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THE COMPLIANCE OF CONTRACTOR ON PROVIDING THE OCCUPATIONAL SAFETY SYSTEM AT THE CONSTRUCTION SITE. (CASE STUDY - GOVERNMENT PROJECTS)

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Abstract
Of late, we have seen many accidents take place, in controlled situation at the construction site. The contract has clearly stated the need of safety at construction site, unfortunately the contractor did not take serious action on it. All parties involved in the project must play their roles in resolving the problems. This phenomenon must be studied based on law and regulation such as Occupational Safety and Health Act 1974 and Machinery and Industry Act 1967 and the safety management system provided by the contractor. There are two methodologies are used in this research; one is based on the literature review in safety management system, such as safety policies, safety plan, accident reporting system, training, monitoring and supervising and risk assessment, legislation. The second methodology is to do a case study on government projects via conducting with the interviews to the target groups that are the contractors, members of professional, and safety officers. The analysis based on the finding of case studies for every item discuss and the result of the analysis will show that the level of compliance of contractor on providing the safety management system. At the end of this research, a proposal to contractor and government agencies for an improvement of management system at construction site such as to propose the percentage of cost on safety by cost of project, will be submitted.

Keywords: Construction, Safety, Management System, Government, Construction Site

1. Introduction

The development of construction industry in Malaysia has risen together with the national economic development. The construction industry sector had expanded 6.3% during the first half 2010 (January-Jun 2009: 2.9%) (Economic Report 2010/2011 – Ministry of Finance Malaysia). A good development progress in the construction industry sector has been exposed to the problem at construction site. Until 2010 there are 1.019 million worker on the construction industry in Malaysia (Labour Force Statistics 2010, Department of Statistics Malaysia) and it increased from time to time compare to 2009 are 1.015 million workers.

The number of accidents in the construction sector reported to Labour Department and Social Security Organisation (SOCSO) in 2010 of 4'667 accidents, compare to reported in 2009 of 4,527 accidents, 2008 of 3,814 accidents (Labour and Human Resources Statistics 2010). This increasing numbers of accident shows that although the country's rapidly growing in construction sector there are some safety aspects that has been ignored by the relevant parties such as contractors, clients, implementation agency, and professionals involved in the construction sector. The same thing happen in the UK (Paton, N. 2007) mentions the number of fatal accidents in the construction industry is estimated to increase by 25%.

1.1 Problem Statements

The occurrence of accidents at construction sites can often be seen reported in local newspapers, on the death accidents involving the construction sector there are 120 accidents in 2010, 115 accidents in 2009 and 131 accidents in 2008 has been reported, Department of Occupational Safety and Health (DOSH – Malaysia). Safety practice at

construction site is very important concern for worker safety and to ensure the smooth construction flow on site. For that the government has issued an Occupational Safety and Health Act 1994, Guidelines for Security and Public Health in the Construction Site (DOSH), Guidelines for Occupational Safety and Health Act 1994 (Act 514) to foster and promote awareness of the dangers and the importance of safety among workers at construction site.

With the rapid development of construction industry, it cannot be compromised to the safety factor and it is a must and should be taken seriously by all parties involved in the construction industry. Statistics issued by Labour Department and Social Security Organisation (SOCSO) and the Occupational Safety and Health (DOSH) clearly shows the level of safety on site at the critical stage. The accidents at construction sites involve the construction sector have been increased. The accidents in the construction sector reported to Labour Department and Social Security Organisation (SOCSO) in 2010 of 4'667 accidents, compare to 2009 of 4,527 accidents, 2008 of 3,814 accidents (Labour and Human Resources Statistics 2010).

The accidents occur at construction sites that appear in local newspapers, "workers died falling from the roof" (Mingguan Malaysia: August 24, 2008), "Men's badly crushed with concrete walls" (Utusan Malaysia: 12 September 2008). The importance of safety aspects at construction site is not seriously taken by the contractor. The government has stressed the importance of worker safety on construction sites with the inclusion in a contract signed by clauses in the standard form of contract, PWD 203 and CIDB 2000 to protect the workers. The poor safety performance of the construction industry continues to give international cause for concern (Haslam R.A. et al-2005).

