knowledge showed significance difference. The overall findings showed that SICW was effective in improving the safety knowledge and awareness of the participants as the training program has met the training objectives. The evaluation also indicated that language, training instructional method, training material and practice factors were the weaknesses of SICW. Those factors could be improved to ensure the effectiveness of SICW. This research could serve as a guideline for improving the effectiveness of SICW.

ABSTRAK

Keselamatan di tempat kerja adalah satu kebimbangan utama pengurus fasiliti disebabkan oleh kadar kematian yang tinggi dalam industri pembinaan Malaysia. Dalam usaha untuk meningkatkan prestasi keselamatan pekerja, Kursus Induksi Keselamatan dan Kesihatan untuk Pekerja Binaan (KIKKPB), satu-satunya latihan keselamatan mandatori dalam industri pembinaan Malaysia telah diperkenalkan untuk meningkatkan tahap pengetahuan dan kesedaran pekerja tentang keselamatan. Walau bagaimanapun, KIKKPB tidak pernah dinilai dari segi keberkesannya dalam menyampaikan pengetahuan dan kesedaran tentang keselamatan kepada para pekerja sejak KIKKPB diperkenalkan. Oleh itu, objektif kajian ini ialah untuk menilai keberkesanan KIKKPB dalam menyampaikan pengetahuan dan kesedaran tentang keselamatan kepada pekerja serta mencadangkan faktor-faktor yang boleh meningkatkan keberkesannya. Penilaian sebelum dan selepas latihan digunakan untuk menilai keberkesanan KIKKPB. Kaedah penilaian sebelum dan selepas telah digunakan dalam kajian ini untuk menilai keberkesanan KIKKPB. Dua set borang soal selidik telah digunakan, satu diedarkan sebelum latihan bermula dan satu diedarkan selepas latihan tamat. Data yang diperolehi daripada dua set soal selidik telah dianalisis untuk memerhatikan perubahan dari segi pengetahuan keselamatan dan kesedaran selepas menghadiri KIKKPB. Keputusan kajian menunjuk, terdapatnya peningkatan ke atas kedua-dua kesedaran dan pengetahuan pekerja selepas latihan, tetapi hanya pengetahuan tentang keselamatan menunjuk terdapatnya perbezaan yang signifikan. Secara keseluruhannya, hasil kajian menunjuk bahawa KIKKPB adalah berkesan untuk meningkatkan pengetahuan dan kesedaran pekerja tentang keselamatan di mana latihan tersebut telah berjaya mencapai objektifnya. Penilaian ini juga menunjukkan faktor-faktor bahasa, kaedah latihan, bahan latihan dan praktis merupakan kelemahan KIKKPB. Faktor-faktor tersebut harus dipertingkatkan untuk memastikan keberkesanan KIKKPB. Kajian ini boleh dijadikan sebagai satu garis panduan bagi meningkatkan keberkesanan latihan KIKKPB.

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LIST OF ABBREVIATIONS

<i>BM</i>	-	Bahasa Malaysia
<i>CIDB</i>	-	Construction Industry Development Board
<i>DOSH</i>	-	Department of Occupational Safety and Health
<i>NIOSH</i>	-	National Institute of Occupational Safety and Health
<i>OSH</i>	-	Occupational Safety and Health
<i>OSHA</i>	-	Occupational Safety and Health Act
<i>SICW</i>	-	Safety and Health Induction Course for Construction Worker
<i>SPSS</i>	-	Statistical Package for Social Sciences

