

# **TOTAL INDUSTRIAL SAFETY CULTURE IN MANUFACTURING SECTOR**

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**BACHELOR OF ENGINEERING**  
**(MANUFACTURING ENGINEERING WITH MANAGEMENT)**



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## **ABSTRAK**

Kini, kemalangan industri di tempat kerja semakin meningkat dari tahun ke tahun. Ramai penyelidik menjalankan penyelidikan mengenai masalah kemalangan industri dan mendapati bahawa industri perkilangan adalah di antara industri yang mempunyai kemalangan industri berisiko tinggi. Oleh itu, objektif utama kajian ini adalah untuk menilai persepsi dan tahap kesedaran pekerja yang bekerja di sektor perkilangan di Pulau Pinang terhadap budaya keselamatan yang dilaksanakan di tempat kerja mereka. Kajian penyelidikan ini melibatkan pembahagian 140 soal selidik budaya keselamatan kepada pekerja yang bekerja di industri perkilangan di Pulau Pinang. Walau bagaimanapun, sebanyak 101 responden diambil sebagai sampel untuk kajian ini. Kuesioner budaya keselamatan dibahagikan kepada tujuh bahagian: A. Dasar OSH, B. Tanggungjawab Pengurusan Tertinggi, C. Latihan OSH, D. Penglibatan dan Penglibatan Pekerja, E. Komunikasi, F. Prosedur Kerja dan G. Bahaya dan Pencegahan Risiko. Soal selidik yang telah dijawab sepenuhnya oleh responden dianalisis dengan menggunakan perisian SPSS untuk memperoleh keputusan.

## **ABSTRACT**

Nowadays, industrial accidents at the workplace are increasing from year to year. Many researchers are conducting research on industrial accident problems and found that manufacturing industries were among the industries with high-risk industrial accidents. Hence, the main objective of this research study is to evaluate the perception and the level of awareness of the employees working in the manufacturing sector in Penang Island towards the safety culture that was implemented at their workplace. This research study involved the distribution of 140 safety culture questionnaire to the employees that work in manufacturing industries in Penang Island. However, an amount of 101 respondents were taken as sample for this research study. The safety culture questionnaire was partitioned into seven sections: A. OSH Policy, B. Responsibilities of Top Management, C. OSH Training, D. Employee Involvement and Engagement, E. Communication, F. Work Procedure and G. Hazard and Risk Prevention. The questionnaires that were fully answered by the respondents were analyzed by using SPSS software to obtain the results.

# **CHAPTER 1**

## **INTRODUCTION**

### **1.1 Introduction**

This chapter will briefly explain about the introduction of this research project. This chapter will explained generally about factors of industrial accidents in the workplace. This chapter will begin with the research background, which will describe about the definition and also the background of industrial accident. This chapter will also focuses on the motivation, problem statement, research objectives, scope of the study, significant of the study and thesis organization.

### **1.2 Research Background**

An industrial accident is defined as a personal accident that is harmful to an employee which has been caused by an unplanned accident or an occupational disease that can cause serious physical damage, fatality or health effects to the employee. The industrial accidents are unexpected events in industry that occurred while the employee is performing jobs. The industrial accidents have a great impact on the reduction of the profitability of the companies. First, when industrial accidents occurred, the compensation will be given to the employee under Work Injury Compensation Act (WICA), regardless of who was at fault, even if the employee no longer works for the company (Ministry of Manpower, 2017). The money from the compensation is taken from the company. Hence, it will reduce the profitability of the company. This is one of the prevention step to ensure that the top management guarding and caring for the welfare of the employees and reduce the industrial accidents at the workplace.

Second, industrial accidents will affect the production of the organization. As the industrial accidents arise, the number of employees will decrease. For example, once the accident occurred, the employee will take a medical leave if he suffers from a minor injury. In some cases, the industrial accidents cause fatality or permanent disability to the employees. Hence, the top management of the company has to be responsible for the employees and find new workers to fill the position. For these cases, the production handled by the employee will stop running for a while. Hence, it will reduce the productivity and will indirectly reduce the profitability of the companies.

The development of the worldwide market and industrial technology leads to economic growth and has shown a positive impact on the financial development and profitability of the companies. However, the industrial accidents rates are rising in tandem with increased technology and industrial activities. From previous research, the number of industrial accidents has been increasing by years and reaching a worrying level. Industrial activity includes all activities involved in converting raw materials into goods such as loading, unloading, maintenance, repairing and welding. In order to perform the industrial activities, the company needs to use various type of technology. Each industrial activity and new technology has different hazards and risks for different classifications such as automotive, electrical, electronic, aerospace, metalworking, chemical and others. Hence, each hazard and risk has different ways of prevention according to their respective classifications.

Companies around Malaysia have to take precautionary measures to mitigate and avoid these increasingly widespread safety issues to reduce the rate of industrial accidents in line with technological improvements and industrial activities. There are various types of precaution steps that can be taken to prevent industrial accidents from occurring. First, the company can adopt a safety culture at the workplace. Researcher found out that the companies that adopt safety culture in their organizations result in the reduction of industrial accidents and will have the least amount of safety issues within the organization. Second, the company has to identify the potential hazard that may occur during performing the job. The examples of potential hazards are improper standard operating procedures (SOP), damage equipment, radiation and poor risk management. Lastly, the company needs to implement the proper and suitable safety measures and precaution steps to prevent the potential hazards that might occur at the workplace.

