DEVELOPMENT OF MONITORING TOOLS FOR CRITICAL SUCCESS FACTOR IN MANAGING OCCUPATIONAL SAFETY AND HEALTH FOR GAS CONTRACTOR COMPANIES IN PENINSULAR MALAYSIA

HAMDAN BIN HAJI RAMAT

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HAMDAN BIN HAJI RAMAT

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Chairman : Associate Professor Shamsul Bahri Bin Mohd Tamrin, PhD
Faculty : Medicine and Health Sciences

There is a need to develop Monitoring Tools for Critical Success Factor in Managing Occupational Safety and Health Management System (OSHMS) for Gas Contractor companies in Malaysia. Critical Success Factor (CSF) is defined as the necessary element that needs to be achieved by companies in order to ensure the success of Occupational Safety and Health (OSH) implementation in tandem with the spirit of Occupational Safety and Health Act 514, 1994 with promotes self-regulatory in work place setting. Critical Success Factor imposed by these industries need to be identified in complying with OSHMS element as to avoid Occupational Safety and Health accident in Malaysia. This study aimed to consolidate the data of Occupational Safety and Health Management System (OSHMS) implementation among Gas Contractor companies in Peninsular Malaysia, identify the Critical Success Factor imposed by these industries and development of monitoring tools for Critical Success Factor in managing occupational safety and health. A total of 80 Gas Contractor companies registered with Department of Occupational Safety and Health (DOSH) in Peninsular Malaysia participated to these newly established OSHMS questionnaire and interview check sheet to determine MS 1722:2011 elements conformity and it Critical Success Factor in this cross-sectional study. Descriptive statistic showed main element conformity mean (standard deviation) the highest score is Policy 72(15.5) and the lowest score is Action for Improvement which is 60(20.7). The highest percentage of company that complies with the main element is Policy 15% and the lowest is Organizing 8.8%. The highest partially complied percentage for company element is Policy distributed between 61.0 to 85.0% which is 76.3%. From the Z-score graph, it indicates that the individual company conformity is not much different from each other and based on Z-score analysis it showed the most Critical Success Factor for main element scored among Gas Contractor companies are Organizing and Evaluation 58 companies, followed by Action for improvement 53 companies, Policy 51 companies and lastly Planning and Implementation 49 companies. Result obtained from questionnaire and interview showed that the implementation of OSHMS in Gas Contractor Companies in Peninsular Malaysia is similar between 0.7% - 5% accepts for the Organizing element, which the score was 19.8%. The mean score for almost all of main element is below 70% and the identified Critical Success Factor element for Gas Contractor companies in Peninsular Malaysia is the employer did not allocate responsibility, accountability and authority to Senior Management for effectively implementing and promoting the understanding on OSHMS arrangement to

all members of the organization leading to in adequate of Initial Review record and not fully completed continual improvement arrangement. Percentage of conformity with OSHMS MS 1722:2011 elements by Gas Contractor companies can be further improved by focusing on the implementation of developed OSHMS Critical Success Factor Monitoring Tools.

Abstrak tesis dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk Ijazah Doktor Falsafah

PEMBANGUNAN ALAT PENGUKUR FAKTOR KEJAYAAN KRITIKAL DALAM PENGURUSAN KESELAMATAN DAN KESIHATAN PEKERJAAN UNTUK SYARIKAT KONTRAKTOR GAS DI SEMENANJUNG MALAYSIA

Oleh

HAMDAN BIN HAJI RAMAT

Januari 2016

Pengurusi : Profesor Madya Shamsul Bahri Bin Mohd Tamrin, PhD
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Terdapat keperluan untuk membangunkan alat pengukur Faktor Kejayaan Kritikal (FKK) Sistem Pengurusan Keselamatan dan Kesihatan Pekerjaan (SPKKP) untuk syarikat Kontraktor Gas di Malaysia. Faktor Kejayaan Kritikal ini di difinasikan sebagai elemen-elemen yang perlu dicapai oleh syarikat untuk memastikan kejayaan perlaksanaan keselamatan dan kesihatan pekerjaan (KKP) seiring dengan kehendak Akta Keselamatan dan Kesihatan Pekerjaan 514, 1994 dengan menggalakkan pengaturan kendiri dalam suasana tempat kerja. FKK yang diterima oleh industri ini perlu dikenalpasti bagi memenuhi kehendak elemen-elemen SPKKP untuk menghindarkan kemalangan berkaitan keselamatan dan kesihatan pekerjaan di Malaysia. Maklamat kajian ini adalah untuk menyatukan data perlaksanaan SPKKP di kalangan syarikat Kontraktor Gas di Semenanjung Malaysia, mengenalpasti FKK yang diterima oleh industri ini dan membangunkan alat pemantauan Faktor Kejayaan Kritikal dalam pengurusan keselamatan dan kesihatan. Sebanyak 80 syarikat Kontraktor Gas di Semenanjung Malaysia yang berdaftar dengan Jabatan Keselamatan dan Kesihatan Pekerjaan (JKKP) terlibat dengan menjawab borang soal selidik dan senarai semak temu bual yang baru dibangunkan untuk menentukan pematuhan kepada elemen-elemen MS 1722:2011 dan Faktor Kejayaan Kritikal di dalam kajian keratan rentas ini. Statistik Deskriptif menunjukkan pematuhan min (sisihan piawaian) skor tertinggi untuk elemen utama ialah Dasar 72(15.5) dan skor terendah ialah Tindakan Penambahbaikan iaitu 60(20.7). Peratusan tertinggi syarikat yang memenuhi kehendak elemen utama ialah Dasar 15% dan terendah ialah Pengelolaan 8.8%. Peratusan tertinggi untuk syarikat yang memenuhi sebahagian elemen ialah Dasar terserak diantara 61.0% ke 85.0% iaitu 76.3%. Dari graf Skor-Z, ia menunjukkan pematuhan syarikat individu tidak banyak berbeza antara satu sama lain dan berdasarkan analisis Skor-Z ia menunjukkan elemen utama yang paling kritikal untuk Faktor Kejayaan Kritikal di kalangan syarikat Kontraktor Gas ialah Pengelolaan dan Penilaian 58 syarikat, diikuti dengan Tindakan Penambahbaikan 53 syarikat, Dasar 51 syarikat dan akhir sekali Perancangan dan Pelaksanaan 49 syarikat. Keputusan yang diperolehi daripada soal selidik dan temu bual menunjukkan pelaksanaan SPKKP di kalangan syarikat kontraktor gas di Semenanjung Malaysia di antara 0.7% - 5% kecuali untuk skor elemen Pengelolaan 19.8%. Peratusan pencapaian skor Min untuk syarikat kontraktor gas untuk elemen utama adalah di bawah 70% dan elemen Faktor Kejayaan Kritikal yang dikenalpasti untuk syarikat Kontraktor Gas adalah majikan tidak memperuntukkan tanggungjawab, akauntabiliti dan kuasa untuk

Pengurusan Kanan melaksanakan dan menggalakkan pemahaman berkesan serta perkiraan kepada semua ahli tentang pengaturan SPKKP di organisasi yang membawa kepada rekod Kajian awal yang tidak lengkap dan pengaturan pembahbaikan berterusan yang tidak siap sepenuhnya. Peratusan pencapaian syarikat Kontraktor Gas dengan elemen-elemen SPKKP MS 1722:2011 boleh dipertingkatkan dengan memberi tumpuan kepada penggunaan Alat Pemantauan Faktor Kejayaan Kritikal yang dibangunkan.

