

THE EFFECTIVENESS OF SAFETY AND HEALTH ASSESSMENT SYSTEM  
IN CONSTRUCTION (SHASSIC)

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## DEDICATION

*Bismillahirrahmanirahhim*

*Especially to mom and late dad  
Thanks for teaching the meaning of life  
And much sacrifice for offspring success  
I will always love u dad...*

*Unforgettable sibling  
Rustam, Ratnadewi, Rashdan, Rudi, Rafiz dan R'shad  
Your advices brings me here...really appreciated it*

*Faithful friend  
Norazlin Nadia & family  
Wouldn't forget how we strive after the long journey together*

*And cheerful supporter  
Dayang, Jaja, Maria, Adila  
Hopefully Allah swt always bless in what ever we do till the end*

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Last word, hopefully information produced by this thesis would be valuable in assisiting for further research. In fact the goodness coming from Allah swt while the badness coming from my own poorness.

## ABSTRACT

Construction industry is really known as one of the industry within the highest accident record. Even though Occupational Safety and Health Act of 1994 has established guidelines for occupational safety and health management system (OSH-MS), but it seems ineffective due to several contractor's firm still lacking of some important elements which should be applied to mitigate accident in construction site. Therefore in 2008, CIS 10:2008 (SHASSIC) introduced by CIDB Malaysia as method for contractors to assess their safety and health complementary performance in site. Since the method still new in the construction industry, this study aims to measure the effectiveness of SHASSIC tool in improving occupational safety and health management in construction site. Four objectives have to be pursued in order to achieve the aim of study: 1) To study the level of OSH management in construction site using SHASSIC tool; 2) To determine weaknesses area of OSH management in construction site; 3) To propose suggestion for improving OSH management towards contractor's firm; and 4) To identify the effectiveness of SHASSIC tool in improving OSH management. Data were obtained by carried out two phases of safety and health assessment which uses CIS 10:2008 SHASSIC as tool to assess six sites selected within Universiti Teknologi Malaysia Skudai compound. The results indicate the performance ranking of sites according to the SHASSIC standard. Three items of weaknesses determined in documentation, seven items in workplace, while category of worker as employees which contribute to the lowest level of compliance to the safety and health requirement. Suggestions were proposed according to the CIS 10:2008 SHASSIC guideline which takes precedence of 1) Occupational Safety and Health Act, 1994 (Act 514) and Regulations, 2) Factories and Machinery Act, 1967 (Act 139) and Regulations and Rules, and 3) OHSAS 18001: 2007, MS 1722: 2005 and ILO OHS MS: 2001 as to comply with safety and health legislation. Thus the effectiveness of SHASSIC tool was identified based on improvement of SHASSIC Score percentage from first toward second assessment carried out on sites.