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Facility management (FM) is an emerging discipline across the globe. It is one of the fastest-growing professions in United Kingdom for its cost-cutting initiatives and has demonstrated significant contribution in adding value to the organization's core business (Best *et al.*, 2003; Pitt and Tucker, 2008; Nutt, 2000). There are numerous definitions of FM found in literature. Chotipanich (2004) defined FM as the coordination between physical resources, workplace, support services to user and process of works in order to support the organization's core business. British Institute of Facilities Management (BIFM) defines it as integrating the processes to support and develop the agreed services which strengthen and improve the effectiveness of its main activities in an organization. International Facility Management Association (IFMA) define it as an occupation covering multiple disciplines to ensure the functionality through the integration of people, places, processes and technologies in the built environment. Syed Mustapa *et al.* (2009) provided the definition of FM as an integration of operation, maintenance, improvement and adaptation of the buildings and infrastructure of an organization in order to support the organization's main business. Lastly, Tay and Ooi (2011) define it as "the integrated management of workplace to enhance the performance of the

organization”. However, there were some interchangeable terms used by these researchers to explain the definition of FM. A few of them were “integration”, “workplace” and “support core business”. Using these, the nearest universal definition for FM that can be used to summarize the compounded definition is “the integrated management of the workplace to enhance the performance of the organization” as suggested by Tay and Ooi (2001). The workplace management is the primary focus for FM. It could include but not limited to the management of space, environment, support service, human resource, financial, etc. (Tay and Ooi, 2001).

Safety is one of the most concerned elements in the workplace for the sky-high fatality status around the globe. In most organizations, especially high risk industries, safety issues in workplace are the main priority to be tackled. Today, construction industry is regarded as one of the most unsafe industrial sectors worldwide (Brunette, 2004; Abudayyeh *et al.*, 2006; Mohamed, 1999). According to International Labour Organization (ILO) (2003), there are at least 60,000 people fatally injured in the construction industry each year and many more suffer from serious injuries and ill-health. This number could represent only less than 20 per cent of construction injuries reported (ILO, 2003). Locally, the Department of Occupational Safety and Health Malaysia (DOSH), Ministry of Human Resources has recorded a total of 763 cases of accidents from 2007 to 2012 in Malaysia’s construction industry, whereas 422 or 55% from the number are fatality accidents (DOSH, 2014).

Any loss of life due to industrial accident is retrogression in human resources development and is not acceptable, not to mention the cost of accident. ILO (2003) estimated the total cost of accident in 2001 was 4 percent of world gross national product (GNP). In 2001, 4 per cent of world GNP came to more than \$1,251,353 million. In Malaysia, Social Security Organisation (SOSCO) recorded RM316 million for employment injury compensation in 2003 and the number has increased to RM716 million in 2012 (Accident Prevention Seminar, 2013). These evidences

suggest that effective efforts should be put in place to reduce the accident rate and eventually the related costs for accident.

Identification of causes and effects of the accident is an important prevention strategy to reduce the growing number of injuries and fatalities among workers. In order to improve the safety performance (reducing fatality, accident and injury rate) of the construction industry, various research have been carried out to identify the factors affecting safety performance of the industry such as safety policy, safety equipment, safety rules, safety management systems, safety audit, safety responsibility, etc. (Ng *et al.*, 2005; Sawacha *et al.*, 1999). Nevertheless, human factor is one of the main significant contributors to poor safety performances (Hughes and Kornowa-Weichel, 2004; Nivolianitou *et al.*, 2004).

The human factor is much related to workers, such that it is always linked to workers' competency, behaviour, and awareness. Heinrich (1959) asserted that one of the factors contributing to workplace accident was unsafe acts. According to Sawacha *et al.* (1999), the occurrence of accidents was much related to the lack of competency skills and knowledge of the worker to perform safely in the workplace. Other researchers reported that unsafe worker behaviour has frequently led to unsafe acts in the workplace, which causes accidents (Hughes and Kornowa-Weichel, 2004; Kawka and Kirchsteiger, 1999; Jannadi and Bu-Khamsin, 2002; Sonnemans and Korvers, 2006; Sacks *et al.*, 2013). Besides this, Musonda and Smallwood (2008) also mentioned that safety awareness is an antecedent display of behaviour, with accidents and incidents as the consequence of behaviours. Therefore, to reduce the occurrence of accidents in the workplace, two main causes of accidents that need to be controlled are the lack of knowledge and awareness and the unsafe behaviour or action.

