

STUDY PATTERNS OF TYPES AND GENDER OF CONSTRUCTION WORKERS ACCIDENTS IN MALAYSIA CONSTRUCTION SITES.

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Abstract - Malaysia construction industries produce 3% of the country GDP and are one of the most hazardous industries, which is as a result of poor performance of safety and health measures. As such the study, studies the pattern of types and gender of construction workers accidents. Twenty – two (22) construction firms were identified that meet the study criteria. Descriptive statistic is used in studying the pattern of the types and gender of the construction workers accidents. Descriptive analysis involves describing a specific situation of a particular result. The results of the descriptive statistic were presented according to the types and gender of the construction workers accident and presented in percentage of its total. Construction industry has been identified as male dominated industry i.e 96.5%. Falls at construction sites were the most common accidents and accounted for 51.95% of the total accidents occurrence on construction site, followed by falling objects accident 11.85%, crane accidents 5.99% etc. Despite the achievement in accident prevention at most construction sites, it has been identified that such types of accident still exists in construction sites. For any prevention measure to be effective in accident prevention there is need to identify those factors that causes the accident, and at the same time to analysis those factors so as to come up with effective preventive measures.

Keywords: Accident prevention, Construction worker, Gender, Safety management

1. INTRODUCTION

According Chang, (2008), there are more than 100 million people in this world that take construction work as a profession and that half of this number are found in Asian countries. Construction exposes workers to a wide range of health problem ranging from asbestosis to back pain, hand-arm vibration syndrome to cement burns (Fact, 2004). The injuries and the illness associated with the construction industry showed that the industry is the most hazardous occupation and high-risk workplace in the world due to poor safety performances.

In Malaysia, construction workers accounted for 7.1 percent of the total workforce i.e 800,000 of 11.2m workforce (Abao, 2010). According to Narayanan and Lai, (2005) that the distribution of workers by countries of origin has not change from the early 1980's and that the Immigration statistics confirm that Indonesians still account for the bulk of the immigrant workers in the sector. The danger posed to personal safety by construction work is one of the reason why Malaysian are unwilling to take up carrier in it, statistic from the Social Security Organization (SOCSO), showed that on the average five thousand accidents occurred in construction site annually between 2000 and 2001. This figure represents about 5 to 6.5 percent of the total number of accidents reported over the period. An average of eighty workers was killed in such accidents (Fong, 2006). Poor performance in health and safety are responsibly for construction site accident. A study on the issues of health and safety performance in many countries such as China, Korean, Turkey, Finland and USA have shown that poor performance in the health and safety measures have dent the reputation of the industry. In Malaysia, construction industry is currently being recognized as a major economic force. According to Abdulrahim, *et al.*, (2008), the construction industry in Malaysia produces 3% of the country GDP and is one of the most hazardous industries, based on the Social Security organization (SOCSO) report in 2000; the fatality rate in the construction industry in Malaysia is more than 3 times of all workplaces. A study conducted by Toole, (2002), as regards to the root causes of accident, is that the behavior of individual employee is sometime (but certainly not always) the primarily causes of accident. Abdelhamid & Everett, (2000) studies the causes of occupational accidents in Malaysia construction industry and indicated that the major courses of construction accident are:

1. Management failure (29.2%), such as poor inspection, poor safety policies and lack of safety education programs.
2. Unsafe method (incorrect work procedure) (26.4%), mostly related to incorrect work procedure. This can undermine all the organization's safety and health procedures to be ignored or worse yet.
3. Lack of personal protective equipment usage and worker negligence contributes to the cause of accident.
4. Unsafe equipment (9.7%).
5. Jobsite condition (11.1%).

However, safety management system implementation in Malaysia lacks the mission, vision and objectives of safety management system as well as lack of awareness and drive for realization of safety among management executives due to over-emphasis on productivity (Husin *et al.*, 2008). It also requires more constructive and practical ideas towards safety management implementation. Similarly, the responsibility of safety at construction sites, most especially of the construction workers, rest on the shoulder of the main contractor of the work. But according to Said, *et al.*, (2009) recently more and more parties in construction process have come to realize that zero accident is indeed, an attainable objective, client, designer firm and contractors can complement each other by playing different roles in preventing accident to achieve an injury free worksite. Furthermore, Said, *et al.*, (2009) have drawn the attention to the fact that contractors are without doubt, still the main party to plan and control construction site safety, and that the designers can only reduce safety hazards in the working environment by considering workers safety issues in their design decision. Ghani, *et al.*, (2009), contractors are aware that they have a role to play in promoting safety programmers and safety behavior as stipulated in OSHA 1994 Section 17 (Duties of employers and self-employed to their employees). They have an obligation to ensure that their workers are not exposed to risk which can affect their safety and health. However, it has become a vital issue to select a contractor with knowledge of safety and health together with a good performance on safety and health based on their previous record.