## ABSTRAK

Industri pembinaan amat dikenali sebagai salah satu industri dengan rekod kemalangan yang tertinggi. Walaupun Akta Keselamatan dan Kesihatan Pekerjaan 1994 telah mewujudkan panduan untuk sistem pengurusan keselamatan dan kesihatan pekerjaan (OSH-MS), tetapi ia dilihat tidak berkesan memandangkan masih terdapat beberapa firma kontraktor yang meninggalkan elemen penting yang seharusnya diaplikasi untuk mengurangkan kemalangan di tapak pembinaan. Oleh itu pada tahun 2008, CIDB Malaysia telah memperkenalkan CIS 10:2008 (SHASSIC) sebagai kaedah untuk kontraktor menilai kecukupan tahap keselamatan dan kesihatan di tapak. Memandangkan kaedah tersebut masih baru dalam industri pembinaan, sasaran kajian ini adalah untuk mengukur keberkesanan kaedah SHASSIC dalam mempertingkatkan pengurusan keselamatan dan kesihatan pekerjaan di tapak pembinaan. Terdapat empat objektif yang perlu dikejar bagi mencapai sasaran kajian: 1) Untuk mengkaji tahap pengurusan keselamatan dan kesihatan pekerjaan di tapak pembinaan dengan menggunakan kaedah SHASSIC; 2) Untuk menentukan bahagian kelemahan pengurusan keselamatan dan kesihatan pekerjaan di tapak pembinaan; 3) Untuk mengemukakan cadangan bagi mempertingkatkan pengurusan keselamatan dan kesihatan pekerjaan kepada firma kontraktor; dan 4) Untuk mengenalpasti keberkesanan kaedah SHASSIC dalam mempertingkatkan pengurusan keselamatan dan kesihatan pekerjaan. Data telah didapati melalui pelaksanaan dua tahap penilaian keselamatan dan kesihatan yang menggunakan kaedah CIS 10:2008 SHASSIC untuk menilai enam buah tapak yang dipilih dalam kawasan Universiti Teknologi Malaysia. Keputusannya merangkumi kedudukan prestasi tapak berdasarkan piawaian SHASSIC. Terdapat tiga perkara kelemahan ditentukan dalam dokumentasi, tujuh perkara di tapak kerja, manakala buruh merupakan kategori pekerja yang menyumbang kepada tahap pematuhan keselamatan dan kesihatan yang paling rendah. Cadangan telah dikemukakan berdasarkan panduan CIS 10:2008 yang mengutamakan 1) Akta Keselamatan dan Kesihatan Pekerjaan, 1994 (Akta 524) dan Peraturan, 2) Akta Kilang dan Jentera, 1967 (Akta 139) dan Peraturan, dan 3) OHSAS 18001: 2007, MS 1722: 2005 dan ILO OHS MS: 2001 bagi mematuhi perundangan keselamatan dan kesihatan. Seterusnya keberkesanan kaedah SHASSIC telah dikenalpasti berdasarkan peningkatan peratusan skor SHASSIC daripada penilaian pertama dengan kedua yang dijalankan di tapak.

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## LIST OF ABBREVIATIONS

<b>ABBREVIATION</b>	<b>FULL NAME</b>
CIDB	Construction Industry Development Board of Malaysia
CIMAH	Control of Industrial Major Accident Hazards Regulation 1996
CPLHC	Classification, Packaging and Labelling of Hazardous Chemical Regulation 1997
CSDS	Chemical Safety Data Sheet
DOSH	Department of Occupational Safety and Health Malaysia
ERP	Emergency Response Plan
FMA	Factories and Machineries Act
HSE	Health Safety and Environment
ILO	International Labour Organisation
ISO	International Standard Organisation
NADOPOD	Notification of Accident, Dangerous Occurrence, Occupational Poisoning and Occupational Disease Regulation 2004
NIOSH	National Institute of Occupational Safety and Health
NCOSH	National Council for Occupational Safety and Health
MSDS	Material Safety Data Sheet
PPE	Personal Protection Equipments
SHASSIC	Safety and Health Assessment System in Construction
SHC	Safety and Health Committee Regulation 1996
SHO	Safety and Health Officer Regulation 1997
SHW	Safety and Health Welfare

SSS	Safety and Health Supervisor
OSH	Occupational Safety and Health
OSHA	Occupational Safety and Health Act
OSHMS	Occupational Safety and Health Management System
OHSAS	Occupational Health and Safety Assessment Series
USECHH	Use and Standards of Exposure of Chemical Hazardous to Health Regulation 2000

## **CHAPTER I**

### **INTRODUCTION**

#### **1.1 Introduction**

The construction sector is one of the important sectors of the Malaysian economy since the rapid development of the sector has contributed towards the national economic growth and it provides economic opportunities for related industries and businesses. This is evident by the implementation of 8<sup>th</sup> Malaysian Plan, whereas infrastructure development has been given priority to support the economic growth. Totally RM38.7 million expended to upgrade and maintain infrastructure and public services to fulfill the increasing demands and to achieve a quality services (Rozanah AB Rahman, 2006).

Within 9<sup>th</sup> Malaysian Plan period, attention is being given to upgrade optimally all the available coverage and services usage as to support the economy activities. Among projects undergone within RM9 period include Iskandar Development in Johor and twin railway line project. Whereas overall RM46.8 million was provided to implement those various projects under RM9. The availability of these projects ensuring construction sector continuous development successfully and the most significant to the national economy is regarding its employment potential (Dr. Fong Chan Onn, 2007).