In order to improve safety knowledge, increase awareness and mitigate worker's unsafe behaviour, Occupational Health and Safety (OHS) training has been introduced and prosecuted. Safety training is an important effort for workers' health

and safety (Schneid, 2000; Goetsch, 2008). The purpose of having health and safety training is to impart safety knowledge, awareness and skill to the workers while shaping their safe work acts and behaviours to reduce workplace accidents. According to Cooper (1998), safety training was an effort used to change the workers' safety behaviour and their attitudes in the workplace. Toole (2002) had showed the lack of training as one of eight root causes of construction accidents. Tam and Fung (2010) also identified safety training as one of the four most effective components of a safety program. Another similar analysis of 70 Thai construction projects also found that safety inductions are effective in reducing unsafe conditions (Aksorn and Hadikusumo, 2008).

1.2 Research Background

Training is the activity provided to an individual to enhance his or her current skills in improving job performance. It was proven that effective training would enable the trainees to transfer the training content they have learned to their daily job. Training has become fundamental to keep pace with technological and economic changes. Training can be defined as a systematic way to acquire knowledge and awareness that would improve the performance of human capital (Salas *et al.*, 2006). Organizations in world leading countries such as the United States have invested more than USD 164.2 billion in 2012 for employee training and development (Association for Talent Development, 2013). It was a large investment by the organizations for the purpose of producing the targeted cognitive, behavioural and affective learning outcomes, which is essential for the organizations' survival (Salas and Stagl, 2009).

According to Mohammed Saad and Norsiah (2013), training is a process of development for the attitudes, knowledge and specialized skills required of an employee to do a job properly. It is assumed that trainees who received specific

application through learning are able to perform using their newly obtained skills to the job context (Fuller and Vassie, 2004). Therefore, it is important to ensure the training provided is effective in terms of knowledge, skill or attitude transfer. As claimed by Aguinis and Kraiger (2009), training efforts will be minimal if the trainees do not fully transfer their attained knowledge, skill and attitude to the job context. An effective transfer of training (transfer knowledge, skill and attitude obtain from the training to the job context) is important for the workers and organizations to improve their performance. According to Baldwin and Ford (1988), transfer of training is the degree to which the knowledge, skills and attitudes gained from training is successfully applied, generalised and maintained in the job. Training efforts will not bring in the expected results if what they have learned is not fully and appropriately transferred and applied to their job (Yamhill and McLean, 2001). Thence, in order to identify the effectiveness of training, it is of paramount importance to assess the training outcomes (Holton, 1996).

As mentioned earlier, OHS training is an important effort to reduce workplace accidents and improve workers' health and safety in construction industries. Realising the importance of safety in construction industry, the Construction Industry Development Board (CIDB) in Malaysia has worked closely with the National Institute of Occupational Safety and Health (NIOSH) to provide safety training classes for the construction workers, which is commonly known as Green Card Training or Safety and Health Induction Course for Construction Workers (SICW) (Bakri *et al.*, 2006b).

SICW was first established in 1997 as a construction worker registration program to comply with the Construction Industry Development Board 520 Act (Amendment) 2011. It is a one-day integrated program that involves the registration and accreditation of construction personnel for the purpose of enhancing safety levels at construction worksites. Qualified participants who have registered and attended the class will be entitled to enjoy an insurance benefit by Takaful Nasional, in which any accidental death of the green card holder, the spouse will be entitled to receive an amount of compensation amounting to RM 21,500.

SICW is of paramount importance for all construction-related workers; however, it should be brought attention that SICW is currently the only mandatory safety training as enacted by the legislation of Malaysia since 1997. It is also found that not all construction firms would provide additional safety-related training to workers, especially for smaller firms (Korman, 1997; The Business Roundtable, 1996). According to Oberman (1996), safety training has been seen as the “first line of defence” to counter the occurrence of accidents. However, this so called “first line of defence” may also appear to be “the only line of defence” for some construction personnel as the SICW is the only safety training they will receive from their employers.