### **1.3 Motivation**

The main motivation of this research study is to increase awareness among employers and employees about issues relating the safety of the employees and the industrial accidents which are increasing yearly until some employees have lost their lives. Secondly is to safeguard the welfare of the employees at the workplace and to ensure that the employees are performing their task in a safety manners. Third, the motivation of this research study is to improvise the performance of the safety culture among the employers and employees at the workplace. A

strong safety culture has shown a positive impact on the safety of employees in various industries (O'Toole, 2002).

#### **1.4 Problem Statement**

Industrial safety are now becoming mainstream focus because it was found that accidents occurring at workplace incurred quite a substantial operating cost thus reducing the company's profit. According to the global statistics collected by International Labor Organization (ILO), there were 2 million employees involved in fatality due to work-related accidents and diseases, while 270 million occupational accidents and 160 million work-related diseases occur per year (M. Safizal A. *et al.*, 2016). Even though some of the companies in Malaysia have implemented the Occupational Safety and Health Act (OSH), provided safety programs and training, enforce rules and regulations regarding safety at the workplace, there are still some cases of industrial accident being reported by Department of Occupational Safety and Health (DOSH) from year by year (DOSH Website, 2016).

There are many factors that contribute to the industrial accident. The factors are technology improvement, organizations, the environment of the workplace and the behavior and attitude of the employees during performing their task. Previous researcher found that the bad behavior of the employees at the workplace will give a negative impact on their safety and increase the industrial accidents. For example, reckless and inattention behavior will lead to an increase in industrial accidents at the workplace (Krause *et al.*, 1994). The employees' attitudes are critical to safety at the workplace (S. Salminen *et al.*, 1993). In conclusion, these factors have to be reduced in order to reduce the industrial accidents at the workplace.

#### **1.5 Objective**

The objective of this research study is in line with the objective of Occupational Safety and Health Act (OSH) which is to encourage a safe work environment for the employee at their workplace (Ali *et al.*, 2017). This research study will give benefits to the industries as they can analyze the factors of the industrial accident and implement the suitable precaution steps to prevent it. The main objectives of this research study are:

- i. To review the occupational accidents occurrence in the industries around Malaysia.

- ii. To investigate and gather information about safety culture and program implemented by the organizations to keep their workplace in safe condition.
- iii. To evaluate the perception and the level of awareness of the employees working in the manufacturing sector in Penang Island towards the safety culture that was implemented at their workplace.

## **1.6 Scope of Project**

The scope of this research project is focus on the safety culture and issues in the Malaysian manufacturing sector. This is because the manufacturing sector in Malaysia is categorized among the highest sector that experienced the occupational accident compared to the other sectors. This research study was conducted at the manufacturing industries around Penang. There are various types of manufacturing industries around Penang, but most of the industries are electrical and electronic based industries. Various types of industries have various types of risks, damage and injuries. Hence, this research study will review and emphasis on the high occupational accidents and find out the factors that lead to this problem.

## **1.7 Thesis Organization**

This research paper will covers five major chapter for the purpose to figure out the research study.

The first chapter is Chapter 1 which is briefly introduces the research. It covers the research background, motivation, problem statement, research objectives, scope of the study, significant of the study and thesis organization.

Next, Chapter 2 discussed about the critical reviewed of the previous literatures that are having the similar topic and area with this research paper. The reading summary of the source regarding the topic will be discussed in this chapter.

Chapter 3 will explain the methods used for this research study. The topics discussed in this chapter are research design, data collection method, population and sampling technique, research instrument, questionnaire design, scale of measurement, pilot test and statistical data analysis.



Chapter 4 is about the presentation and interpretations of the result. This chapter is basically discussed the result that this research gained from the data, the responses rate, data presentation, reliability analysis and descriptive analysis.

The last chapter is Chapter 5 which is about the conclusion for the whole research paper discussed in this chapter. The implication of the study, limitation of the study will also be discuss in this chapter, and some suggestions and also recommendations are given in this chapter.

## CHAPTER 2

### LITERATURE REVIEW

#### 2.1 Introduction

The main focus of this chapter is to study, review, gather information, summarize and synthesize article, journal, books, paperwork, website and ideas from previous researchers. Literature review helps in constructing and developing this research study. The literature review in this chapter explains history of safety culture, safety culture in a workplace, industrial accident in Malaysia for all sectors and manufacturing sector, safety and health act and hazard identification.

#### 2.2 History of Safety Culture

On 26<sup>th</sup> April 1986, an experiment was done at number 4 reactor of Chernobyl nuclear power plant in northern Ukraine. The aim of this experiment was to study reactor safety in case of the breakdown of the main electricity supply to the plant. After a moment of the experiment, there was a steam explosion occur which blew the cover of the reactor and cause the largest accidental release of radioactivity into the environment. The exposed reactor core keeps burning roughly about 10 days with continued releases of radioactivity into the atmosphere over this period. A population around 6 million were living in territories which were authoritatively assigned as contaminated. As the outcome of the nuclear accident, the populations were migrated in Belarus, Russia and Ukraine and healing measures were set up to decrease the entry of contaminants into the human food chain in various nations all through Europe. Nowadays, the healing and medicinal measures are still set up in various nations, while a territory of the previous Soviet Union stay abandoned.