Said, *et al.*, (2009) concluded that clients can actively impact construction safety by selecting reliable contractors addressing safety issues in design and participating in safety management during

construction. Also, client can actively address safety by engaging in the following activities;

- 1- Establish and communicate attitudes toward safety.
- 2- Consider safety in contractors selection
- 3- Develop contractual safety arrangements
- 4- Address safety during design and constructability review
- 5- Participate in safety dialogues during construction
- 6- Implement total safety culture and behavior-based safety.

Therefore for effective implementation of safety and health at construction site, there is the need for full support to the safety and health officer from the contractor. And at the same time a full commitment and support from top management is needed in order to improve safety performance on sites, as management roles have to go beyond organizing and providing safety policies and working instruction (Mohammed, 2002).

2. METHODOLOGY

In order for the study to provide a more complete picture of the issues as regard to types of accident and the gender of the construction workers in construction sites, quantitative data are used. Also, the following criteria were for the study:

1. The construction firm must be built/civil engineering, construction firm with at least 25 years experience.
2. The construction firm must be certified ISO 9000 G7 contractors registered with CIDB Malaysia

The location of the study area was in the Klang Valley which is an area in Malaysia comprising Kuala Lumpur and its suburbs, and adjoining cities and towns in the state of Selangor. Twenty – two (22) construction firms were identified that meet the study criteria. The selection is similar to reported work of laryea & Mensah, (2010) and Eddie, *et al.*, (2012). Descriptive statistic is used in studying the pattern of the types and gender of the construction workers accidents. According to Reeves, (1992) descriptive analysis involves describing a specific situation of a particular result.

3. RESULT AND DISCUSSION

Types of Accident

Table 3.1: Types of accidents in 20 Construction Sites from 2000 – 2011

S/No.	Types	Fatal	NPD	PD	Total
1	Falls	289	2,688	5	2,977
2	Falling Objects	86	546	47	579
3	Crane Accidents	65	409	36	510
4	Electrocution	72	245	26	343
5	Welding, Cutting and Bracing	42	104	18	164
6	Dangerous and Defective Machine	21	72	21	114
7	Building Collapse	2	48	7	57
8	Scaffolding Accidents	60	244	32	336
9	Others		522	28	550
	Total	653	4,553	524	5,730

Source: Researcher Analysis (2015)

Construction workers engage in many activities that expose them to serious hazard, such as falling from above. Table 3.1 show the records of accidents in the 20 construction sites from 2000 – 2011. From the finding in Table 3.1 of the descriptive analysis carry out, falls is number one causes of accident and death in the construction sites in Malaysia. In many parts of the world, falls from height are leading causes of fatalities in construction operations (Sorock *et al.*, 1993). In Taiwan, Chi and Wu (1997) showed that fall Contributed to more than 30% (377) of 1230 work related fatalities. In the U.S., between 1992 and 2006, falls accounted for 32% of fatal occupational injuries in general Dong *et al.*, (2009) and 37% of fatalities in the construction industry (Kaskutas *et al.*, 2009). Internationally, falls from heights in New Zealand are the leading cause of occupational injuries (Bentley *et al.*,

2006). Falls account for approximately 51% of injuries in China's construction industry (Yong, 2009). In Hong Kong, work-related falls from heights represented more than 47% of the total fatal incidents in 2004 (Chan *et al.*, 2008).