Statistics have shown that the number of fatalities in Malaysian construction industries for the past six years (2007–2012) was 422 cases. The number is not satisfying as compared to Singapore with 160 cases (Workplace Safety and Health Statistics Report, 2007-2012), Hong Kong with 230 cases (Labour Department of the Government of the Hong Kong Special Administrative Region, 2007-2012) and Australia with 248 cases (Safe Work Australia, 2007-2012). Although there were significant reductions in industrial accidents since the implementation of Occupational Safety and Health Act (OSHA) in 1994, there is still room for improvement in reducing the number of accidents in Malaysia’s construction industry. The role of SICW is too great; it should not be allowed to be ineffective. Therefore, it is important to ensure the effectiveness of the SICW to deliver the necessary knowledge on safety and awareness to the workers.

Besides, a recent research of Salleh *et al.* (2012) found that approximately half of the Myanmar foreign workers, which are the second largest foreign work force in the Malaysian construction industry, failed to understand the information presented in either verbal or written form during the course. According to Vazquez and Stalnaker (2004), the traditional safety training was ineffective for the immigrants who do not understand the local language of the country. Language barrier is a type of communication barrier that has been agitating the stakeholders in Malaysian construction industry because almost all the labourers in the construction

sites are foreign workers who cannot speak or understand the local language (Valithern, 2014). So, with the existence of a language barrier how is the effectiveness of SICW in terms of knowledge on safety and awareness gained?

1.3 Problem Statement

Today, Malaysia's construction industry remains to be a high-risk industry due to poor safety performance (Hamid *et al.*, 2008; Saifullah and Ismail, 2012; Misnan and Mohammed, 2007). High accident and fatality rates in Malaysia's construction industry have imprinted a negative image towards the industry (CIDB, 2008). Previous researchers have identified the lack of knowledge on safety and awareness and unsafe behaviour or acts at the construction sites as the main causes for the construction accidents (Hughes and Kornowa-Weichel, 2004; Kawka and Kirchsteiger, 1999; Jannadi and Bu-Khamsin, 2002; Sonnemans and Korvers, 2006; Sacks *et al.*, 2013). Therefore, safety training has been introduced and prosecuted to impart safety-related knowledge and skills to the workers while shaping the workers' safe work acts and behaviours for the reduction of workplace accidents (Schneid, 2000; Goetsch, 2008). It is believed that safety training can help to improve the performance of the worker, thus reduce accidents, injuries, and the cost of compensation (Gillings and Kleiner, 1993; Waehrer and Miller, 2009; Ho and Dzung, 2010). Therefore, it is fundamental to establish an effective training to impart the necessary knowledge and skills before tasks could be assigned.

For the past 17 years, SICW, as enacted by the Malaysian legislation is and still remains the only mandatory safety training in Malaysian construction industry. Every construction related personnel must attend this one-day safety training course before they are allowed to enter the construction sites. Due to this reason, enormous amounts of construction related personnel have attended the training with more yet to

come. Unfortunately, SICW has never been evaluated in terms of its effectiveness of safety knowledge and awareness gain.

There are many safety related research could be found in the Malaysian construction industry. However, there is lacking of research on the evaluation of the effectiveness of SICW (refer Appendix A). From Appendix A, most of the Malaysian studies were on safety culture, safety behaviour, safety practice and safety performance. The only study that focussed on SICW, was done by Bakri *et al.* (2006b), whereby the study only introduced on what is SICW but not on the effectiveness of the existing SICW. Using the responses from the industry and insurance benefits for the workers, Bakri *et al.* (2006b) has claimed that SICW as a successful safety and health program in Malaysia. However, in that research, there was no empirical study carried out by the researcher to evaluate the effectiveness of the training. Without a proper training evaluation, the information regarding the effectiveness of training remains uncertain and no systematic analytical strategy could be made to improve the effectiveness of SICW. Therefore, this research has attempted to evaluate the effectiveness of the SICW in Malaysia's construction industry towards enhancing the workers' safety knowledge and safety awareness. Based on previous literatures, training evaluation research was also conducted with the ways to improve the effectiveness of training such as the research done by Kumpikaite (2007); Zinovieff and Rotem (2008) and the International Atomic Energy Agency (2003). Accordingly, this study attempts to follow suit by answering the following research questions:

- i. Is SICW effective in terms of safety knowledge and awareness gain?
- ii. What are the factors that can be focused to improve the effectiveness of SICW in term of safety knowledge and awareness gain?