According to the Vacancies Reported to The Malaysian Labour Department by Industry 2004 to 2008 as in Table 1.1, construction taken place among top three industries which contribute high employment annually especially start from year 2006 until last year 2008.

Table 1.1 : Vacancies Reported to the Malaysian Labour Department by Industry 2004 to 2008

No.	Industry	Year				
		2004	2005	2006	2007	2008
1.	Agriculture, Hunting and Forestry	1,367	39,450	185,271	220,120	269,272
2.	Fishing	6	988	2,833	6,639	6,276
3.	Mining and Quarrying	41	150	861	1,163	1,450
4.	Manufacturing	17,769	112,542	348,302	275,155	327,798
5.	Electricity, Gas and Water Supply	198	859	2,227	1,477	2,047
<b>6.</b>	<b>Construction</b>	<b>3,505</b>	<b>48,524</b>	<b>129,586</b>	<b>117,217</b>	<b>107,421</b>
7.	Wholesale and Retail Trade, Repair of Motor Vehicles, Motorcycle, Personal and Household Goods	3,890	11,993	26,315	30,647	43,948
8.	Hotel and Restaurant	1,331	11,928	41,641	35,953	55,369
9.	Transport, Storage, and Communication	1,046	3,892	8,287	12,578	15,264
10.	Financial Intermediation	5,228	5,574	11,564	28,471	89,044
11.	Real Estate, Renting, and Business Activities	934	8,300	15,078	21,764	36,777
12.	Public Administration and Defence, Compulsory Social Security	1,224	2,497	3,539	11,287	11,132
13.	Education	2,167	6,997	11,797	13,341	26,454
14.	Health and Social Work	102	788	4,137	3,080	7,727
15.	Other Community, Social and Personal Service Activities	2,410	10,352	28,736	43,871	54,079
16.	Private Household with Employed Person	36	100	1,011	1,139	2,378
17.	Ex-Territorial Organisation and	58	161	70	696	2,544
18.	Others	8,663	39,405	12,920	-	-
	<b>Total</b>	<b>49,975</b>	<b>304,500</b>	<b>834,675</b>	<b>825,182</b>	<b>1,058,980</b>

Source : Labour Department, Ministry of Human Resource.

It is undeniable that workers are the most important assets of the industry, without it the industry cannot progress. However, construction workers are two to three times more likely to die on the job than workers in other industries while the risk of serious injury is almost three times higher. Many site injuries result from people falling from structures such from roofs and scaffolds, or being hit by falling objects. Many others are caused by the misuse of mechanical plant and site transport, including hoist (Frayer, 1995).

As such, shortage of labour is one of the factors which could lead to the slow progress of the industry, especially the construction industry which is very much independent on human resources. As the construction industry continues to progress, the problems to the nation is inevitable. Even though this industry becomes one of the national economic catalysts, however it concurrently contributes to high amount of industrial accident (Rozanah AB Rahman, 2006).

The safety and health of workers is paramount concern for all employers. This is especially true in the construction industry that continuously boasts one of the highest job injury rates of all professions. Construction employs 7.9 million people, 5.4% workforce, yet accounts for 20% of fatalities and over 12% of the injuries in the workforce according to the 2005 Bureau of Labor and Statistics reports (Kraig Knutson, 2009).

Construction accidents causes many human tragedies, de-motivate workers, disrupt site activities, delay project progress and adversely affect the overall cost, productivity and reputation of the construction industry. Although project safety and health management is very much a traditional concern for the construction industry, the industry seems to suffer from a general inability to manage workplace safety and health to a level where a pro-active zero-accident culture prevails.

Due to this matter, Malaysian governments have maintained an on going commitment towards establishing a working environment free of injury and disease. Several strategies were set out which involve enforcement of acts and regulations; legislate of standards; training and promotion to control occupational safety and health aspects for every phases of construction activities. However, evidence is clear that zero-accident culture cannot be guarantee by legislation alone. Therefore construction firm plays significant role in implementation of occupational safety and health management as effectively in construction site as accordance with the legislation requirement (YB Dato' Seri S. Samy Vellu, 2005).