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In the name of Allah, the most Gracious and the Most Merciful

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This thesis submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfillment of the requirement for the degree of Doctor of Philosophy.
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LIST OF ABBREVIATIONS

API	American Petroleum Institute
ASME	American Society of Mechanical Engineers
CSF	Critical Success Factor
DOSH	Department of Occupational Safety and Health
DSM	Department of Standards Malaysia
EC	Energy Commission
GMSB	Gas Malaysia Sdn Bhd
HSWA	Health Safety at Work Act
HSE-MS	Health Safety and Environment Management System
HSC	Health and Safety and Commissioning
HSE	Health and Safety Executive
ISRS	International Safety Rating System
ILO	International Labor Organization
JDA	Joint Development Area
KSF	Key Success Factor
KRA	Key Result Areas
LPG	Liquid Petroleum Gas
LNG	Liquefied Natural Gas
MISC	Malaysian International Shipping Corporation
MT's	Monitoring Tools
NLCP	National Standard Compliance Program
NGDS	Natural Gas Distribution System
NIOSH	National Institute of Occupational Safety and Health
NYCOSH	New York Committee for Occupational Safety and Health
OSH	Occupational Safety and Health

OSHA	Occupational Safety and Health Act
OSHMS	Occupational Safety and Health Management Systems
PGU	Peninsular Gas Utilization
PDCA	Plan, Do, Check and Action
PEMP	Process Environmental Management Plan
PSP	Process Safety and Health Plan
QMS	Quality Management Systems
SOCSO	Social Security Organization
SWO	Standard Writing Organization
TAGP	Trans ASEAN gas pipeline
TTM	Trans Thailand Malaysia
U.S EIA	United State Energy Information Administration

CHAPTER 1

INTRODUCTION

1.1 Background

Safety and Health at work has been a common problem since the dawn of Industrial revolution. However, the promulgation of safety legislation during that period attempted to control safety and health hazards and was mainly aimed at the manufacturing industry (Lynda et al., 2006). No focus was given to other sectors such as transportation, forestry, agriculture, and others although safety and health issues are vital, based on the accident statistics, only in the last few decades was a new approach on occupational safety and health (OSH) introduced that no longer limited at scope of statutory protection to places of work such as factories which statutory responsibilities lies wholly on the Authority (Lynda et al., 2006).

Rapid growing of industrialization contributed to positive impact to income per capita and quality of life. However, it also increased of incidents at workplace. This new approach on promulgation of Occupational Safety and Health Act (OSHA), 514 in 1994 defined the duties on the employer and employees of a place of work through self-regulation, participation and consultation (Aina, 2013).

1.2 Occupational Safety and Health Management System (OSHMS)

The main aim of OSH-MS is to identify and analyze on processes which contribute to risk and cause accidents (Booth et al., 1995). In 1994, European Process Safety Centre has suggested policy, organization, management practices and procedures, monitoring and auditing, and management review as the main elements of safety management systems.

For developed countries, the increase in pace of trade and economies, to compete with other countries, the development in the raise to become the leader among them in conjunction with the modernization, the awareness of the occupational accidents and diseases become more global concern. Most of the workers or employers closed one eye on the working conditions. Having said that, international agencies have been following minimum standards and guidelines that have been set for the workers to do because they want to cut cost and gain more profit in their business. Only 10% has been covered in OSH laws which population in developing countries eliminates major hazardous industries and occupations (La Dou, 2003).

Different priorities have been set for the industrially developed countries and developing countries. Although both industrial countries aim to develop the country, it has different point of view in aspect of safety and health. Stress, aged workers, workers right to know, chemicals, ergonomics, and health services are the priorities in develop country in OSHMS. Meanwhile, the priorities in safety and health in industrially developing countries are agriculture, hazardous occupations construction

and mining, major hazards control, small enterprises, informal sector, occupational disease reporting, and safety, health and child labor (Kawakami 2001).

1.3 Importance of OSHMS

There are several reasons why OSH-MS is important and become pertinent issues. The most important reason is because the industries could attain the benefits from OSH-MS implementation. Investment in OSH-MS enables the employers to prevent or at least reduce workplace accidents and injuries which will result in higher productivity and minimization of financial losses (Kwesi, 2011).

The system also serves to meet national laws and regulations with promote continuous improvement on OSH performance. Implementing the OSH-MS is not merely to fulfill the requirement of the stakeholders in keeping up with the business. Unlike the Quality Management Systems (QMS) where the purpose is to meet customers satisfaction, the OSH-MS is for the people in the organization who work and deal with the daily hazardous and risks.

The existence of effective OSH-MS proves that the organization has exercised the duty of care and self-regulation towards putting into practice OSH at the workplace.

Implementation of requirement in MS 1722: OSHMS – Requirement standard will give many benefits such as minimize the risk of getting occupational related injuries and accidents, potential reduction in downtime and associated costs, demonstration of legal and regulatory compliance, demonstration to stakeholders of commitment to safety and health, better management of safety and health risk, current and future and all these will result to the success of the organization (Anuar et al., 2008).

Establishment of OSH-MS will also help in implementing other Malaysian Standard certification such as MS International Standard Organization (ISO) 15189 (Medical Laboratories: Requirement for Quality and Competence). This study showed compatibility between MS ISO 15189 and OSH-MS requirements in order to provide a quality services among the medical laboratories (Anuar et al., 2008). Implementation of OSH-MS also not static to only one sector as mentioned previously.

In Malaysia, implementation of OSH-MS is also significant in the establishment of new sewage treatment plants in order to provide a safe workplace to the wastewater treatment plant operators (Fadzil et al., 2009). Aware with the importance of the OSH-MS in Malaysia, DOSH assist the implementation by publishing one of the latest publications which is Guidelines on Occupational Safety and Health published by DOSH in 2011 that is mainly to assist organizations in implementing the requirements in the MS 1722: 2011 OSH-MS – Requirement Standard.

1.4 Status of OSHMS in Malaysia

A statement by SOCSO state that in 2012 there are a total of 863,338 registered employers in Malaysia (SOCSO, 2012). Apparently, the number of organizations

certified with the MS 1722 is very small as compared to the total numbers of industries in Malaysia. Since MS 1722 was introduced in 2005, cumulatively 181 organizations had been certified until 2015 by accredited certification body (DSM, 2015). As a comparison with Quality Management Systems (QMS), the Department of Standards Malaysia (DSM) reported that there are 7,240 organizations certified with the ISO 9001 since 2015.

It can be noted that QMS receive more attention by organizations as the systems ensure them to stay competitive in the global market (Standard Malaysia 2015). The awareness and importance of quality and having quality management system for organizational performance has attracted many sectors in Malaysia. As shown in Table 1.1, numbers of QMS certified organizations had been increased since year 2013 to 2015. QMS 9001 recorded highest certification, followed by EMS 14001, OHSAS18001 and the lowest certification was MS 1722.

Table 1.1: Number of Certified Organization in year 2013 to 2015 for QMS 9001, EMS 14001, OHSAS18001 and MS 1722 Issued by Department of Standards Malaysia (DSM) Accredited Certification Bodies

No	Scheme	2013	2014	2015
1	QMS 9001	6628	7044	7240
2	EMS 14001	1170	1246	1274
3	OHSAS 18001	743	795	833
4	MS 1722	158	172	181

Source: Department Standards of Malaysia (2015)

Quality is usually not a legal requirement but safety and health are a part of employers and employees duties under law. Purposely, QMS is for customer's satisfaction. Therefore, the advent of OSH-MS will help to shift the mind-set of the organization that safety and health is as equally important as any other business functions. The OSH-MS provides more benefits on employees OSH performance that will consequently contribute towards an increase in their productivities (Standard Malaysia, 2012).