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Picture 1: Shown that workers did not wearing safety helmet.
Site visit to Air Itam Mosque Project dated 19 Ogos 2008. (JKR Project)

Picture .2: Shown that wokers did not wearing safety helmet and safety belt.
Site visit to Air Itam Mosque Project dated 19 Ogos 2008. (JKR Project)

2. Literature Review

Safety can be defined as a situation or a place free from risk or danger: a well-defined as quality or situation that does not exist or involving risk or danger. Safety also can be interpreted in the existence of a safe condition or quality of safe: with no personal injury or loss: the situation is not exposed to danger and injury: free from danger: is defined as the quality is protected and not cause danger. Laney JC (1982) interpretation in which a construction site where workers can safely move and work as usual without any risk. There are legal obligations that require the safety management in the workplace, such as Act 514. Occupational safety and Health Act, 1994 by the governments of Malaysia and also a rule that seeks to maintain safety standards at work. Guidelines for Public Health and Safety in Construction Site are intended to maintain safety at the construction site.

Gherardi, S., Nicolini, D., Odella, F. (1998) gives meaning to the concept of safety is not separate object of knowledge which has implications for the way organizations manage and organized, provide knowledge of what is dangerous and what is safe, it is located within a specific practice and are controlled by the community arises around the practices and it interdependence between the communities.

We can say here safety is not only a concept but the organization should play a role in providing knowledge to the organization of the danger that might arise at work or at a construction site. These safety practices should be publicized and given the knowledge and exposure to all the staff and organization and to let they know their responsibilities when they are at work.

2.1 Elements of Safety Management System

In practice there are safety elements that play a distinctive role in the health and safety plan. The safety plans is the development of safety guidelines for an organization. *State Government of Victoria, Australia, Department of Human Services, in The Capital Development Guidelines* stated that, the elements should be included in the safety and health plans included contract description, occupational health and safety structure and system, safety training, risk assessment, workplace health and safety inspections and health and safety consultation, emergency procedures, record and investigate accidents and safety and health performance monitoring.

Ahmaden Bakri, et.al. (2006), the elements that need to be included in the occupational health and safety management system is a policy, organizing (control, cooperation, communication and competence), planning and implementation, measuring performance, auditing and initial periodic status review and also stated that in Occupational Safety and Health Act 1994 was still no adequate provision to ensure the safety and health at work places.The system and procedures involving the organization and organizational emphasis in conveying knowledge about the systems and procedures to employees is very important.

Kartam NA, et.al. (2000) have expressed safety procedures should be adapted by the owners, designers, contractors and insurance companies. This is because hazardous working conditions and it is a problem to the industry (Tam, 2002). Therefore, some safety management system was introduced as new method of controlling safety policies, procedures and practices within a company (Wilson & Koehn, 2000).. Farnandez-Muniz B, et. al. (2007) have expressed a good management system should contain the following items, safety policies, incentives for employee participation, employee training and development competency, communication, planning and control and monitoring activities of the organization.

With the safety management system as a tool to manage, it can be used as a guide the safety activities of organization. (Farnandez-Muniz B. et. al.- 2007). Tam (2002) stated that there are seven elements of the safety management system, the safety audit, effective safety training, increase competency of supervision, increase management involvement, safety promotion, establishment of safety policy and prevent dangerous hazards.

Guideline on Occupational Safety and Health Management System ILO-OSH (Geneva 2001) have outlined five key elements in the safety management that are the policy, management, planning, implementation and evaluation and improvement. While Vassie L. (2000) have expressed the elements of safety and health management consists of a written safety policy, risk assessment, accident reporting system, written safe work procedures, incentive schemes, safety audit system, training programs, permit to work and health surveillance. *Health and Safety in Construction in Northern Ireland, (1996)* have stated that safety management should have, risk assessment, statement of health and safety, training and advice and monitoring.