1.4 Research Objectives

The research objectives for this research are as below:

- i. To evaluate the effectiveness of the SICW in Malaysia's construction industry in terms of safety knowledge and awareness gain.
- ii. To suggest the factors that will improve the effectiveness of the SICW in terms of safety knowledge and awareness gain.

1.5 Scope of Study

SICW is a mandatory training for every construction worker in Malaysia, including local and foreign. Therefore, in order to evaluate the effectiveness of SICW and improve the effectiveness of the training, the scope of study included both local and foreign workforce. The respondents of this research were all construction related personnel who had attended SICW in Johor. The selection of Johor as the only state to gather the necessary data was in correspondence to the suggestion by CIDB Headquarters, as all the certified trainers were trained under the same training centre with standardized training materials provided by CIDB to the trainers, thus making no difference in collecting the data from different states.

1.6 Significance of Study

Safety has always been a persistent problem in construction industry. Previous researches showed that construction industry has a very poor safety performance record. Therefore, safety training has been seen by many researchers as an important effort taken to increase the safety awareness and safety knowledge of the workers by shaping their safety behaviour and enhancing their safety performance. However, there is lacking of research carried out to examine the effectiveness of mandatory safety training towards safety knowledge and safety awareness gain. Thence, the aim of this research is to evaluate the effectiveness of current safety training practices in Malaysia's construction industry. The findings of this research would show the effectiveness of safety training practice in Malaysia in enhancing the safety awareness and safety knowledge of the construction workers.

The findings of this research would also serve as a guideline for CIDB in designing the content of training and deciding a suitable safety training method for SICW to be applied in Malaysia. As mentioned in the earlier section, the targeted respondents of this research were construction related workers who have attended the mandatory safety training course managed by CIDB. The findings of this research would provide the results on the effectiveness of such training towards safety awareness and safety knowledge of the workers and later suggest the factors that can be focused to improve the effective of SICW accordingly. Furthermore, this research would provide insights to the CIDB on the strengths and weaknesses of the construction workers. CIDB could design the safety training course according to the workers' strengths and weaknesses to suit the remedy to the case, only then could it enhance the workers' safety awareness and safety knowledge and thus, increase the effectiveness of SICW.

Besides that, the findings of this research has also great significance to all the facilities managers in Malaysia's construction industry as they would have better understanding on the effectiveness of safety training that their workers have attended.

The findings of this research would provide better understanding to facilities managers as they will understand whether or not the safety trainings that have been provided to the workers are sufficient to effectively enhance the workers' safety awareness and safety knowledge. Although safety awareness and safety knowledge obtained from training could not exactly solve all the safety issues in construction sites, nevertheless, it is important in determining the preventive and precautionary steps taken by the workers in minimizing the accident risks. For example, a worker who is aware on the risk of falling from scaffolding and knows how to reduce the risk, will take precautionary steps to prevent it and to protect himself. Meanwhile, a worker who is not aware of such risk and does not have any knowledge about it will definitely not take any precautionary steps to prevent it because he does not know about it. Thence, safety awareness and safety knowledge possessed by the workers are necessary to be concerned by all facilities managers in Malaysia's construction industry as they are responsible in managing the safety of the workplace to ensure the productivity of the construction site.