There are various OSHMS established voluntary or for certification in the organization. In Malaysia, the OSHMS has been implemented since 1999 with the introduction of OHSAS 18001. Prior to that, many multinational organizations have already implemented in-house or any other recognized OSHMS introduced by their parent organization. For example, petrochemical; and oil and gas industries are known to have already implemented the OSHMS on the basis of self-regulation in view of high risk nature of activities. Apart of OHSAS 18001, other OSH-MS implemented in Malaysia are Health Safety and Environment Management System (HSE-MS), International Safety Rating System (ISRS), and Integrated Offender Management System (IOMS). In Malaysia, it is still not mandatory requirement by the regulatory body namely DOSH to obtain OSHMS certification. It was observed that high percentage of organization owned by countries such as Japan, Europe and US were active in establishing and implementing the system.

These organizations represent various sectors with the scientific sector leading the other entire sector by 41.3% (DSM, 2013). The organizations identified from the scientific sectors are cement manufacturing companies pharmaceutical, oil refining, chemical and palm oil processing. This is followed by other sectors namely services sectors, 28.0 percent; electric and electronic sectors, 18.7 percent; and engineering sectors, 12 percent.

There are a few factors that contribute to the significant increase in percentage of organizations from the scientific sectors to subscribe OSH-MS. Among these are the high risk of exposure as compared to the other sectors, use of hazardous chemicals, confine space operations and potential fire risk.

To convince the industries on the importance and relevancy of the safety and health, the DOSH, NIOSH and other relevant parties have played significant roles in their respective areas to change the industries mind-set from merely complying with OSH law and regulation to self-manage OSH issues systematically to prevent or minimize work related accident, injuries and diseases.

1.5 Occupational Accidents and Incidents in Malaysia

Based from the statement by International Labor Organization (ILO, 2014), it was calculated that occupational accidents and work-related diseases cause over 2.3 million fatalities annually, of which over 350,000 are caused by occupational accidents and close to 2 million by work-related diseases. Between the year1985 and 1988, there was increase on 40% compensation claim for the cases of occupational accidents and disease within Malaysia (Sadhra et.al, 2001).

Good medical services and better governance system are most likely to become the reason of the increase of compensation claim and it true increased incidence. Data mention before shows a notable change in the identification and coverage in occupational injuries and illnesses from avoiding the incident from happen. Thus, Malaysia still continues to face major problems in occupational and work related disease (Sadhra et.al, 2001).

With numbers of workplace available in Malaysia, it is estimated that more than 13 million of worker in the workplace (Sadhra et.al, 2001). Small workplaces can be considered as smallholder, contract laborers, and self-employed workers.

In Malaysia the distribution of economic activity have encounter change due to rapid industrialization. Before manufacturing services and construction conquer the work sector in Malaysia, agriculture was the major sector in Malaysia. Due to sluggish growth in agriculture sector and other primary industries, the manufacturing services and construction sector has begun high employment growth (Sadhra et.al, 2001). These shifts have occurred in tandem with changes in the epidemiology of several diseases in Malaysia. The prevalence of communicable disease has declined with a concomitant increase in non-communicable diseases. In 1960, the principal causes of hospital admissions were gastroenteritis, tuberculosis, and malaria. In 1990, cardiovascular disease, neo-plasms, accidents and mental disorders were more predominant (Sadhra et.al, 2001).

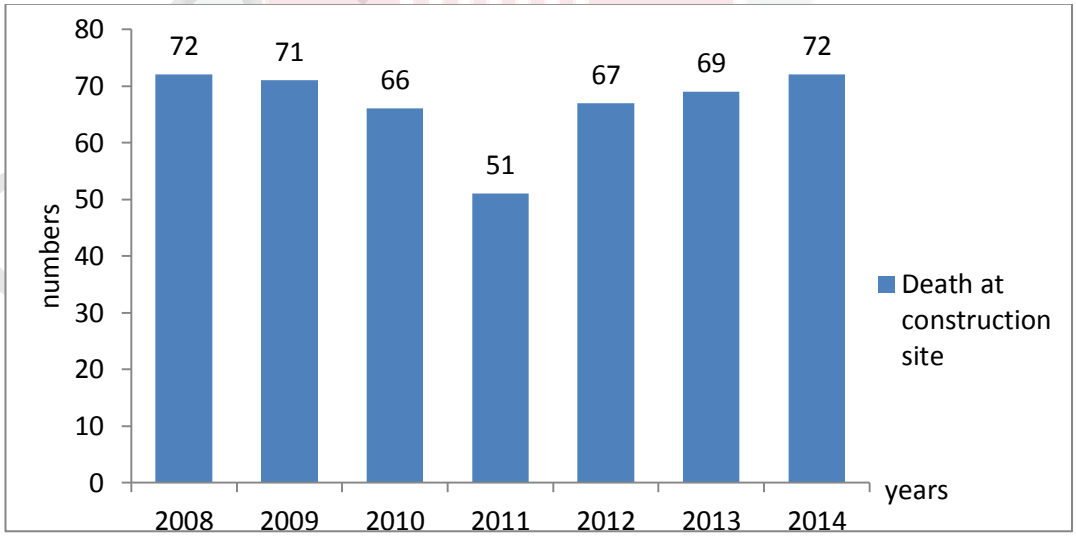
Despite of these efforts, statistics given by DOSH updated December 2014 in their official website, the number of occupational accident by the category of permanent disability (Table 1.2) is still at worrying level which is 144 (as per December 2014) compare to previous years' number; 163 (2013), 203 (2012), 164 (2011), 192 (2010), 108 (2009) and 159 (2008).

Table 1.2: Number of Permanent Disability (investigated) that had been recorded from December 2008 to December 2014

No	Sector	2008	2009	2010	2011	2012	2013	2014
1	Manufacturing	134	90	162	133	147	128	112
2	Mining and Quarrying	0	1	1	0	0	0	4
3	Construction	2	6	4	5	12	12	6
4	Agriculture, Forestry, Logging & Fishery	7	8	18	12	26	14	9
5	Utility	12	3	3	3	3	0	1
6	Transport, Storage and Communication	1	0	1	6	5	1	3
7	Wholesale and Retail Trade	0	0	0	3	6	7	3
8	Hotel and Restaurant	1	0	0	1	0	1	0
9	Financial, Insurance, Real Estate and Business Services	1	0	1	0	3	0	5
10	Public Services and Statutory Bodies	1	0	2	1	1	0	1
	Total	**159**	**108**	**192**	**164**	**203**	**163**	**144**

Source: Department of Occupational Safety and Health (2014)

Number of death in the construction by sector is fluctuate from 72 death (as per December 2014), 69 (2013), 67 (2012), 51 (2011), 66 (2010) 71 (2009) and 72 (as per December 2008). 72 is the highest number and 51 is the lowest number of death in construction site from years 2008 to 2014. The data was shown in Figure 1.1



Source: Department of Occupational Safety and Health (2014)