From the literature review shows that there are elements that need to be given emphasize in the practice of safety management system, and it can be listed as covering what has been studied by previous researchers. The conclusion that safety management system practice can be identified and included with the following elements: (Table 1)

Table 1 : Safety Management System Elements

No.	Safety Elements	No.	Safety Elements
i	Safety Policy	x	Safety Audit
ii	Training and Competency	xi	Periodic Inspection
iii	Monitoring, Supervision and Observation	xii	Communication (Tool Box Meeting and Briefing)
iv	Risk Assessment	xii	Evaluation System
v	Management (Management Commitment)	xiv	Improvement Actions
vi	Planning and Implementation	xv	Work Permit
vii	Safety Working Procedures	xvi	Safety Consultation
viii	Accident Reporting System	xvii	Performance Measurement
ix	Incentive Scheme	xviii	Control and Review Activities

2.2 Accidental Statistics

Accidents are one thing that cannot be predict when it will happen and where it will happen; Laney JC (1982) defines accident as an occurrence beyond the control or expectations and involved injuries and damages. In many cases circumstances or things that cause accidents are usually in control. As a preventive a safe methods and procedures to be used to control work situation on site. Statistics of accidents reported is a measure of safety in the country. These statistics show the accident reported only, this means that there are possibilities of accidents not reported by the employer. There are 2,534 accidents had been reported in year 2010 compare to 2,386 accidents in year 2009, 2,535 accidents in year 2008 and 3,395 accidents in year 2007 (DOSH Annual Report 2008 and 2009), (Table 2). The statistic shows that there is an increase of 148 accidents in year 2010.

Table 2: Total type of Injury in Year 2007 to 2010

NO	Type of Injury	2007	2008	2009	2010*
.1	Non Permanent Disabilities (NPD) Accidents	3008	2134	2054	2157
2.	Permanent Disabilities (PD) Accidents	168	162	108	192
3.	Fatal Accidents	219	239	224	185
	Total	3395	2535	2386	2534

*Source: DOSH Annual Report 2008 and 2009. * Department Statistics : www.dosh.gov.my*

2.3 DOSH Accidental Statistics

The total number of accidents reported to Department of Occupational Safety and Health (DOSH) in 2007 to 2010 can be seen in Table 3. From the data obtained, 120 accidents in the construction sector in 2010 compared to 115 in 2009, 131 in 2008 and 181 in 2007. This shows there is an increase in 2010 over 2009 by 66 fatal accidents in 2010, compared to 71 in 2009, 73 in 2008 and 95 in 2007. There is a decline in the number of fatal accidents in the construction sector. Although the number is too small, but it is still considered a great value because it involves human life.

Compared with other sectors, construction industry is the third highest level under the manufacturing and Agriculture/Forestry/Fishing sector. This shows the construction sector is still consider high in accident compared to the total staff of 1.019 million workers in this sector. Therefore safety policy should be established to enable workers and employers to comply and guarantee safety of workers (Nurul and Aziz: 2007). The Government has set in the law on occupational safety in Act 514 Occupational Safety and Health Act 1994, Factories and Machinery Act 1967 and Guidelines on Occupational Safety and Health in 1994 showed the government's policy to protect workers. Under DOSH has outlined the government policy for the welfare of workers.

Table 3: Total Numbers of Accidents in Sector Reported to DOSH from 2007-2010.

No.	Type of Sectors	2007				2008				2009				2010*			
		NPD	PD	F	Total	NPD	PD	F	Total	NPD	PD	F	Total	NPD	PD	F	Total
1.	Manufacturing	2094	133	63	2290	1585	136	79	1800	1419	90	63	1572	1493	162	59	1714
2.	Mining and Quarrying	5	1	9	15	4	0	9	13	2	1	3	6	2	1	1	4
3.	Construction	76	10	95	181	55	3	73	131	38	6	71	115	50	4	66	120
4.	Agriculture/Forestry/Fishing	712	14	30	756	368	7	43	418	440	8	44	492	467	18	30	515
5.	Utilities	51	4	10	65	84	12	20	116	116	3	23	142	34	3	11	48
6.	Transport, Storage and Communication	7	0	2	9	18	1	8	27	21	0	18	39	16	1	14	31
7.	Wholesale and Retail Trades	11	1	3	15	2	0	0	2	0	0	0	0	0	0	0	0
8.	Hotels and Restaurants	11	2	0	13	13	1	1	15	18	0	0	18	25	0	0	25
9.	Finance, Insurance, Real Estate and Business Services	25	0	4	29	2	1	4	7	0	0	1	1	30	1	1	32
10.	Public Services and Statutory Body	16	3	3	22	3	1	2	6	0	0	1	1	40	2	3	45
Total By Type of Category		**3008**	**168**	**219**	**3395**	**2134**	**162**	**239**	**2535**	**2054**	**108**	**224**	**2386**	**2157**	**192**	**185**	**2534**