In the ‘The Chernobyl Accident: Updating of International Nuclear Safety Advisory Group (INSAG-1)’, the factors of the Chernobyl nuclear accident were discussed. There are several factors that cause the steam explosion:

- i. Violation of procedures
  - Eight coolant pumps were working at full flow, and it seems that several flow rates surpassed the set values. INSAG consider that such operation was unacceptable. The

State Committee for the Supervision of Safety in Industry and Nuclear Power (SCSSINP) Commission reports that the operation of all of the eight pumps at once was not prohibited by any archive, including the test procedures, even though the procedure is wrong.

- In INSAG-1, it is considered as violation of the requirement if the operation has a very low operational reactivity margin. It will increase the void coefficient and indirectly cause failure and destructive.
- INSAG-1 state that during the test, there are three parts of the reactor protection had been disabled at Chernobyl which are the emergency core cooling systems (ECCS), the trip on steam drum water level and the ‘two turbine’ trip. Disabling all these parts is allowed, however, disabling the ECCS showed a poor level of safety culture and it was not essential to disable the ECCS for a long period of time.

ii. Departure from test procedures

- The test procedure was started at a power level of 200 MW, well beneath that recommended in the test procedure. The explanation behind this was the operators’ failure to achieve the prescribed test power level which is 700 MW. Therefore, the power distribution in the core and the thermal-hydraulic conditions cause the reactor to be highly unstable.

The concept of safety culture was obtained from the analysis of the Chernobyl 1986 nuclear power plant accident. This accident resulted in serious political and social shock to Europe and the management begins to know and realize the significance of safety culture in a workplace (Beresford, 2016).

### **2.3 Safety Culture in a Workplace**

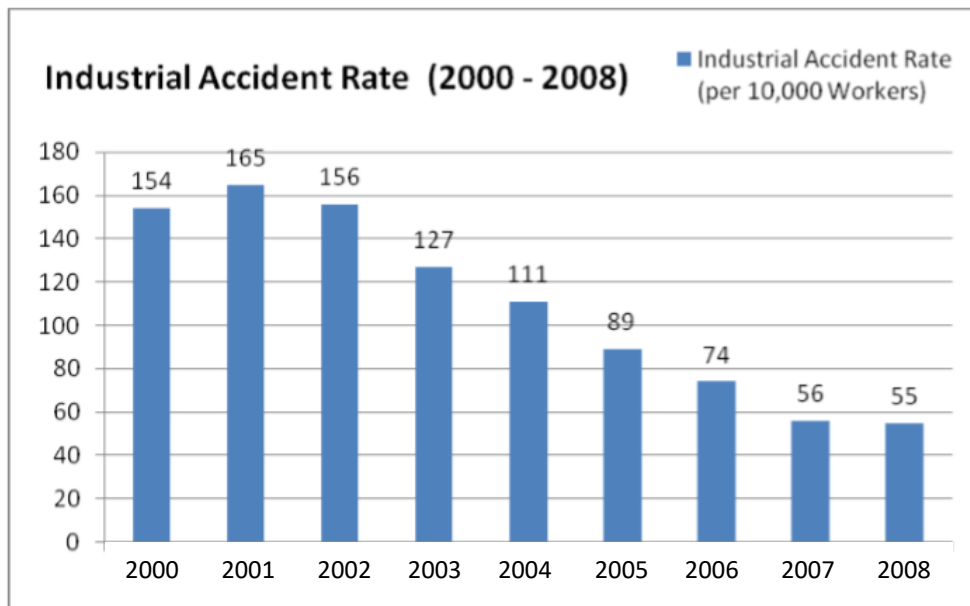
There are various definitions of safety culture and basically safety culture is related to safety beliefs, perception and values, and the attitude of the employees. According to Biggs, Herbert C., Dingsdag, Donal P, Roos, and Colette R., “a safety culture is an organizational culture that places a high level of importance on safety beliefs, values and attitude-and these are shared by the majority people within the company or workplace (Herbert C. *et al.*, 2008).” The term ‘culture’ of an organization can be defined as ‘the way we do things around here’ (Dominic, 1998). Most accidents occurred are due to unsafe environment and lack of safety culture at a

workplace. The implementation of the safety culture will improve the safety and health of the organization and indirectly reduce the occupational accidents at a workplace.

The safety culture will help the employees to understand and realize the importance of working in a safe workplace environment. The importance of safety culture is to provide belongingness, trust and cooperation among the employees through their cohesiveness and enrollment. They remind each other on the importance of safety and improve the communication through teamwork. Furthermore, safety culture provides direction of safety practices in a workplace. Besides that, implementing the safety culture at a workplace can also improve the productivity and profitability of an organization. For example, when the top management provides the safety culture at a workplace, they will indirectly convince their employees that the workplace has a safe environment to perform their task. A safe workplace will encourage the employees to perform their task without a doubt, improve the productivity and reduce the unexpected accident at a workplace. Hence, the profitability of the organization also will increase (Dominic, 1998; Safizal *et al.*, 2016)