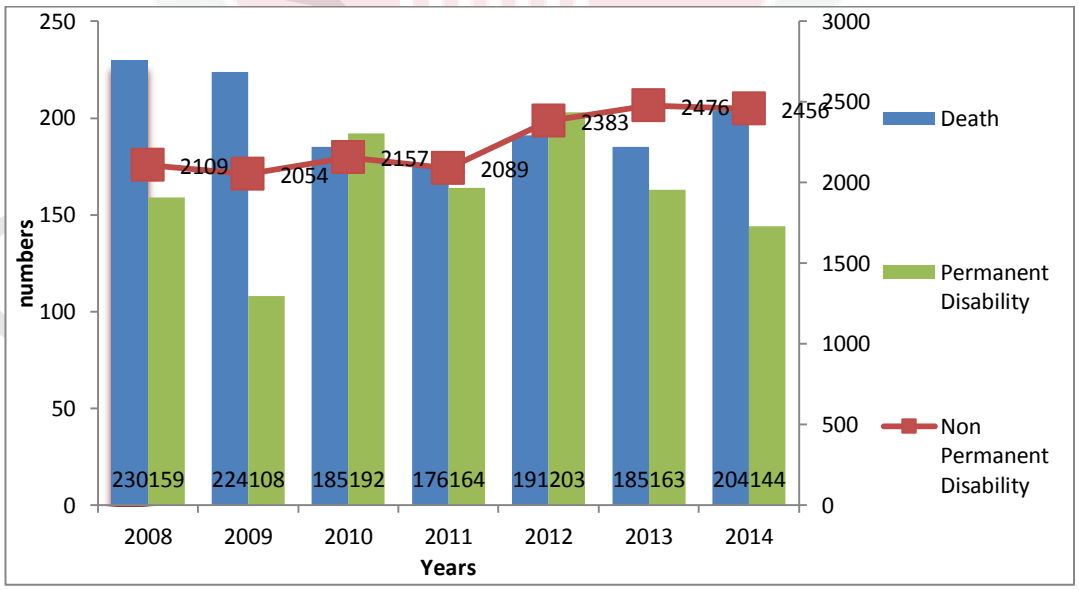
Figure 1.1: Number of death that had been recorded in construction site from 2008 to December 2014 (investigated)

The advance and rapid evolution of globalization and liberalization had put a developing countries construction workers exposure to dust, and are three to six times more likely to die from accidents at work than other workers. (Human Development Report, Work for Human Development, 2015), similarly, in many instances the booming construction sector relies heavily on rural migrant workers who earn low wages. From Human Development Report, (Work for Human Development, 2015), it shows the number of non-fatal and fatal in Malaysia from 2005-2013 it stated that 41,500 non-fatal cases which is occupational accidents that do not leading to death but that entail a loss of working time and 274 fatal cases of occupational accidents that lead to death within one year had occurred in Malaysia.

Workers should have been exposed to the importance of safety and health by their employers and this should be mandatory to all employers. Thus, the lack of exposure regarding these matters leads to high number of accidents at workplace. Many major industrial accidents have killed dozens of workers. Working environment which produce the atmosphere of feeling safe and healthy will help and gives the employer to increased enterprise efficiency and competitiveness.

As in Malaysia, there are some agencies responsible to collect, gather and compile data on occupational accidents and diseases. A few of them are the DOSH under the Ministry of Human Resources, NIOSH, and the Occupational Health Unit under Ministry of Health, Social Security Organization (SOCSO), and the Department of Labor

By looking the graph in Figure 1.2 investigated incident cases in year 2008 to 2014 by Department of Occupational Safety and Health, Graph shows a pattern of fluctuated number of permanent disability. The reported deaths from 2008 to 2014 are decreased from 230 to 204. However the reported non-permanent disabilities have increased from 2109 in year 2008 to 2456 in year 2014.



Source: Department of Occupational Safety and Health (2014)

Figure 1.2: Investigated Incident Cases in Malaysia from 2008 - 2014

1.6 Critical Success Factor (CSF)

The effective implementation of OSHMS is controlled by certain Critical Success Factor (CSF). CSF is a process of identifying tasks and requirements for success by prioritizing requirements from vision and mission statement (Daniel Austin, 2002). Identification of CSF initially will enable such as but not limited to proactive management and mitigates risk areas, assist companies in establishing clear vision for OSHMS, alignment between OSHMS strategy and existing company strategy. OSH CSF addresses a specific part of Loss Control Management while providing a degree of synergy and overlap in others. It forms an integral part of risk management process, and correctly implemented and introduced will have a profound and desirous impact and outputs (Ronald 2011).

From the perspective of Ronald (2011), CSF defines as a term of an element in an organization or project to show his mission is accomplished. CSF is important as it function to ensure the success of a company or organization. In the world of data analysis and business analysis, this term regularly used and it is familiar to them. Unable to execute CSF properly will affect the success for a manager or an organization. Therefore, to ensure high performance continuous attention is needed to the managerial or enterprise area, as they who represent it.

Due to this sustainable development of success factors implemented by organizations, Malaysia's manufacturing sector workplace injuries has reduced proportionally after OSH-MS first introduced in Malaysia in the early 2000. In OSH-MS, the critical success factors are the keys to build an effective safety and health management system that is both functional and humanized (Bakri et al., 2006).

Based on statement by Gates (2010), CSF is defined as the handful of key areas where the need of an organization must perform well on a consistent basis to achieve its mission. According to Business Dictonary.com, CSF is defined as limited number (usually between three and eight) of characteristics, conditions, or variability of an organization, program and project it also can be called as Key Success Factor (KSF) or Key Result Areas (KRA).

1.7 Natural Gas

Natural gas is considered as non-renewable fossil fuel. It is known with characteristic of clean, safe, and most useful of energy source. Most scientists believe that the dead of tiny sea creature and plant that died 200-400 million years ago has form natural gas (naturalgas.org 2013). Natural gas exists in nature under pressure in rock reservoirs in the Earth's crust, either in conjunction with and dissolved in heavier hydrocarbons and water or by itself. It is produced from the reservoir similarly to or in conjunction with crude oil.

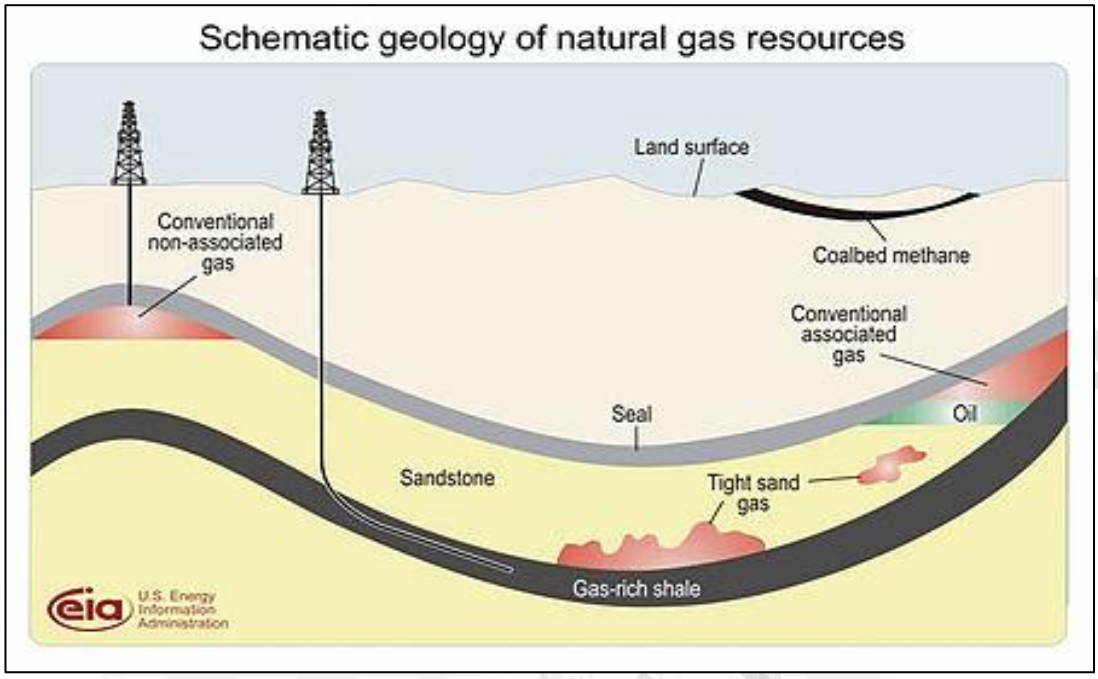


Figure 1.3: Natural gas resources in earth

1.7.1 Natural Gas Related Accidents

As years pass by, the usage of the natural gas involved Millions of people consume and utilize it as a part of lifestyles. Methane, known as an extreme flammable yet the main element of natural gas and one that can also cause suffocation (Fernandez 2007). Natural gas is pumped from fields around the world and transport through millions miles of pipelines so that we can heat our homes, cook our meals and ensure we have hot water on tap (Fernandez 2007). Table 1.3 causes of incident reported and Table 1.4 consequences of the incident reported to Energy Commission (EC) from 1993 to 2008.