To determine the sufficiency of implementation of occupational safety and health in construction, various tools of safety performance measure were exist to

evaluate the level of implementation by organization. Recently in year 2008, Construction Industry Development Board Malaysia (CIDB) through Construction Industry Standard (CIS) has established CIS 10:2008 Safety and Health Assessment System in Construction (SHASSIC). SHASSIC is an independent method to assess and evaluate the safety and health performance implement by contractor in construction works.

Results gathered by these assessments are valuable for contractor to improve their performance since they had recognized areas of weaknesses in implementation occupational safety and health management in construction site. Rowlinson (2004) agrees that if the performance show improvement being made after assessment conducted, this has proven the effectiveness of tool assessment selected as to measure safety and health performance and its applicable as to improve the occupational safety and health management in construction site.

## **1.2 Background of the Problem**

Construction safety and health is a global issue in that it is a concern wherever construction activities take place. The reality is that the construction industry continually has injury and fatality statistics that make it one of the most dangerous industries in which to work. Even though tremendous improvements have been made in safety performance in some countries, the construction industry continues to lag behind most other industries. This has been the experience within most countries. As the world has become smaller through technology and through cooperative arrangements that cross many borders, the issue of construction worker safety and health become a well-recognized problem and represents a concern that is shared worldwide (Hinze, 2007).

Over many years, government has taken a lot of effort to the number of people who are killed, injured, or suffering ill health as a result of construction work. Those effort introduced to construction firms with intends to mitigate accident

occurrence in construction site. Noticeably, the worst cases of industrial accidents would be disablement and fatality cases. Table 1.2 shows Industrial Accidents Reported by Industry and Type of Accident recorded by Malaysian Social Security Organization (SOCSO). In year 2008, construction holding among the highest amount of 1,736 disablement while contribute to 102 amounts of fatality cases reported.

Table 1.2 : Industrial Accidents Reported to the Labour Department and Social Security Organization (SOCSO) by Industry and Type of Accidents, 2005 to 2008

No.	Industry	Fatal				Disablement			
		2005	2006	2007	2008	2005	2006	2007	2008
1.	Agriculture, Hunting and Forestry	181	195	35	132	3,953	2,423	446	1,605
2.	Fishing	9	22	4	22	76	84	56	164
3.	Mining and Quarrying	32	9	-	15	337	128	-	194
4.	Manufacturing	448	402	258	268	12,459	9,000	3,261	9,701
5.	Electricity, Gas and Water Supply	1	16	7	13	125	92	667	272
<b>6.</b>	<b>Construction</b>	<b>165</b>	<b>166</b>	<b>53</b>	<b>102</b>	<b>2,041</b>	<b>1,171</b>	<b>84</b>	<b>1,736</b>
7.	Wholesale and Retail Trade, Repair of Motor Vehicles, Motorcycle, Personal and Household Goods	139	147	165	195	2,110	1,831	2,086	3,729
8.	Hotel and Restaurant	5	4	-	36	69	34	-	413
9.	Transport, Storage, and Communication	64	82	49	121	721	637	617	530
10.	Financial Intermediation	65	73	7	16	933	943	92	1,649
11.	Real Estate, Renting, and Business Activities	14	28	-	114	294	136	-	1,982
12.	Public Administration and Defence, Compulsory Social Security	4	3	177	156	24	20	2,246	1,704
13.	Education	-	-	-	3	2	-	-	93
14.	Health and Social Work	1	1	-	30	-	-	-	350
15.	Other Community, Social and Personal Service Activities	164	156	-	9	1,743	1,358	-	133
16.	Private Household with Employed Person	-	-	-	65	6	7	-	1,242
17.	Ex-Territorial Organisation and Bodies	-	32	-	4	5	360	-	93
18.	Others	-	1	-	0	-	31	-	2
	<b>Total</b>	<b>731</b>	<b>1,337</b>	<b>755</b>	<b>1,301</b>	<b>-</b>	<b>18,257</b>	<b>9,555</b>	<b>21,592</b>

Source : Social Security Organisation (SOCSO), Labour Department Peninsular Malaysia, Sabah and Sarawak, Ministry of Human Resources.