NPD - Non Permanent Disabilities Accidents
PD - Permanent Disabilities Accidents
F - Fatal Accidents

Source: DOSH Annual Report 2008 and 2009, * Department Statistics : www.dosh.gov.my

2.4 SOCSO and Labour Department Accidental Statistics

There was an increase of 140 accidents in construction industry in 2010 of 4667 accidents compare to 4527 accident in year 2009.

Table 4: Industrial Accidents Reported to the Labour Department and Social Security Organisation (SOCSO) by Industry, from 2006 – 2010 in Construction Industry

Industry	Year				
	2006	2007 [1]	2008	2009	2010
Construction	4500	3931	3814	4527	4667

Source: Labour and Human Resources Statistics 2010
Figures for 2007 and 2010 is reported by Social Security Organization (SOCSO), exclude Dept. of Labour Sabah, Sarawak and Peninsular Malaysia

Comparing the years 2006 to 2010, accidents in 2010 was the highest of 4667 compared to 2006, 4500 accidents, 3931 accident in 2007, 3814 accident in 2008 and 4527 accident in 2009 (Table 4). With the increasing number of accidents through the statistics (Table 3) shows that there are factors that contribute to an accident at a construction site and is very worrying. Thus the improvement of safety management system is important in addition to look at the compliance of contractors in applying this system on construction site.

2.5 Laws on Safety

Construction safety is a global issue of concern wherever there are construction activities and construction problems are the same from one country to another (Hinze, 2008). Therefore, the existence of laws related to safety is very important and appropriate to protect the interests of workers while they were at a construction site. In Malaysia, workers covered by Act 514 - Occupational Safety and Health Act 1994 (referred to OSHA 1994), Act 139 - Factories and Machinery Act 1967 (referred to FMA 1967), the Occupational Safety and Health (Safety and Health) in 1997, the Factories Regulations and Machinery (Building Operations and Works of Engineering Construction) (Safety) Regulations 1986 and the Factories and Machinery (Safety, Health and Welfare) 1970.

There are guidelines issued to support acts such as the Occupational Health and Safety Guidelines 1994 and the Guidelines for the Safety and Public Health in the Construction Site. The occupational Safety and Health Act Guidelines 1994 is to explain and clarify the provisions in each section in the Act. This guideline provides assistance to the Occupational Safety and Health officials in performing their duties to enforce this Act in the workplace is enshrined under this Act. Guidelines for the Safety and Public Health in the Construction Sites (First Revision 2007)

will hopefully be a standard reference for the developer, contractor, Engineers, Architects, Designers and Health and Safety Officer. DOSH urged all parties concerned and involved in the construction industry to make the site and surrounding area a safe place for the public and employees in accordance with practices recommended in the guidelines. The government wants to and if possible, contractors and professionals to fully utilize the guidelines in the interest of all parties. Requirements under the Standard Form of Contract PWD 203 (Revised 2007) there are clauses under this JKR203 related to the affairs of workers in the construction industry.

2.6 Personal Protection Equipment (PPE)

There no stated in the Factories and Machinery Act 1967 and Occupational Safety and Health Act 1994 on the definition of safety tools. However, the definition of the phrase "protective equipment" in Rule 2, the Occupational Safety and Health and Standards of Exposure of Chemicals Hazardous to Health Regulations 2000, applicable and relevant to the discussion in this study. Personal protective equipment is a device or equipment to protect employees from injury or illness that can occur from exposure to other chemicals, radiation, or other hazards, such as electric shock machine movement, physical objects, and so on and easily injured human organs from outside the eye, ear, skin, and respiratory system.