Table 1.3: Cause of Incident Reported from 1993 to 2008

Cause of Incident	Natural gas and LPG Piped Gas System	
	No.	**%**
Installation/Maintenance of gas piping system not satisfactory	19	44
Dangerous work/action by third party near/on piping network	17	40
Unsafe uses of gas appliance.	7	16

Source: SuruhanjayaTenaga (2009)

Table 1.4: Consequence of Incident Reported from 1993 to 2008

Consequence	Natural gas and LPG Piped Gas System No.
Fatality	12
Injury	23
Property damage	42

Source: Suruhanjaya Tenaga (2009)

1.8 Problem Statement

A previous study shown more than 344 organizations from various sectors are certified with either MS 1722: 2011 or OHSAS 18001: 2007 (Yuen, 2006). Static from (DSM, 2015) shown only 6 gas supply sector and 164 construction sector are certified with certification body. 16% from total sector that certified on OSHMS either MS1722 or OHSAS 18001. Therefore, it is the need to identify the critical success factors for the organization in complying with OSHMS element or requirement in Malaysia. OSH goal and focus is to ensure that the employer and employee are in good shape and health in conjunction to the good of the people and country (Bakar, 2006).

Based on explanation by (Levitt and Samelson, 1993) they said that OSH is a field that related to industrial hygiene, occupational medicine, occupational nursing, engineering, epidemiology and toxicology. OSH also affects employees and other related persons at workplace include the surrounding environment and conditions. Even though through time, the working environment has improved fairly, however occupational accidents still happen. As conclusion, this catastrophe problem needs to be improved as to avoid occupational accidents happen in the organization.

For decade, industries had tried to face the problem. Various systems have implemented in order to reduce accidents and injuries at workplace. Yet, there was a decrease in the rate regarding injures and accident either minor or major accident yet the rate is too small. It presumes that ignoring the signals and warning is the main reason for this problem.

OSH standards are compulsory rules, set and enforced. The objective is to terminate or diminish OSH hazards in the workplace. The OSH standards desire is to provide minimum tolerable degree of preservation that must be granted to every worker. The area of relation is to the working conditions and dangers of injuries, sickness or death that may arise by reason of work task. The provision of OSH standards is to promoting welfare and well-being of workers as it state is an exercise of the enforcement.

In achieving the effective implement of OSH system in the region, few experts in OSH explain that it is hard as according to a fact of a study in 2003. The findings

from the study explain the reason that contribute to fail of OSH which was the management lack of responsibilities to their employees, lack of understanding and trained Occupational Safety & Health personnel, and weak operation law of Occupational Safety & Health standards. SOCSO had spent amount of RM 890 million in compensation alone in 2005 to workers who were involved in industrial accidents compared in 2004 which RM 840 million (Bakar, 2006).

Hopefully by having this study it should be able to assist and guide Gas Contractor companies to improve their Safety and Health Management System, ready for certification and reduce numbers of incident and accident at workplace.

1.9 Justification of Study

In Malaysia, research related to the Development of Monitoring Tools for Critical Success Factor in Managing OSHMS for Gas Contractor Companies is not yet exist. The Main outcome of this study was the establishment of Monitoring Tools for identifying the Critical Success Factor in Managing Occupational Safety and Health for Gas Contractor companies in Peninsular Malaysia.

This study is useful for the employers in natural gas sector to establish and maintain their safety system according to the requirement in OSHA 1994. As this study result obtain and apply in a company, all employees will get the benefit where they can perform their works safely and reduce the risk of getting involved in any accident. Monitoring tools that developed in this study can be used by DOSH to monitor the safety related activities among gas contractors. This study is carried out to determine the Safety and Health critical success factor among Gas Contractor works in peninsular Malaysia and further development monitoring tools for Safety and Health. The critical success factor data and monitoring tools can be used as indicator for gauging safety and health management system. Hopefully with careful development of these CSF Monitoring Tools can lead to a successful OSHMS implementation and will also yield a strong return on investment.

1.10 Conceptual Framework

First of all, the important step in this study is to have a listing on Gas Contractor companies registered with DOSH; identify all OSHCSF facing by an organization in comparing with the MS 1722: 2011 requirement on OSHMS elements. Figure 1.4, Conceptual framework, describe that all gas contractors that interested to undergo application to OSHMS will check confirmation with MS 1722:2011 requirement. Elements in MS 1722:2011 which consisted of five (5) main elements which are including Policy, Organizing, Planning and Implementation, Evaluation and Action for Improvement. During the evaluating process, each element classified either comply, partially comply and non-comply for each elements. Both partially and non-comply classification can contribute critical Success Factor (CSF) after plotting with the established compliance graph among gas contractor. This the only sure way to develop monitoring tools for OSHMS in Gas Contractor companies in Peninsular Malaysia