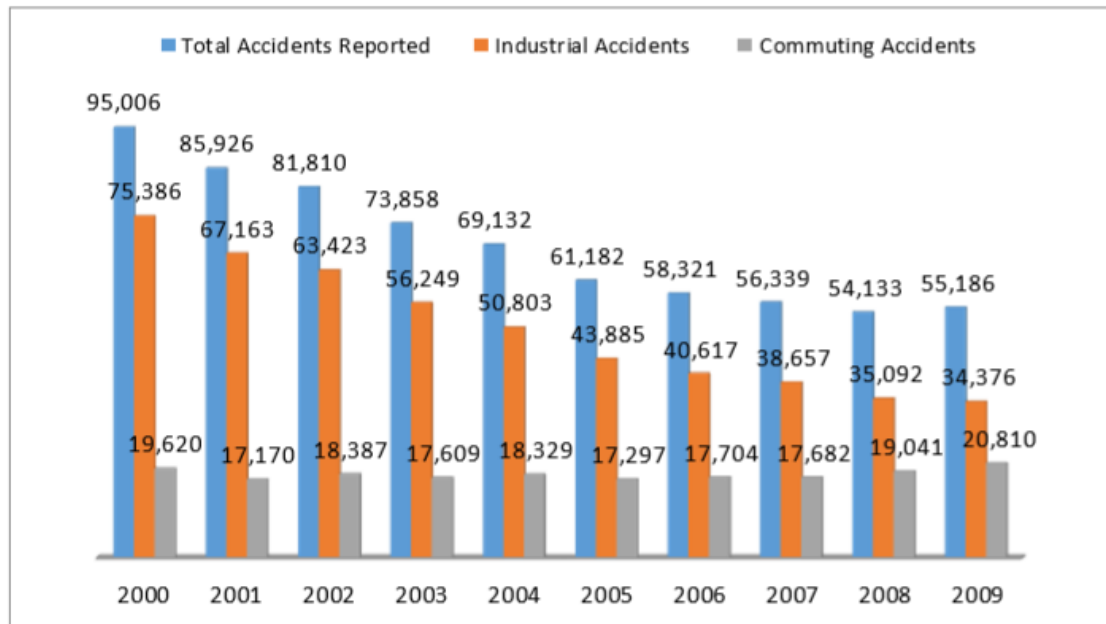
## 2.4 Industrial Accident in Malaysia for All Sectors

### i. Industrial Accident



**Figure 2.1:** Industrial Accident Rate 2000-2008 (Auyong, 2014)

From Figure 2.1, the industrial accident rate has been enhanced from 165/10,000 in 2001 to 55/10,000 in 2008. The Deputy Ministry of Human Resources was cited in the Harian Metro that the fatality rate was 211 per 100,000 workers recorded in 2009 (Harian Metro, 26<sup>th</sup> May 2010). Statistics from the Ministry of Human Resources showed that the industrial accident rate has declined from 4.15 cases for every 1,000 workers in 2008 to 3.31 cases in 2012 while the commuting accident rate remained at 5.48 cases per 1,000 workers in 2012 (Auyong, 2014).



**Figure 2.2:** Number of Reported Accident 2000-2009 (Au Yong, 2014)

Auyong Hui-Nee found out that the occupational accidents in Malaysia showed a continuous decline from year 2000 to 2008 (Figure 2.2). However, the statistics remained constant since 2009 (Auyong, 2014). Hence, some precaution measures should be taken and implemented at the workplace in order to reduce the occupational accidents in Malaysia.

**Table 2.1:** Industrial Accidents Reported by Sectors, Malaysia from 2012 to 2016 (Ali *et al.*, 2017)

Sector	2012	2013	2014	2015	2016
Manufacturing	1,722	1,655	1,667	2,040	2,333
Mining and Quarrying	42	35	62	39	25
Construction	177	164	172	237	233
Agriculture, Forestry,	446	535	492	480	471

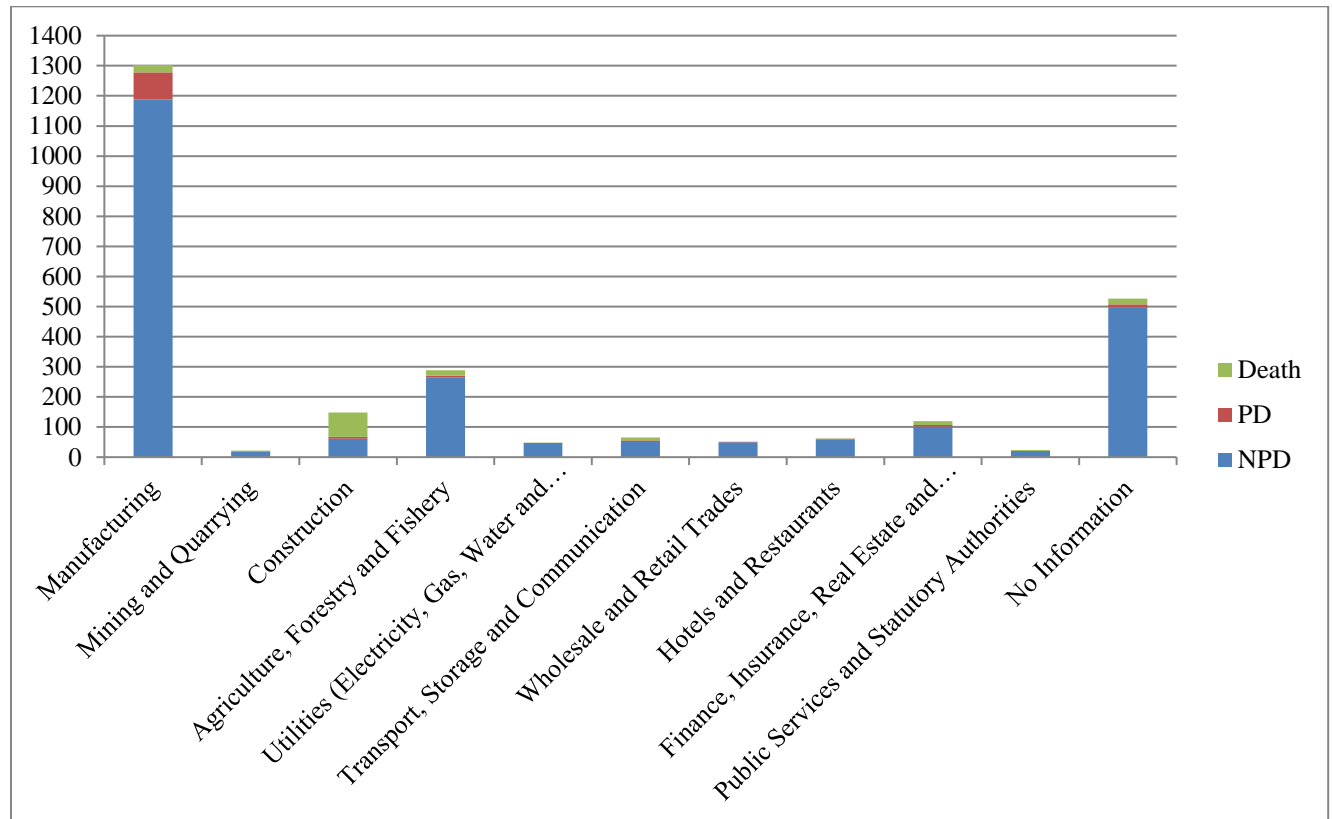
Logging and Fishery					
Utility	94	108	70	96	75
Transport, Storage, and Communication	95	93	102	131	130
Wholesale and Retail Trade	73	78	83	108	109
Hotel and Restaurant	15	20	57	62	90
Financial, Insurance, Real Estate and Business Services	62	71	74	119	126
Public Services and Statutory Bodies	54	67	26	32	110
Grand Total	2780	2826	2805	3344	3702