There are various types of safety equipment used by workers to protect their bodies from injured at work, including working at a construction site. Regulations Factories and Machinery (Safety, Health and Welfare) 1970 lists the necessary safety equipment provided by the employer and worn by employees during work related to the workplace. Occupational Health and Safety Act 1994 also emphasized the provision of safety equipment by employers and employee compliance to the application. Among the safety equipment specified in **Regulation 32**, Regulations Factories and Machinery (Safety, Health and Welfare) 1970 are:

i. Eye and face protection equipment such as safety glasses and face shields and protective head (helmet).
ii. Skin and body protection equipment such as gloves, aprons, safety belts, special or general safety clothing (weather proof and insulated clothing and jackets easily see) and safety shoes.
iii. Respiratory protective device.
iv. Tools hearing protection / ear and face shield.

Safety device used must comply with standards set and should correspond to the actual situation and the user must be given training application, which is the purpose of its application, the correct application of the method, when it applies, and etc. Employers are responsible for directing the application of safety to all employees during their work at construction sites. Employees who work at construction sites are often exposed to dangers that can hardly be envisage. Therefore, the safety device should be use at all times while performing any work on site (Nurul and Abdul Aziz: 2007).

3. Methodology

Basically there are a few steps on the methodology on this research and it's involved in the following steps.

3.1 Literature Review

Literature review to identify the elements of safety management system in the construction safety on site. It involved on the articles of safety management system in journals and reports. The study on the current law and regulation on safety is important because it's the only law and regulation that protect the worker on site that stated by law. The study on accidental statistics by DOSH, SOSCO and Labour Department is important to know the current situation of safety on site and to know the level of safety on construction site. The statistics data will be extracting from the DOSH Annual Report 2009 and Labour and Human Resources Statistics 2010 report. This data will shown some significant on accidental happen in Malaysia, overview of all sectors including construction. After the safety management system has been identified, the next step is to do case study on the government projects on ground by interview of contractor, safety officer and government officer. The project chosen base on the physical percentage on site from 25% to 75% progress. The interview will look on the safety management system provided by the contractor base on the questionnaires of the literature review on safety management system. There are some significant data collection during observation on site visit for the project to identify the safety measure taken by contractor on preventing the accident on site that will be discuss in the analysis and finding.

3.2 Data Collection and Case Study Analysis

The next step is to get data and information from the interview for the site of government projects. The data and information will be analysing base on what is the safety management system provided by contractor. How far the contract has been full fill to suite the safety requirement and what are the obstacles facing by the contractor and government to implement the requirement as per contract.

3.3 Conclusion, Finding and Recommendation

In the conclusion will find out either the contractor have any system in providing safety measure at construction site. From the interviews it will be summarize all finding and we will know the level and standard of safety management system on construction site provide by contractors. At the end of finding, recommendation to the government and contractor will help them in improving the safety management system in order to get the high standard of safety for workers and construction site.

4. Results and Discussion

There are four case study on government projects has been done, JKR as the implementation agency (refer to Table 2.5). The selected projects base on site physical progress from 25% to 75%. The project cost range from RM22 millions to RM28 millions with all contactor Class A.

Table 4.1: List of Project

CASE STUDY	PROJECT NAME AND LOCATION	AGENCY	SHO
1	Kompleks Mahkamah Syariah Cawangan Negeri Sembilan	JKR Daerah Seremban	Part Time
2	Kompleks Mahkamah Syariah Cawangan Negeri Melaka	JKR Daerah Melaka Tengah	Full Time
3	Sekolah Tunas Bakti Teluk Air Tawar, Butterworth	Pasukan Projek Khas, JKR Pulau Pinang	Full Time
4	Masjid Abdullah Fahim, Bertam Perdana, Kepala Batas, Seberang Perai Utara	Bahagian Bangunan, JKR Pulau Pinang	Part Time

4.1 Safety Management System

From this case study there are two projects that adopt existing standards as their references. Case study 2 adopt the guideline by International Labour Office, Geneva, Guideline OSH Management System and case study 3 adopting the ISO 14001 standard, Environmental and Occupational Health and Safety Manual. This two projects have safety features that meet the guidelines applied at construction site. Another two project have no any references, only use safety procedures, policy, PPE, have tool box meeting and safety observation on site and its depend on the SHO on the implementation of safety for the site. Case Studies Project 2 and 3 even though not meet the overall safety management system, this two projects were successfully implemented safety management systems at the construction site between 70% to 80% from the overall system used.