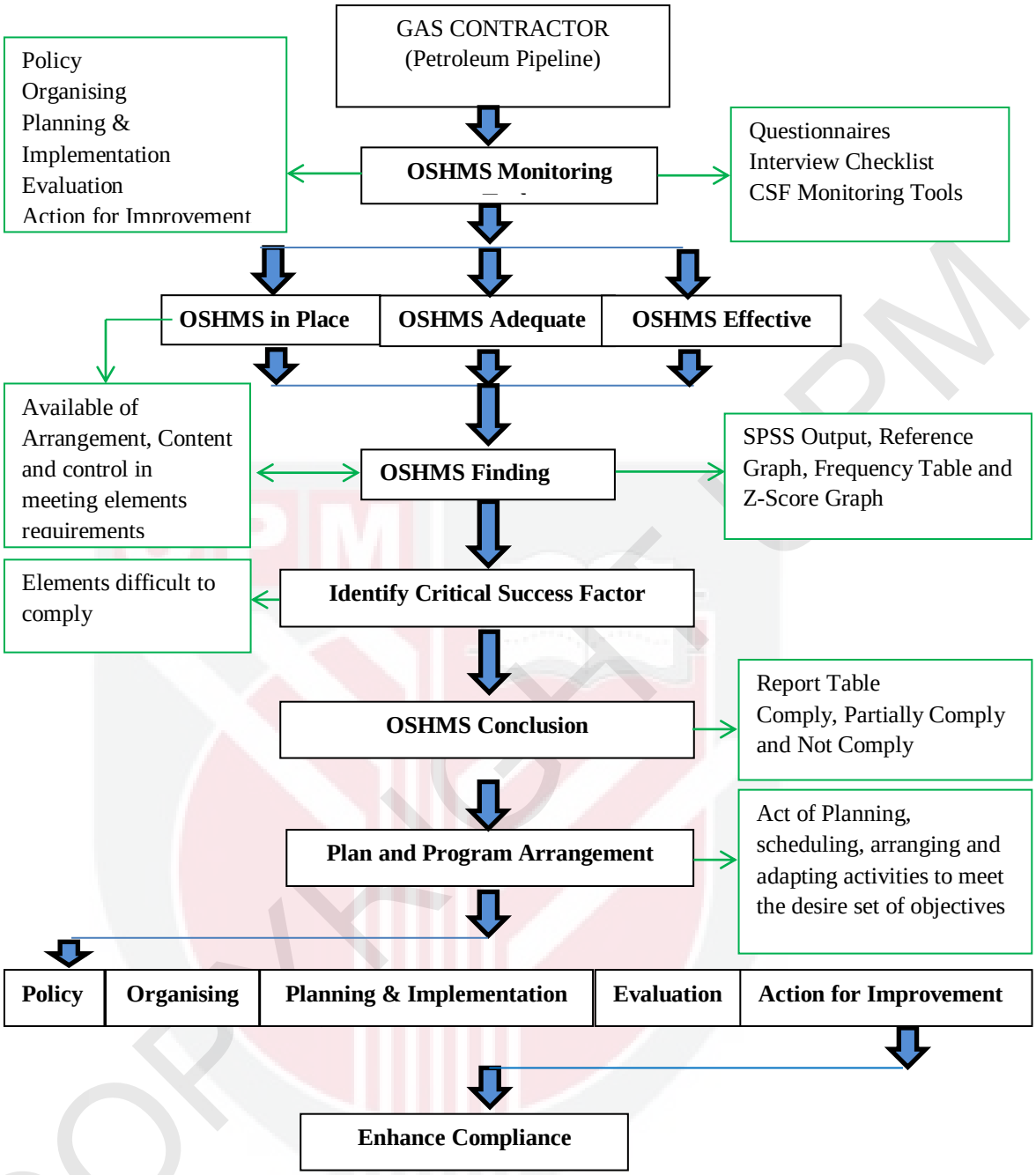


Figure 1.4 Conceptual Frameworks

1.11 Objectives

1.11.1 General objective

General objective of this study is to determine and develop monitoring tools for Critical Success Factor (CSF) in enhancing OSHMS compliance among Gas Contractor companies in Peninsular Malaysia,

1.11.2 Specific objectives

1. To establish survey instrument questionnaires and interview for data consolidation and recommendation for continual improvement
2. To determine conformity of OSHMS compliance among gas contractor
3. To determine OSHMS Critical Success Factor for Gas Contractor companies in Peninsular Malaysia with current technological progress
4. To identify appropriate documentation arrangement in the organization to show strong leadership and commitment towards OSH activities; and
5. To identify forms and records arrangement as an evident in maintaining the OSHMS in the organization.

1.12 Study Hypothesis

General Objective

There is significance difference between two developed monitoring tools used in this study to determine Critical Success Factor (CSF) in enhancing with OSHMS for Gas Contractor companies in Peninsular Malaysia

Hypothesis for objectives

There is a significance difference between OSHMS Critical Success Factor for Gas Contractor companies in Peninsular Malaysia with current technological progress. These research studies questionnaires and interview check sheet questions the current OSHMS practice by the respondent's and expected to be examined and grading in ensuring OSHMS Critical Success Factor Monitoring Tools are ready for its development.

a) Policy
b) Organizing
c) Planning and Implementation
d) Evaluation
e) Action for Improvement

By having this research study questionnaire and interview, it should be able to determine compliance, identify critical success factor, documentation, forms and records arrangement as an evident in maintaining the OSHMS elements Policy, Organizing, Planning and implementation, Evaluation and Action for improvement in the organization to show strong leadership and commitment towards OSH activities. The expected results for realization feasibility of this OSHMS Critical Success Factor monitoring tools can be used for future implementation, adaptation & practice in the Gas Contractor companies work both by clients and contractors.

Positive impact to Malaysian Standard on OSHMS – Part 1: requirements (MS 1722: Part 1:2011) compliance by gas contractor companies in creating Occupational Safety and Health as a culture and norm in for organizations operational.

Hopefully established Critical Success Factor monitoring tools should be able to improve Safety and Health Management System compliance, improve role of industry and academicians in promoting hazards free working environment and last but not lease reduce number of accident at Gas Contractor companies works in Peninsular Malaysia.

REFERENCES

Aksorn, T., & Hadikusumo, B. (2008). Critical success factors influencing safety program performance in Thai construction projects. Safety Science, Vol 46, No. 4, 709-727. http://dx.doi.org/10.1016/j.ssci.2007.06.006

Amirah, N., Asma, W., Muda, M., & Wan Mohd Amin, W. (2013). Safety Culture in Combating Occupational Safety and Health Problems in the Malaysian Manufacturing Sectors. Asian Social Science, Vol 9, No. 3, http://dx.doi.org/10.5539/ass.v9n3p182

Andrade, H., & Valtcheva, A. (2009). Promoting Learning and Achievement Through Self-Assessment. Theory Into Practice, Vol 48, No. 1, 12-19. http://dx.doi.org/10.1080/00405840802577544

Austin, D. (2002). Overview of Critical Success Factor Analysis. W3.org. from http://www.w3.org/2002/ws/arch/2/04/UCSFA.ppt.

Bakri,, A., Mohd Zin, R., Misnan, M., & Mohammed, A. (2006).). Occupational Safety and Health (OSH) Management Systems: Towards Development of Safety and Health Culture. 6th Asia-Pacific Structural Engineering And Construction Conference, No 6, 1-5.

Booth, R., & Lee, T. (1995). The role of human factors and safety culture in safety management. ARCHIVE: Proceedings Of The Institution Of Mechanical Engineers

Ceylan, H., (2012). Analysis of Occupational Accidents According to the Sectors in Turkey. *Gazi University Journal of Science*, Vol 25, No. 4, 909-918.

CIDB MASTER PLAN. (2006). Retrieved 12 April 2006, from http://www.cidb.gov.my/v6/files/OHSAS2006v2.pdf

ConglinXu (2013) NGL Prices Down Since Early 2012 Retrieved on January 2013 at http://www.ogj.com/articles/2013/07/eia-ngl-prices-down-since early-2012.html

Damiebi,. (2011). *Strategy Management and Business Success*. Retrieved from http://ieomsociety.org/ieom2011/pdfs/IEOM019.pdf

Department of Occupational Safety and Health, Malaysia,. (2014). *Occupational Accident Statistics. Dosh.gov.my.* Retrieved from http://www.dosh.gov.my/index.php?option=com_content&view=category&id=467&Itemid=781&lang=en

Department of Standard Malaysia, (2015). Jsm.gov.my. Retrieved 26 March 2016, from http://www.jsm.gov.my/statistics#.VvNdczG6_8g

Developed and is maintained by the Natural Gas Supply Association.. (2013). Naturalgas.org. Retrieved 27 March 2016, from http://education.ky.gov/cte/documents/foundationsofenergyoverview.pdf

Dodge and Picket. (2007). A well-constructed rubric. Cluteinstitute.com. Retrieved from http://www.cluteinstitute.com/ojs/index.php/JIER/article/download/8463/8474

Donoghue, A. (2001). A risk-based system to penalize and reward line management for occupational safety and health performance. Occupational Medicine, Vol. 51, No. 5, 354-356. http://dx.doi.org/10.1093/occmed/51.5.354

Energy Information Administration, (U.S. EIA, 2007) Independent Analysis and Statistic from https://www.eia.gov/beta/international/analysis.cfm?iso=MYS

Energy Information Administration, (U.S. EIA, 2009) Malaysian International Shipping Corporation From https://www.eia.gov/beta/international/analysis.cfm?iso=MYS