If the safety training provided to the workers was insufficient in enhancing the workers' safety awareness and safety knowledge, facilities managers need to take up other extra efforts such as providing more relevant in-house trainings to the workers instead of only providing them with the only compulsory training that must be attended under OSHA. Moreover, the findings of this research will provide the information to the facilities managers on the strengths and weaknesses of the workers and on their safety knowledge after attending the safety training course, and later, based on these weaknesses, decide on the strategies to be implemented to strengthen the weaknesses, and increase the safety performance.

1.7 Research Methodology

The research would be done in five main stages including research background, literature review, data collection, data analysis and, conclusion and recommendation. Figure 1.1 on page 13 gives a summary of what would be achieved in each of the stages.

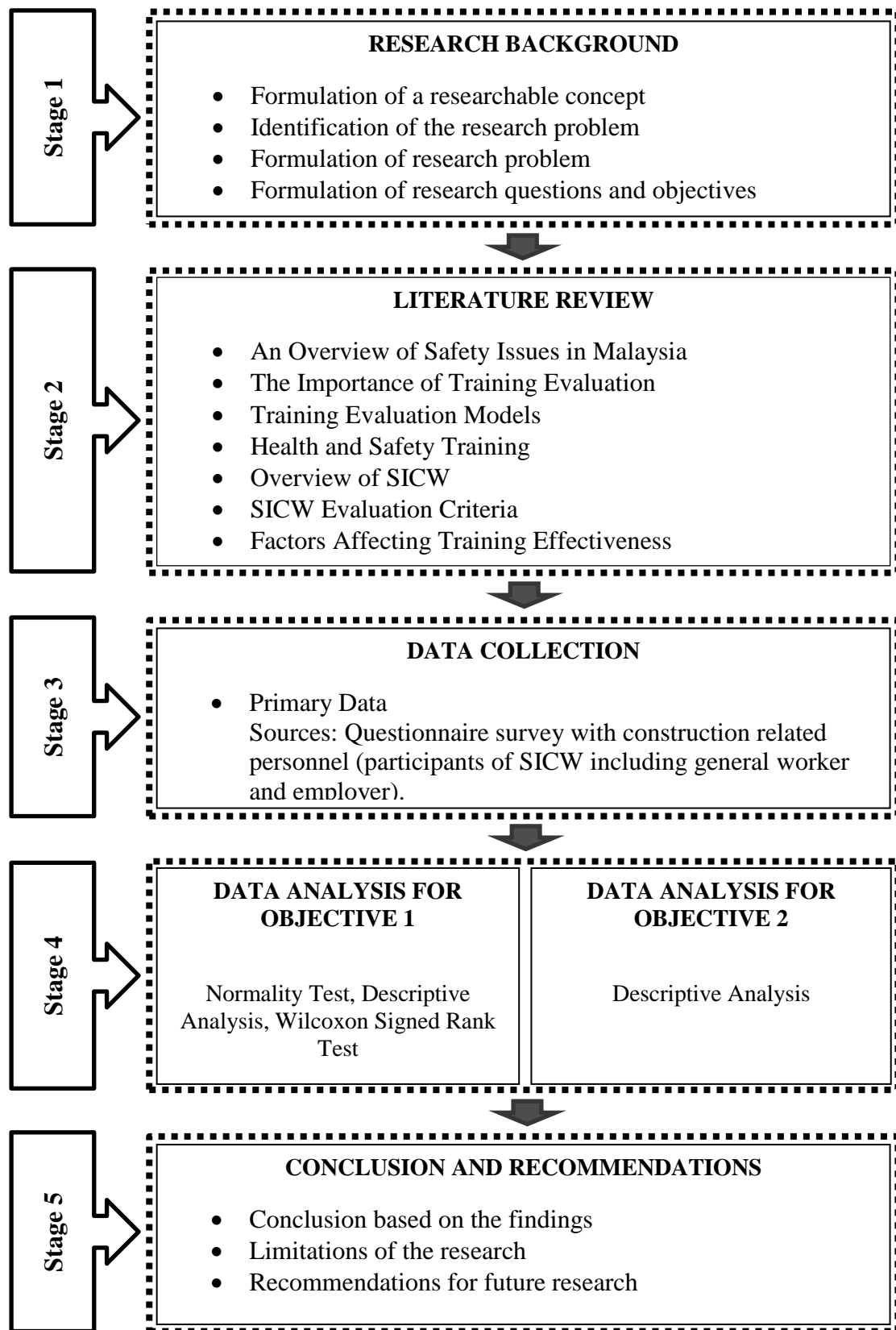


Figure 1.1: Overall Research Flow

1.7.1 Stage One

This stage involved the background of this study, formulation of a researchable concept, identification of the research problem, formulation of research problem, questions and objectives. General background information relevant to safety training would be collected. Based on the research field, major reading had to be done on lots of reading materials to provide a more clear idea of the research. It was important as it would provide the direction of the research, on which the objectives of the research could be driven. Finally, the identification of a methodology to achieve the research objectives was designed.

1.7.2 Stage Two

This stage entailed the details of the literature review to answer the research questions and to understand issues related to the research problem. Definitions, state-of-the-art knowledge and statistics related to industry accidents were extracted from annual reports, literature, journal articles, conference papers, workshop papers and web references to establish details about safety training and safety performance.

A systematic search of the academic literature was conducted to include studies of any empirical research design related to safety training. The data collection phase of the literature review has involved the search in multiple electronic databases (Scopus, ScienceDirect, ProQuest, Web of Science, Google Scholar and Emerald) for published peer-reviewed articles which have evaluated the effectiveness of safety training.

Searches were conducted using selected keywords: safety training, effective training, training evaluation, accident prevention, construction safety and occupational hazards. The selected keywords were, in fact, chosen from some of the keywords supplied by authors in the same relevant studies.

1.7.3 Stage Three