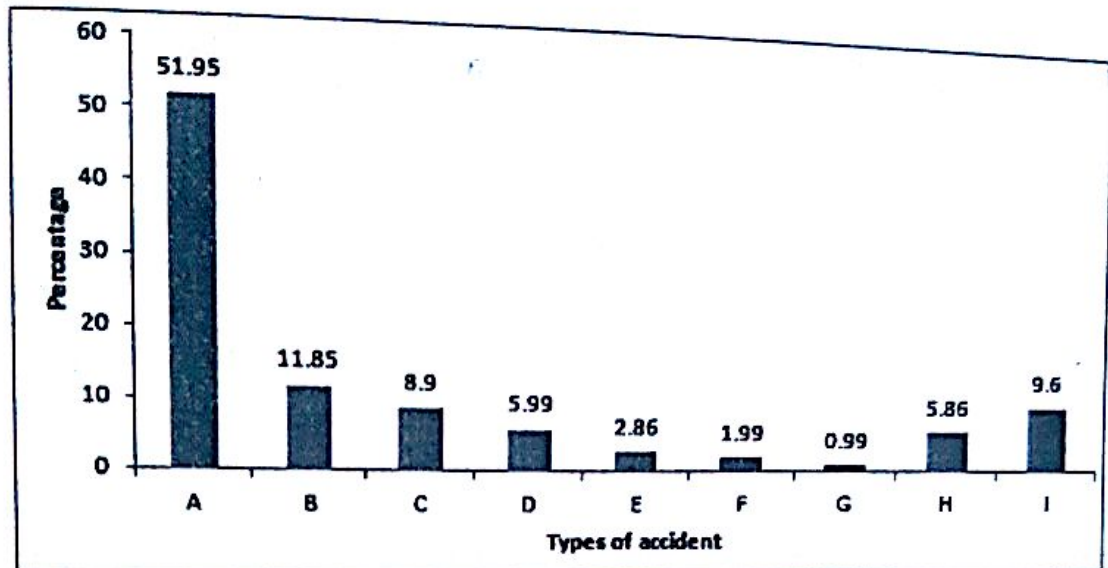


Figure 3.1: Types of Accident in percentage

Legend.

- | | |
|---------------------------------------|-------------------------|
| A. Falls | B. Falling Objects |
| C. Crane Accident | D. Electrocution |
| E. Welding, Cutting and Bracing | |
| F. F. Dangerous and Defective Machine | |
| G. Building Collapse | H. Scaffolding Accident |
| I. Others | |

Figure 3.1 shows the percentage distribution of occupational injuries by accident type. Fall from height (51.95%) represents the most common type of accident, followed by Falling Objects accident (11.85%), Crane accident (8.9%), Electrocution (5.99%), Scaffolding Accident (5.86%) and others (9.6%). The finding is inconsistent with previous research done by Murty *et al.*, (2006) and Abdul Rahim, *et al.*, (2008). Fall accidents number is 2977 cases (51.95%) in which 289 cases (9.71%) are fatal accidents during the period of study 2000 – 2012. Table 3.2, shows the annual incident rate of fatal falls accident i.e 9.68 per 100 employees. This means that in every 100 employees 9.68 employees

have been involved in a recordable injury or illness as a result of falls. In this study falls also causes several nonfatal injury and illness, fall nonfatal accidents accounted for 2688 cases (92.3%) of the total falls cases. Falls annual incident rates for nonfatal injuries are 87.10 per 100 employees. This is an issues that needs attention as it can easily turn to fatal injuries or illness if not properly address at an early stage. The primary causes of fall accidents in construction were falling from a roof, erecting structural steel, exterior carpentry, exterior masonry, installing equipment, demolition (MaCann, 2002; Murty, *et al*, 2006). Other papers in this special issue of Applied Ergonomics e.g. Hoonakker *et al.*, (2005); Chi *et al.*, (2005) describe the situation in other countries, revealing a similar pattern.

Fatal work-related falls continue to be a leading cause of death in the construction industry (Stern *et al.*, 1995; Cattledge, *et al.*, 1996; Suruda, *et al.*, 1997). In 1994, the construction industry accounted for 32.1% of all work-related fall deaths Bureau of labour Statistics (BLS, 1996). From 1980 to 1989, the construction industry had the highest annual average rate of deaths resulting from falls with 6.56 per 100,000 workers National Institute for Occupational Safety and Health (NIOSH, 1993). Special trade contractors had the highest frequency of fatal work-related deaths, accounting for approximately 57.5% of all fatal work-related falls in this industry in 1994 (BLS, 1996). Fall from roofs, ladders, and scaffolds account for approximately 28.5 % of the total fatal work-related events in the construction industry (BLS, 1996).