Meanwhile based on Statistic of Occupational Accident for the Category of Death investigated by DOSH, construction sector has succeeded to decrease number of death from year 2007 to 2008 (see Figure 1.1). But the main issue can be adopted here is construction sector still remain the highest amount of 168 deaths for both year compare to other sectors.



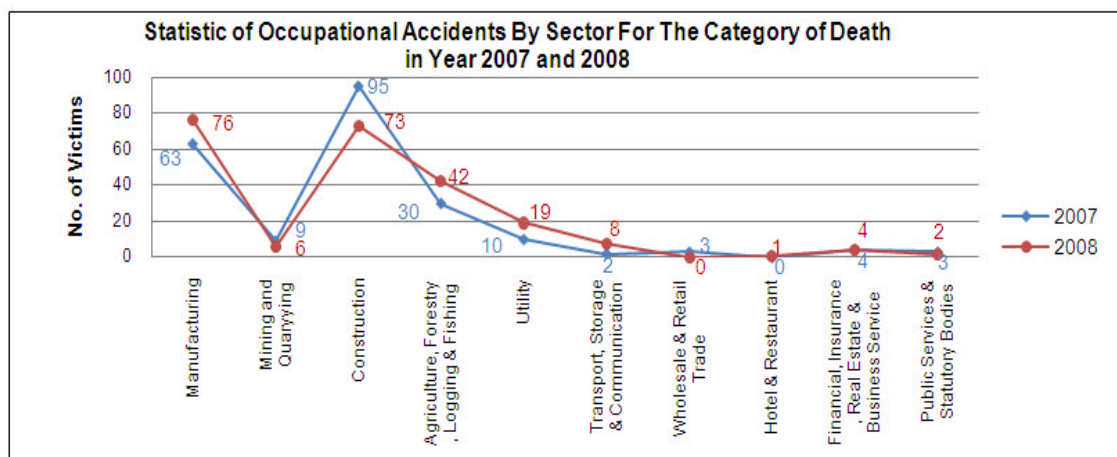


Figure 1.1 : Statistic of Occupational Accidents by Sector for the Category of Death in Year 2007 and 2008

Source: Department of Health and Safety Malaysia, 2009

Much effort has been implemented but accident statistic still shows construction sector taken place as hazardous industry. These proven that performance of safety and health in construction industry are still unsatisfactory. As been reported in May 2009, Petaling Jaya startled with unplanned collapse of old supermarket building which killed 7 workers during demolition progress. This shows the lack of safety awareness and site planning before demolition commencement. Effect from the occurrence, National Institute of Occupational Safety and Health (NIOSH) emphasized to all project managers to conduct proper site plan of risk assessment before commencing work to avoid the same tragedies (Bernama, 2009).

Malaysian government's effort through Department Occupational Safety and Health (DOSH) has enforced Occupational Safety and Health Act and Regulations (OSHA), 1994 (Act 514); Factory and Machinery Act (FMA), 1967 (Act 139); Occupational Health and Safety Management System, OHSAS 18001:2007; Occupational Safety and Health Management System, MS 1722:2005. But their initiative alone is insufficient to increase or strengthen safety and health activities within growing construction industry. Earnest effort from all the industry stakeholders is also necessary.

During the declaration of National Safety and Health campaign 1994 in Kuala Lumpur, Malaysian 4<sup>th</sup> Prime Minister, Dato' Seri Dr. Mahathir Mohamad said,

*“Safety and Health consultants who provide safety and health consultation services in the construction industry hold responsibility to put more effort in safety and health encouragement towards employers. Besides organizing course and provide training they should take part in prevention of accident by involve in legislation enforcement, inspection of safety and health implementation on site by contractor, and providing new initiative to improve occupational safety and health within industry”.*

Recognizing these necessities institution bodies such as National Occupational Safety and Health Malaysia (NIOSH) and also Construction Industry Development Board Malaysia (CIDB) play significant role by establishing guidelines and performance-based workplace health and safety standard which sets generalized performance objectives and provides a system of clearly stated responsibilities to encourage greater self-regulation for the construction industry.