Table 2.1 shows the number of accidents reported by sectors from 2012 to 2016. From Table 2.1, the number of accidents reported for the manufacturing sector has been the highest throughout the years. It increases from 1722 in 2012 to 2333 in 2016. This showed that the employees that work in the manufacturing area are exposed to high accidental hazards. Besides that, from Table 2.1, the pattern of accidents reported for each sector is different to another sector (Ali *et al.*, 2017). As the conclusion, different industrial sectors are having different type of hazards.

**Table 2.2:** Occupational Accidents Statistics by Sector until October 2018 (DOSH Website, 2016)

Sector	NPD	PD	Death	Total
Manufacturing	1188	90	25	1303
Mining and Quarrying	18	2	2	22
Construction	61	6	81	148
Agriculture, Forestry and Fishery	264	7	18	289
Utilities (Electricity, Gas, Water and Sanitary Services)	47	0	1	48
Transport, Storage and Communication	54	2	9	65
Wholesale and Retail Trades	49	2	1	52
Hotels and Restaurants	59	2	1	62

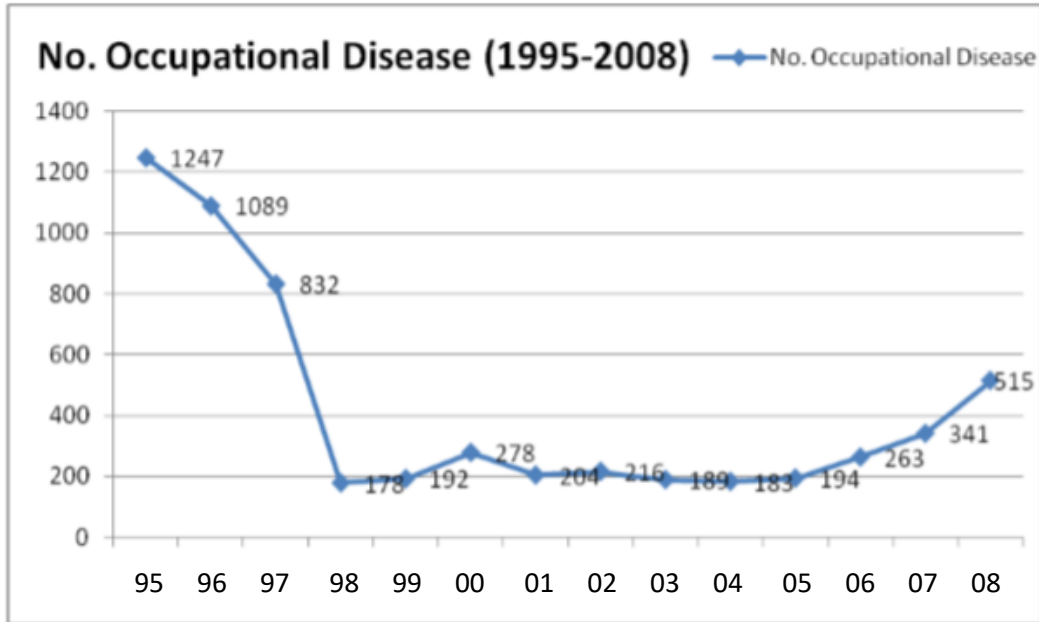
Finance, Insurance, Real Estate and Business Services	102	5	13	120
Public Services and Statutory Authorities	21	0	3	24
No Information	497	11	19	527
Total	2360	127	173	2660