Engineering Manufacture 1989-1996 Vol. 209, No. 52, 393-400. http://dx.doi.org/10.1243/pime_proc_1995_209_098_02

Fariza, H. (2012). Challenges for the Internationalization of SMEs and the Role of Government: The Case of Malaysia. Journal of International Business and Economy (2012) Vol. 13, No. 1, 97-122

Fernández-Muñiz, B., Montes-Peón, J., & Vázquez-Ordás, C. (2007). Safety management system: Development and validation of a multidimensional scale. Journal Of Loss Prevention In The Process Industries, Vol. 20, No. 1, 52-68. http://dx.doi.org/10.1016/j.jlp.2006.10.002

Fernández-Muñiz, B., Montes-Peón, J., & Vázquez-Ordás, C. (2012). Safety climate in OHSAS 18001-certified organisations: Antecedents and consequences of safety behaviour. Accident Analysis & Prevention, 45, 745-758. http://dx.doi.org/10.1016/j.aap.2011.10.002

Gadd, S., Keeley, D., & Balmforth, H. (2004). Pitfalls in risk assessment: examples from the UK. Safety Science, Vol. 42, No. 9, 841-857. http://dx.doi.org/10.1016/j.ssci.2004.03.003

Gas Malaysia. (2009). Natural Gas Reserve. Retrieved 26 March 2016, from http://Natural Gas Reserve

Gas Malaysia. (2010). Gasmalaysia.com. Retrieved 26 March 2016, from http://www.gasmalaysia.com/index.php/our-services/natural-gas/supply concept

Gas Malaysia. Natural Gas Production. (2012). Oil and Energy Trends, Vol. 37, No. 12, 21-23. http://dx.doi.org/10.1111/oet.12029_4

Gates, L. (2010). Strategic Planning with Critical Success Factors and Future Scenarios: An Integrated Strategic Planning Framework. Ft. Belvoir: Defense Technical Information Center.

Gene expression; posttranscriptional modifications (2C-01 - 2C-09). (2004). Genes Genet. Syst., 79(6), 407-409. http://dx.doi.org/10.1266/ggs.79.407

Gentry B, Fernandez L. (1997). Evolving public–private partnerships: general themes and urban water examples. Academicjournals.org. Retrieved 27 March 2016, from http://www.academicjournals.org/journal/AJBM/article-full-text-pdf/BE55D3724402

Government of Barbados Ministry of Labour - OSH Safety Management. (2004).Labour.gov.bb. Retrieved 26 March 2016, from https://labour.gov.bb/osh-safety-management?highlight=health

Guidelines on Occupational Safety and Health Management Systems. (2011). Retrieved 26 March 2016, from http://www.dosh.gov.my/images/dmdocuments/glx/ve_gl_oshms.pdf

Hamid, A. (2011). *Core values that best explained the organizational productivity*. Retrieved 27 March 2016, from http://www.academicjournals.org/article/article1380700896_Ab%20Hamid%20et%20al.pdf

Heidi Goodrich, A. (2014). Understanding Rubrics. Retrieved 27 March 2016, from http://www.saddleback.edu/uploads/goe/understanding_rubrics_by_heidi_goodrich_andrade.pdf

Hierarchy-of-Hazard-Controls. (2012). NYCOSH. Retrieved 27 March 2016, from http://nycosh.org/wp-content/uploads/2014/10/Hierarchy-of-Hazard-Controls-NYCOSH.pdf

Holcroft, C., & Punnett, L. (2009). Work environment risk factors for injuries in wood processing. *Journal Of Safety Research*, 40(4), 247-255. http://dx.doi.org/10.1016/j.jsr.2009.05.001

I Anuar, and F Zahedi, and A Kadir, and A.B Mokhtar, (2008) *Occupational safety and health management system (OSHMS) guideline compliance among medical laboratories in Klang Valley*. Jurnal Kesihatan Masyarakat, Vol. 14, No. 1, 39-44. ISSN

IJM,. (2013). Safety and Environment Report. Retrieved 27 March 2016, from http://www.ijm.com/web/download/arc_ar_2013_29.pdf

Innovation in turbulent markets. Calif. Manag. Rev., Vol. 42, No. 4, 45–69. From http://www.academicjournals.org/journal/AJBM/article-full-text-pdf/BE55D3724402

International Labour Organization (ILO). (2011). *Prevention of workplace incidents and accidents, The ILO Guidelines on OSHMS,* Ilo.org. Retrieved 3 November 2012, from http://www.ilo.org

International Labour Organization (ILO). (2012). *Malaysia ratifies key international labour standard on occupational safety and health*, Ilo.org. Retrieved 3 November 2012, from http://www.ilo.org

International Labour Organization (ILO). (2014). *Safety and Health at Work: A Vision for Sustainable Prevention. ILO,* Ilo.org. Retrieved 27 November 2014, from http://www.g20.utoronto.ca/2014/ILO-safe_and_healthy_workplaces.pdf

International Law Book Services. (2008). Malaysia Act, Factories and Machinery Act 139:1967 Regulations & Rules, Malaysia. Retrieved from https://simplymalaysia.wordpress.com/members/malaysian-laws-and-acts/act-139-factories-machinery-act-1967/

International Law Book Services. (2011). Malaysia Act, Factories and Machinery Act 514:1994 Regulations & Rules, Malaysia. Retrieved from http://www.opbw.org/nat_imp/leg_reg/malaysia/Occ_Safe_Health.pdf

J. P. Bakar, & L. Elgert,. (2006). Driving Improvements in Occupational Safety and Health. Journal Of Agricultural Safety And Health, Vol. 11, No. 2, 273-279. http://dx.doi.org/10.13031/2013.18195

Jabatan, A. (2010). Industrial Pollution Discharges. Retrieved 18 January 2010, from http://www.doe.gov.my/webportal/en

Kawakami, Tsuyoshi (2001). Bureau of Statistics, I. Statistics on the Employment Situation of People with Disabilities: A Compendium of National Methodologies ILO Bureau of Statistics in Collaboration with the In Focus Programme on Skills, Knowledge and Employability. SSRN Electronic Journal. http://dx.doi.org/10.2139/ssrn.908252

Kennedy, R., & Kirwan, B. (1998). Development of a Hazard and Operability-based method for identifying safety management vulnerabilities in high risk systems. Safety Science, Vol. 30, No. 3, 249-274. http://dx.doi.org/10.1016/s0925-7535(98)00025-3

Kirkwood,. (2009). Folk.uio.no. Retrieved 27 March 2016, from http://folk.uio.no/jonmic/Statkurs/19%20 20Sample%20size%20and%20power.pdf.

Kopp, J. (1997). Private capital for public works: designing the next generation franchise for public–private partnerships in transportation infrastructure (1st ed.). Department of Civil Engineering, North western University, USA. Retrieved from http://www.academicjournals.org/journal/AJBM/article-full-text pdf/BE55D3724402

Kwesi A.T. (2013). Occupational Health and Safety and Sustainable Development in Ghana. IJBA, 4(2). http://dx.doi.org/10.5430/ijba.v4n2p74

La Duo, J (2003). "International Occupational Health".International Journal of Hygiene and Environmental Health.Vol. 206, No. 4, 303-313(11). From http://eprints.utm.my/2660/1/71777.pdf

Laukkanen, T, Wang, Y., Chen, Z., Nie, S., & Shin, D. (1999). Construction work and education: occupational health and safety reviewed. Construction Management and Economics, 72 (8 Supplement), 4750-4750. http://dx.doi.org/10.1158/1538-7445.am2012-4750

Layman, L., Quinlan, M., Bohle, P., Quinlan, M., & Russell, A. (1994). Managing Occupational Health and Safety in Australia. Labour History, No. 67, 185. http://dx.doi.org/10.2307/27509299

Levitt, R., & Samelson, N. (1993). Construction safety management. New York: McGraw-Hill.