This stage detailed the fieldwork activities considered in the research. This included the collection of primary data by using the survey instrument of questionnaire. Two sets of questionnaire would be distributed to the respondents, namely pre-test questionnaire and post-test questionnaire. Pre-test questionnaire would be distributed to the respondents before the training started, whereas post-test questionnaire would be distributed after the training ended.

1.7.4 Stage Four

Upon completion of data collection phase, the collected data would be brought into this stage four to be analysed. For objective one, the data would be run with Normality Test, Descriptive Analysis and Wilcoxon Signed Rank Test. Meanwhile for objective two, the data would be run with Descriptive Analysis. All the analysis would be assisted using Statistical Package for Social Science (SPSS) Version 16.0. The outcome of the analysis would be presented using graphs and tables to summarize and visualize the information acquired from the analysis in order to draw conclusions.

1.7.5 Stage Five

In this final stage, all the conclusions, recommendations, research limitations and problems encountered in the process of conducting this research would be disclosed. The final conclusion would be derived based on the findings of the analysis. At the end, recommendations for future research would be given based on the limitations of study.

1.8 Chapter Outline

This research report was organized and presented in five chapters.

Chapter One was the introductory part for this research report. This chapter begun with a brief introduction on research background, followed by the problem statement, research questions, research objectives, scope of research, significant of study, a brief discussion on research methodology and lastly chapter outline.

Chapter Two identified the importance of safety training and training evaluation. It focused mainly on the literature part of training evaluation method and factors affecting training effectiveness. The training evaluation criteria were also identified in this chapter.

Chapter Three discussed on the methodology used to carry out this research in order to achieve the research objectives. It discusses in detail the methodology and techniques used in the process of data collection and data analysis.

Chapter Four presented the findings and analysis of data collected. Analyzed data was discussed in depth in this chapter. The effectiveness of SICW in term of safety knowledge and awareness gain was identified in this chapter. Besides, the factors affecting the effectiveness of SICW were identified as well.

Chapter Five is the last chapter of this research. Conclusions were made based on the findings and analysis of the evaluation. Then, it was followed with the limitation of research, recommendations and suggestions for future research.

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