**Figure 2.3:** Occupational Accidents by Sector until October 2018

Table 2.2 and Figure 2.3 show the statistic of occupational accidents by sector until October 2018. The number of occupational accidents reported for the manufacturing sector has been the highest among the others with 1188 non-permanent disability, 90 permanent disability and 25 death cases. This indicates that occupational accident in the manufacturing sector has not diminished although most of the companies had implemented the safety culture at their workplace. Besides that, from Figure 2.3, the pattern of accidents reported for utilities, transport, wholesale, hotels and restaurants are almost the same. As the conclusion, more effort is needed to reduce the occupational accidents in the manufacturing sector.

ii. Occupational Disease



**Figure 2.4:** Number of Occupational Disease 1995-2008 (Auyong, 2014)

Figure 2.4 shows the number of occupational disease in all sectors from 1995 to 2008. From the figure, the number of occupational disease has decreased from 1247 in 1995 to 183 in 2005. However, the number of occupational disease increased since 2006 from 194 to 615 in 2008. SOCSO reported that the number of occupational disease keep increasing until 2009 with 954 number of cases. Most of the occupational disease involving mainly at hearing, lung, skin, musculoskeletal disorder, cancer, physical agent, biological agent and chemical agent (Auyong, 2014). The occupational disease can occur in any sectors; hence, the top management of every company must take an action to reduce the occupational disease that would lead to death risk.

**Table 2.3:** Occupational Disease and Poisoning By Sector 2015 (Ali *et al.*, 2017)

Sector	No. of Cases	Percentage (%)
Manufacturing	3487	86.4
Mining and Quarrying	109	2.7
Construction	5	0.1
Agriculture, Forestry, Logging	122	3.0



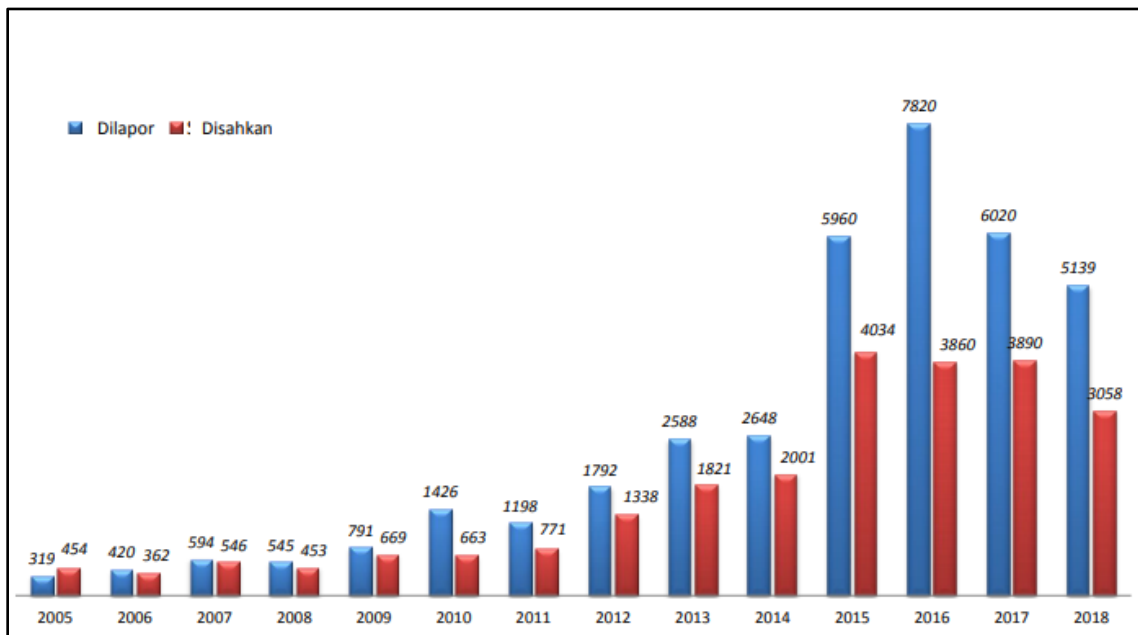
and Fishery		
Utility	77	1.9
Transport, Storage and Communication	17	0.4
Wholesale and Retail Trade	4	0.1
Hotel and Restaurant	14	0.3
Financial, Insurance, Real Estate and Business Services	50	1.2
Public Services and Statutory Bodies	149	3.7

From Table 2.3, it shows that the manufacturing sector has the highest number of occupational disease and poisoning in 2015, with 3487 number of cases (86.4%). The second highest is the public services and statutory bodies sectors with 149 cases (3.7%). Then, it was followed by the agriculture, forestry, logging and fishery sectors with 122 cases (3.2%) (Ali *et al.*, 2017).

**Table 2.4:** Occupational Disease and Poisoning Statistics 2005-2018 (DOSH Website, 2016)

<b>Year</b>	<b>Number of Cases</b>
2005	319
2006	420
2007	594
2008	545
2009	791
2010	1426
2011	1198
2012	1792
2013	2588
2014	2648
2015	5960