Linda, (2006).Understanding Change: Theory, Implementation and Success by Linda Holbeche (ISBN: 9780750663410) from Amazon's Book Store

Lynda, S.R.,Judith, A.C, Robson, L., Clarke, J., Cullen, K., Bielecky, A., Severin, C., & Bigelow, P. et al. (2006). The effectiveness of occupational health and safety management system interventions: A systematic review. Safety Science, Vol. 45, No. 3, 329-353. http://dx.doi.org/10.1016/j.ssci.2006.07.003

Makin, A., & Winder, C. (2008). A new conceptual framework to improve the application of occupational health and safety management systems. Safety Science, Vol. 46, No. 6, 935-948. http://dx.doi.org/10.1016/j.ssci.2007.11.011

Malaysian Gas Association (2014), Natural Gas Industry Annual Review http://www.malaysiangas.com/portal/document/publication/1419816334_Malaysia%20G.pdf

MLA Australia (2005) Location: http://www.mla.com.au/files/6cba68a2-1c1f-439e-a687-a5c400a4b1d4/annual_report_2005_06.pdf

Moffett, S., McAdam, R., & Parkinson, S. (2002). Developing a model for technology and cultural factors in knowledge management: a factor

analysis. Knowl. Process Mgmt., 9(4), 237-255. http://dx.doi.org/10.1002/kpm.152

Muhamad Fadzil, S.D., Malakahmad, A., and Downe, A.G. Siti Dhamina, M., Amirhossein, M., & Downe, A. (2009). Occupational Safety and Health Management System (OSH-MS) for sewage treatment plants. Universiti Malaysia Perlis (Unimap). Retrieved from http://dspace.unimap.edu.my/xmlui/handle/123456789/37437

Musli, 2007 World Engineering Congress 2007, Penang, Malaysia, 5 – 9 August 2007.... Questionnaire, respondents that 'have not implemented IMS and do not plan to implement it' were...

National Institute of Occupational Safety and Health (NIOSH) (2011).Occupational Safety and Health Management System Training. NIOSH Bangi Malaysia. OHSAS Project Group, (2007).OHSAS 18001:2007 Retrieved from www.osha.my/2011/03/sho-issue.html

National Institute of Occupational Safety and Health (NIOSH). (2009). Report on workers safety in the manufacturing sector. NIOSH, Bangi, Malaysia. Retrieved from http://www.osha.my/2009/10/kursus-sho.html

NSW, (2008). Contractor OHS Assessment Tool (June 2008, version 1.0). © NSW ... State of NSW – 2008 from http://www.resourcesandenergy.nsw.gov.au/__data/assets/pdf_file/0010/253756/Contractor-OHS-Assessment-Tool-final-website-version.pdf

Occupational Safety and Health Management System Guidelines, (2005). MS1722 Part 1:2005. Department of Standards Malaysia.

Occupational Safety and Health Management System Guidelines, (2007). MS1722:2011. Department of Standards Malaysia.

PETRONAS. (2014). Peninsular Gas Utilisation Project. Retrieved from http://www.petronas.com.my/our-business/gas-power/gas-processing-transmission/Pages/gas-processing-transmission/peninsular-gas-utilisation.aspx

Process Safety Analysis an Introduction By R. Skelton. Institute of Chemical Engineers: Rugby, UK. 1997. 213 pp. ISBN 0-85295-378X. £26.00. (1998). Organic Process Research & Development, Vol. 2, No. 5, 337-337. http://dx.doi.org/10.1021/op980013l

Ragan, P.T., Carder, B., 1994. Systems theory and safety. Professional Safety Vol. 39, No. 6, 22–27.

Ram, P. (2013). Relationship between job satisfaction and job performance in thepublic sector – A case study from India. *International Journal of*

AcademicResearch in Economics and Management Sciences, Vol. 2, No. 2, 2226-3624. From http://dx.doi.org/10.5539/ass.v12n2p165

Ratnasingam, J. &Bennet, M.C. (2009).Health and safety issues of the Malaysian furniture sector. IFRG, Singapore. Report No. 17.108.

Ronald Daniel (2011) Critical Success Factor. University of Washington Available from https://depts.washington.edu/oei/resources/toolsTemplates/crit_success_factors.pdf

Sadhra, S., Sarok, A., & Susil, J. (2012). Occupational Hazards in the Workplace: A Case of an Electronic Company in Sama Jaya, Kuching, Sarawak, Malaysia. Asian Journal of Business Research, Vol. 2, No. 1, http://dx.doi.org/10.14707/ajbr.120001

Said, M.S, Said, F. Halim. A.Z, The determinants of industrial accidents in the Malaysian manufacturing sector. (2012). African Journal of Business Management, Vol. 6, No. 5, http://dx.doi.org/10.5897/AJBM11.2439

Sawhney M, Prandelli E (2000). Communities of creation: managing distributed

Shim and Lee,. (2001). Leadership styles and work environment. Retrieved from http://www.academicjournals.org/journal/AJBM/article-full-text-pdf/BE55D3724402

Social Security Organisation (SOCSO) Annual Report (2010) Kuala Lumpurretrieved at February 09, 2011 at http://www.perkeso.gov.my/Jadual9.pdf

Social Security Organization (SOCSO) (2012) Annual Report 2012, http://www.perkeso.gov.my/images/Laporan_Tahunan_2012.pdf

Standard Malaysia, (2012), *Protection of employees from work hazards http://www.jsm.gov.my/ms-1722#.VqdlbE9K7vw*

Standard Malaysia, (2013) from http://www.jsm.gov.my/documents/10180/86670/NSCP+Handbook/5f9ea4d5-32c9-4c1f-9d32-88fe53fb2b87

Suruhanjaya, T., Laporan,T,. (2014). Natural Gas Usage by Sector. Retrieved from http://www.st.gov.my/index.php/ms/component/k2/item/603-energy-commission-annual-report-2013.html

SuruhanjayaTenaga 2009 Statistic Retrieved on February 2009 athttp://www.st.gov.my/index.php/industry/statistics-reports.html

WATANABE, H., KODA, S., SASAKI, T., TSURUTA, Y., ITO, A., & HARA, K. et al. (2010). Roudou Anzen Eisei Kenkyuu, Vol. 3, No. 1, 11-16. http://dx.doi.org/10.2486/josh.3.11

Work for Human Development 2015. (2015). *Human Development Report*. Retrieved 27 March 2016, from http://hdr.undp.org/sites/default/files/2015_human_development_report_1.pf

Yoon, S., Lin, H., Chen, G., Yi, S., Choi, J., & Rui, Z. (2013). Effect of Occupational Health and Safety Management System on Work-Related Accident Rate and Differences of Occupational Health and Safety Management System Awareness between Managers in South Korea's Construction Industry. Safety And Health At Work, Vol. 4, No. 4, 201-209. http://dx.doi.org/10.1016/j.shaw.2013.10.002

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Hamdan Bin Haji Ramat, Shamsul Bahri Bin Hj. Mohd Tamrin, Mohd Rafee Bin Baharuddin and Mansor Bin Ahmad (2014). Questionnaires Results for Data Consolidation on Occupational Safety and Health Management System Among Gas Contractor in Peninsular Malaysia. *Journal of Occupational Safety and Health vol 11, No. 1 : 39-45*

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