In year 2006, DOSH has been enforced Occupational Safety and Health Management System (OSH-MS) to be implemented by construction firms. A Malaysian Standard MS1722:2005 OSH-MS established by government as guidance for employer to implement the occupational safety and health management on construction site (Dr. Fong Chan Onn, 2007). Recently OSH-MS has been applied mostly to the construction organization around Malaysia. However accident statistic still shown construction sector contribute to high rate of death annually (YB Datuk Dr. S. Subramaniam, 2009).

Therefore it is necessary to conduct occupational safety and health assessment to review the performance of Occupational Safety and Health Management System (OSH-MS) being implemented on construction site as to fulfill the legislation requirement. In year 2008, Safety and Health Assessment System in Construction CIS 10:2008 (SHASSIC) were established by CIDB as tool to assess the performance of safety and health management in construction site. Since this

method still new to the industry, it is advisable to conduct a study to measure the effectiveness of SHASSIC tool in improving occupational safety and health management in construction site.

### **1.3 Aim and Objective of Study**

The aim of the study is to measure the effectiveness of SHASSIC tool in improving occupational safety and health management in construction site. In order to achieve the aim, following objectives shall be pursued:

- i. To study the level of OSH management in construction site using SHASSIC tool.
- ii. To determine weaknesses area of OSH management in construction site.
- iii. To propose suggestion for improving OSH management towards contractor's firm.
- iv. To identify the effectiveness of SHASSIC tool in improving OSH management.

### **1.4 Scope of Study**

The scope of the study will be covered at three construction sites under progress within Universiti Teknologi Malaysia Skudai, Johor. Respondents to be interviewed from each site include management personnel, safety and health officer, and site workers.

Study shall be carried out when there are different type of activities that are on going at same time (concurrent activities) and many workers of different trades are involved at the site. The SHASSIC assessment is carried out when the actual physical work progress had achieved or falls within 25% to 75%.

## **1.5 Significant of Study**

Referring to the problem issues, evidently the performance of occupational safety and health management in construction site is still under unsatisfactory. Therefore, conducting performance assessment is needed to study the level of OSH management being implemented. Whereas from the result, weaknesses could be recognize and improvement can be made.

Application of SHASSIC as tool of safety and health assessment system in the construction site is still new in Malaysian construction industry. Thus, findings from this study are really valuable to determine the effectiveness of this tool which could be applicable in improving occupational safety and health management in the industry.

Besides, other interested parties such as National Occupational Safety and Health Malaysia (NIOSH) could apply this study as to recognizing weaknesses areas in implementation of OSH management by contractors. According to this matter they may get new initiatives to organize more effective consultation and training programs which could lead to overcome as said weaknesses. While, the Construction Industry Development Board Malaysia (CIDB) as the inventor of SHASSIC tool could also refer the study as to make any amendment towards this tool whereas necessary to improve its application to be more effectively.

## **1.6 Methodology of Study**

This study is mainly divided into three stages:

- i. Identification of Topic and Scope of Study
- ii. Collection of Data and Information concurrently with Analysis and Discussion
- iii. Conclusion and Recommendation

### **1.6.1 First Stage : Identification of Topic and Scope of Study**

Topic of study was selected base on safety and health construction issues arise recently. Instead of searching via internet, discussion with lecturer was made to get view on congruence topic, aim and scope of study. Concurrently to wider knowledge on topic to be selected, meeting with DOSH, NIOSH and CIDB personnel was undergone to collect information on occupational safety and health management and also to gathered Malaysian annual occupational accident by industry.

### **1.6.2 Second Stage : Collection of Data and Information concurrently with Analysis and Discussion**

Commence with gathered secondary data by reviewing the relevant literature on construction safety and management books as well as academic journal published by safety and health department. These follow by conducting two phases of assessment session, to collect primary data which is more effective way to achieve objectives of the study. The assessment will be conducted on three construction sites under progress as been mentioned in the scope of study. The assessment shall be carried out in three different approaches; 1)Document Check, 2)Workplace Inspection, and 3)Employee's Interview.

### **1.6.3 Third Stage : Conclusion and Recommendation**

All the findings are summarized according to the objectives. Several recommendations to be develop base from the research undergone to give some either new initiatives or improvement that can be guidelines for other interested parties.