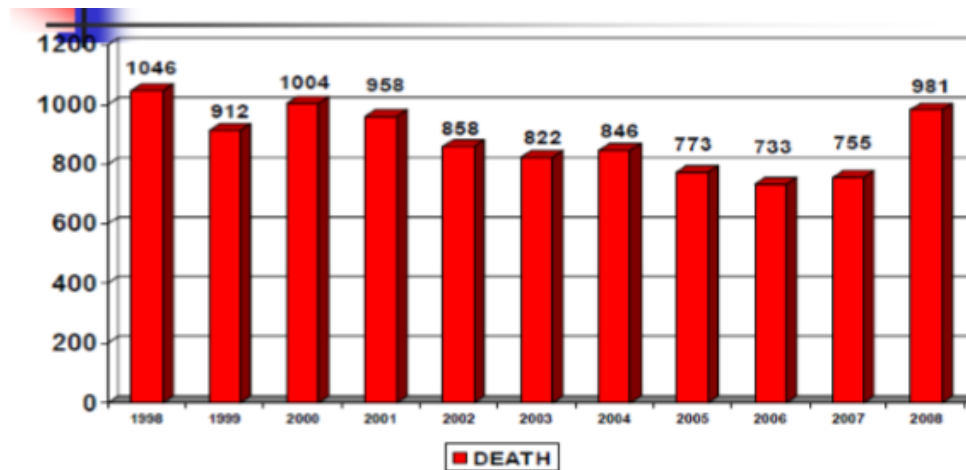
2016	7820
2017	6020
2018	5139
Total	37260



**Figure 2.5:** Occupational Disease and Poisoning Statistics 2005-2018 (DOSHS Website, 2016)

Table 2.4 and Figure 2.5 show the statistics of the occupational disease and poisoning from 2005 to 2018. From the figure, it is clearly seen that the occupational disease and poisoning keep increasing from year 2005 until 2015. However, the bar chart shows a fluctuating pattern from year 2015 to 2018 and it seems to be decreasing in year 2018.

iii. Occupational Death, Permanent Disability and Non-Permanent Disability



**Figure 2.6:** Number of Occupational Death 1998-2008 (Auyong, 2014)

Figure 2.6 shows the number of occupational death from 1998 to 2008. The number of occupational death decrease from 1046 in 1998 to 733 in 2005. However, the number of occupational death increases to 981 in 2008 (Auyong, 2014).

**Table 2.5:** Number of Reported Accident 2012-2016 (Ali *et al.*, 2017)

Years	Total Accident Reported	Death	Permanent Disability	Non-Permanent Disability
2012	2780	191	207	2382
2013	2826	185	165	2476
2014	2805	204	145	2456
2015	3344	213	122	3009
2016	3702	240	144	3348

Table 2.5 shows the total number of accidents by types in Malaysia during 2012 to 2016. The total number of accidents reported for all sectors increase from 2780 in 2012 to 3702 in 2016. Besides that, the total number of death and non-permanent disability reported for all sectors also show a significant increase from 191 in 2012 to 240 in 2016 and from 2382 in 2012

to 3348 in 2016 respectively. However, the total number of permanent disability reported for all sectors has declined from 207 in 2012 to 144 in 2016 (Ali *et al.*, 2017).

## 2.5 Manufacturing Sector in Malaysia

In Malaysia, there are different classifications of manufacturing industry. There are various types of industry such as automotive, textile, wood based, electronics and many others. Manufacturing industry refers to the industry that involved in the manufacturing and processing of items and transforms them into new items. In other word, manufacturing industry is the industry that converts the raw materials into finish products. The finished products can either serve as the finished goods to fulfill customer requirement and satisfaction or as the intermediate goods that is used in the production of the industry (Ali *et al.*, 2017).

**Table 2.6:** Industrial accidents of manufacturing sector last five years (2012 to 2016)  
(Ali *et al.*, 2017)

Year	Death (D)			Permanent Disability (PD)			Non-Permanent Disability (NPD)		
	Total	MFG	%	Total	MFG	%	Total	MFG	%
<b>2012</b>	191	40	21	207	147	71	2382	1535	64
<b>2013</b>	185	58	31	165	128	78	2476	1469	59
<b>2014</b>	204	45	22	145	112	77	2456	1510	61
<b>2015</b>	213	46	22	122	89	73	3009	1906	63
<b>2016</b>	240	72	30	114	74	65	3348	2187	65
Average % of 5 Years (D)			25%	Average % of 5 Years (PD)		75%	Average % of 5 Years (NPD)		64%

Table 2.6 shows the industrial accidents of manufacturing sector for the last five years which is from 2012 to 2016. From the table, we can see that the number of death reported for manufacturing sector increase from 40 in 2012 to 72 in 2016 by increment of 80% while the number for non-permanent disability increase from 1535 in 2012 to 2187 in 2016 by increment of 42%. However, the number of permanent disability reported for manufacturing sector decrease from 147 in 2012 to 74 in 2016 by decrement of 50% (Ali *et al.*, 2017).

Nowadays, the manufacturing industries in Malaysia have experienced the latest and new innovation that results in new growing technology which indirectly leads to new type of industrial disease impact on employees' health. Industrial disease is the disease that occurs during the process of converting the raw material into finish products.

**Table 2.7:** Statistic of Occupational Poisoning and Disease from Year 2012 to 2015

(Ali *et al.*, 2017)

<b>Years</b>	<b>Number of Occupational Disease Cases</b>
2011	1198
2012	1792
2013	2588
2014	2648
2015	5960

Table 2.7 shows the statistic of occupational poisoning and disease that have been reported to the Occupational Health division from year 2012 to 2015. The number of occupational disease cases increase from 1198 in 2011 to 5960 in 2015 by 397% of increment (Ali *et al.*, 2017).