4.2 Personal Protection Equipment

The result of this case study show that all four projects have provided personal protection equipment (PPE) for safety such as helmet, boots, gloves, safety belt, mask and earplugs as stipulated in the contract. The problem from this study show that some workers did not wear PPE as instructed by SHO, but it was able to control by giving them warning or penalty. This is because of the attitude of the workers and is a main problem to SHO on instructing them.

4.3 Budget Constrain Due to Contract

Beside safety, budget is very important for the implementation of safety on site. From this case study, show that the average budget for the safety range from 1% to 2.5% of total project cost. This allocation is the cost that has been price during the tender stage and its fixed. The tender price for safety item is not determined or fixed by JKR but is a

price has been inserted by contractor during the tender. So the SHO must provide all safety requirements as per tender that has been specified in the contract. From the interview all SHO said the amount allocate by contractor is not enough, but they have no choice, to follow as per contract. Through the research show that the reasonable amount range from 5% to 10% of total cost depend on the size of project, is enough to provide and implement the safety management system on site.

4.4 Safety Signage

Guidelines for the Safety and Public Health in the Construction Sites (First Revised: 2007) item 11.7, stated: "Suitable warning signs should be posted at conspicuous positions." This show that the contractor must provide and put the safety warning sign at the place or position that can easily see. From this research shown that all contractor provide the safety signage as required by the guidelines. But there are sign ages that do not meet in terms of the strategic position and location and can be easily seen by everyone and workers. Case study 1 show that, there were only two sign ages placed only at the main entrance to the site and one at the site office. This is show that the contractor just provide the signage but never put at the strategic and varieties of places at many locations. The signage has been place improper and no emergency plan provided together with signage in order the worker can take first action if any accidents happen on site.

4.5 Safety Awareness

From the interview show that the awareness among workers is less because, from all the site visit, mainly workers is foreigners from Bangladesh, Myanmar and Indonesian with no background or experience working at construction site. So the SHO facing some difficulties on communicating with workers. They mainly ignore instruction by SHO without wearing safety helmet, safety boots and ignore some instruction in the tool box
meeting. So SHO have to imposed penalty to workers and give warning in order to encourage awareness on safety matters.

4.6 Cause Of Accident

This case study found that there is no accidents happen on site, but safety matter still a major issue have to be maintain on construction site. From the increase in accidents at the site through the statistics by the DOSH, the Labour Department and SOCSO, all SHO, from the finding of this study, the accidents on construction sites are caused mainly by human itself. The research show that, the opinion of SHO, the cause of accident mainly because of the attitude, careless, bad behaviour of workers by ignoring safety matters.

5. Conclusion and Recommendation

As conclusion of this study, government projects also meet the requirements of safety on construction sites. Although only two of the four case study projects, the implementation of 70% -80% of safety and health, had more than enough for the implementation of safety on site. Through this study also found that not all government projects to succeed and meet the safety management plan. Nevertheless the safety policy is to help safety management at the construction site. Tool box meeting is the major priority emphasized during the briefing to the workers once in two week. Most of SHO agreed that the tool box meeting is the time to explain the need of safety during workers on site, to put awareness among workers, checking session on wearing PPE, to notify the new worker be on site and to explain their responsibilities and the need to comply accordingly to instruction and the needs by the law and regulation.

The suggestions from the results of this study must be put forward for an evaluation of the government, especially JKR, for an improvement of safety management system in the government contract administration. To enhance the safety management system at the construction site, the government should set the value of the contract between the 5% -10% of the total project cost on safety. This also depends on the cost, if higher, than the higher percentage is required or otherwise. The government, especially in contract administration must look on safety management system in deep and must be detail in the item of contract and spell out what has to implement during site possession and through the project. The specification on the safety items also must come from DOSH and NIOSH department together with JKR. This collaboration is very important in order to come up with specific

specification for tender and contract document. So, the item of safety management system is no longer under preliminary item but under one specific item by itself.

Finally the government must make rule on appointed of SHO by contractor must be a full time SHO for a project above 10 millions. For a project below than that a part time SHO can be consider but the safety clerk must be a full time officer. The government should also set that the contractor must have a reference for the preparation of safety management system either by EMS & OSH 14000 standards or ILO or guidelines. The rule of government on setting the reference and specific specification can help to strengthen the safety management system at construction site.

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