To be more understandable, Figure 1.2 on the next page clarifies research methodology flow chart on how this study will be conducted.

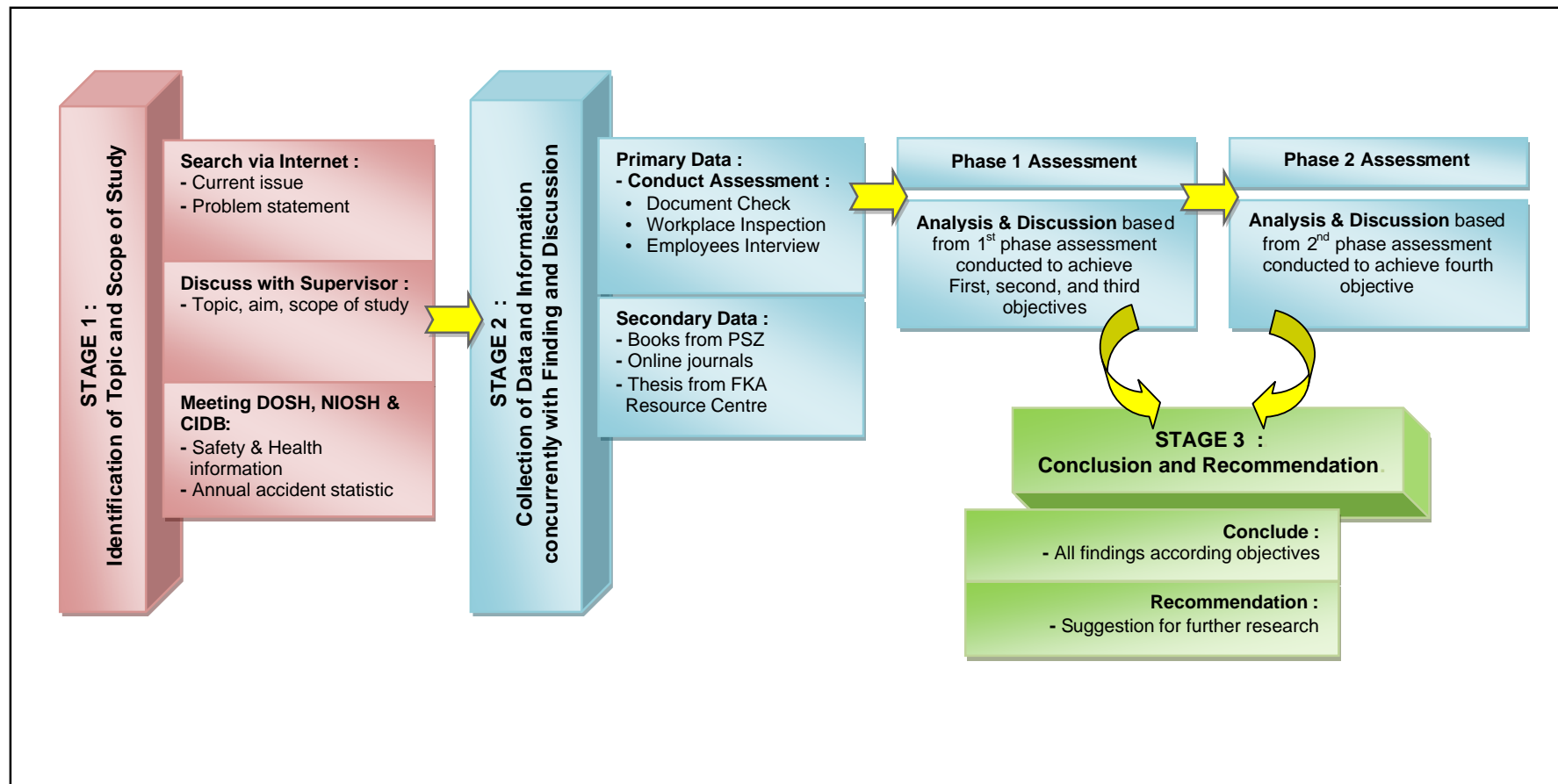


Figure 1.2 : Research Methodology Flow Chart

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