There are many factors that lead to the industrial accidents and occupational disease in manufacturing industry. For example, some companies do not apply safety culture at their workplace. Lack of safety culture can cause unexpected accidents and injuries to the employees (Auyong, 2014). Next, non-compliance of the requirement of Occupational Safety and Health Act (OSHA) 1994 also will lead to the industrial accidents (Auyong, 2014). Besides that, most of the employees do not aware of the potential hazard that might occur at the workplace (Ali *et al.*, 2017). Hazard is a potentially harmful situation that may cause injury to the worker. Examples of hazards are explosive materials, toxics, radiation, flammable materials and electric charge (DOSH, 2008). Lastly, the employees that work in the manufacturing industry might involve in the different operation of handling machine and equipment such as lathe machine, milling machine, welding operation and forklift which may lead to the unexpected occupational accident.

## **2.6 Safety and Health Act**

### **2.6.1 Occupational Safety and Health Act (OSHA) 1994**

In Malaysia, the government has taken some precautionary measures to make sure that all the organizations follow the rules and legislations. Therefore, Occupational Safety and Health Act (OSHA) 1994 was gazetted on 24 February 1994 mainly referring to the British Occupational Safety and Health Act of 1970 that includes a general duty for employers (Auyong, 2014). OSHA 1994 was formulated considering the fact that the Factories and Machinery Act (FMA) 1967 only covered and secured the occupational safety and health in the manufacturing, mining, quarrying and construction sectors, whereas the other sectors were not covered by FMA 1967 (Ali *et al.*, 2017). The scope of OSHA 1994 covers and secures all persons at work in both private and public sectors except on board ships and the military forces (Auyong, 2014). The Occupational Health and Safety regulations impose a penalty and punishment to the employers for the presence of unsafe work environment for their employees and noncompliance with the standards (Auyong, 2014).

The objectives of OSHA 1994 are to protect and secure the safety, health and welfare of the workers at the workplace, to promote and encourage the occupational environment for the employee at the workplace which is fitted to their physiological and psychological needs, and to offer the mean whereby the associated occupational safety and health legislations can be continuously alternated by a system of regulations and approved industry codes of practice (Ali *et al.*, 2017; DOSH, 2008). The fundamentals of OSHA 1994 are self-regulation and tri-partite consultation. Tri-partite consultation is the co-operation between employers, employees and government.

### **2.6.2 Worker compensation**

The Act applies to any individual who is utilized generally than in an administrative limit, in railroads factories, mines, manors, mechanically pushed vehicles, loading and unloading, construction, maintenance and repairing, and different dangerous works and occupations determined in Schedule II to the Act, Under Section 2(3) of the Act, the State Governments are engaged to broaden the extent of the Act to any class of people whose occupations are viewed as risky after giving three months' notice in the official periodical. However, the Act, does not apply to individuals serving in the Armed Forces of Indian Union,

and employees secured under the arrangements of the Employees' State Insurance Act 1988. The goal of the Workers' Compensation Act, 1923 is to impose a commitment upon the employers to pay compensation to workers for accidents arising at the workplace during working (Ministry of Manpower, 2017).

## **2.7 Hazard Identification, Risk Assessment and Risk Control (HIRARC)**

Nowadays, the evolution of technologies has lead people to face risk in their life especially the workers in the industry. People will make a decision based on risk. Risk is the likelihood of a hazardous event to occur within a specific period and the severity of injury to people health, property and environment (DOSH, 2008). Risk can be reduced by implementing HIRARC at the workplace. The main purpose of HIRARC are to identify the factor that may cause injury and damage to the employees, to examine whether the injury will be falling to anyone or not, and to enable the top management and employers to plan, execute and monitor the preventive measures to ensure that the risk are being controlled at all times (DOSH, 2008; DOSH Human Resource Malaysia, 2018).

There are some procedures involved in implementing HIRARC. First, classify the work activities in accordance with their similarity. Second, identify the potential hazards that might occur in a workplace. By identifying the potential hazards in the workplace, the employers can determine the critical and hazardous operations that contribute high risk to the health and safety of the employees. The third step is to analyze and evaluate risk from each hazard by conducting risk assessment. After analyzing the risk, the employer can evaluate and select the suitable control and preventive measures to reduce the risk. Then, the employers have to monitor the execution of the preventive measures to ensure that risk is reduced (DOSH, 2008; DOSH Human Resource Malaysia, 2018).

## CHAPTER 3

### RESEARCH METHODOLOGY

#### 3.1 Introduction

This chapter will explain the methods used for this research study. Topics covered in this chapter are literature review, research design, data collection method, population and sampling technique, research instrument, questionnaire design, scale of measurement, pilot test and statistical data analysis.

#### 3.2 Literature Review

As mentioned in Chapter 2: Literature Review, the main purpose of literature review is to study and gather information from article, journal and paperwork published by previous researchers. There are four main objectives of literature review:

- i. To study the literature and writing related with this research study.
- ii. To synthesis and incorporate the data in that literature and writing into an outline.
- iii. To investigate the data and information assembled by recognizing voids in current knowledge; by appearing of speculations and perspectives; and by detailing regions for further research and assessing zones of contention.
- iv. To displays the writing in a sorted out way.

Literature review is an important part that needs to be emphasized in the formation of a research study. It is important to ensure that the content obtained from literature review is accurate. If the information obtained is less accurate, it will affect the result and consequently affect the overall project. By studying the articles, journals and paperwork from previous researchers, it can gather a lot of information about industrial accidents and injuries at the workplace and safety culture that have been implemented in order to mitigate and reduce these accidents. Literature review helps to understand more about safety culture and it also guide to prepare this research project efficiently.