In the study falling object accident is 679 cases and death due to falling object accounted for 86 cases (12.67%) of the total falling object accidents. The research finding is in the same range with other researchers finding of fatal accidents due to falling objects like 14.4% of Helender, (1991), 20.86% of MaCann, (2002), 10.92% of Murty *et al*, (2006) and 17.1% of Abdul Rahim, *et al*, (2008). Such incident may be due to lack of toe boards on scaffolding, lack of tool belts for workers, bad storage and stacking and poor housekeeping (Abdul Rahim *et al*, 2008).

Crane accidents accounted for 8.9% of the fatal accidents under the period of study; also its fatality rate is 12.75% of the crane accidents. In Murty *et al*, (2006) research crane fatal accidents is 8.29%. The fatal incident rates for crane accident is 1.94 per 100 employees while its nonfatal incident rates are 14.19 per 100 employees, this rate clearly

indicates that crane operators are clearly at risk. But according to Suruda, *et al.*, (1997) that crane operators comprised only 13% of the victims in crane related construction deaths in an occupational safety and health (OSHA) investigation of 502 crane related deaths. This indicates that crane safety research must focus on risk factor for both crane operators and those working near the crane (Richard, *et al.*, 2001).

Table 3.2 Analysis of types of Accidents in 20 Construction Firms

Type of Accidents	Fa tal	Non fatal	Size of sites	Number of hour worked	Number ofdays	Numb. of lost time cases		Incident Rate (IR)		Lost time case (LTC)	
						Fatal	No nfa tal	Fa tal	No nfa tal	Fat al	Nonf atal
falls	15	135	155	310,000	61	8	68	9	87.	5.1	43.87
Falling Objects	4	30	155	310,000	61	2	15	2.	19.	1.2	9.68
Crane Accidents	3	22	155	310,000	61	2	11	1.	14.	1.2	7.1
Electrocution	4	14	155	310,000	61	2	7	2.	9.0	1.2	4.52
Welding, Cutting and Bracing	2	6	155	310,000	61	1	3	1.	3.8	0.6	1.94
Dangerous Defection Machine	1	5	155	310,000	61	1	3	0.	3.2	0.6	1.94
Building Collapse	0.1	3	155	310,000	61	0	2	0.	1.9	0	1.29
Scaffolding Accident	3	14	155	310,000	61	2	7	1.	9.0	1.2	4.52
others	0	25	155	310,000	61	0	14	0	18.	0	9.03

Source: Researcher Analysis (2015)

Electrocution account for 5.99% of the total 5730 cases of accident compare to 10.8% finding of Abdul Rahim *et al.*, (2008) the result is half of its finding. Also the fatality rate of fatal electrocution accidents is 12.87%, i.e, 72 cases of the total electrocution accidents rate i.e 343 cases for the period of study. The incidence rate for fatal electrocution is 2.58 per 100 employees while that of nonfatal incident rates is 9.03 per 100 employees Table 3.2. This rate clearly indicates that construction workers are at risk. According to OSHA, the most common cause of electrocution accidents on construction sites are contacted with power line, lack of ground fault protection, improper grounding of electric equipment, failure to follow manufacturer's instructions and improper use of extension and flexible cords.

Scaffolding accidents account for 5.86% of the total accident rate with its fatality rate of 17.86 % of the total scaffolding accident rate. Its fatal incidence rate is 1.94 per 100 employees while that of nonfatal incident rates is 9.03 per 100 employees. This means that in fatal scaffolding accidents 1.94 employees are involved in injuries or illness in every 100 employees, as for nonfatal scaffolding accidents 9.03 employees are involved. These circumstances should not have occurred when site follows an OSHA standard. Occupational Safety and Health Act (OSHA) stated that 25% of workers hurt in scaffold accidents had no scaffolding training and 75% of scaffolds lacked guardrails, OSHA estimate that workers following the safety rules for scaffolding could save each year, at least 50 lives and prevent more than 4500 accidents

Others welding, cutting and bracing (2.86%), dangerous and defection machine (1.99%) and building collapse (0.99%) form of accidents all constitute a potentially alarming as such proper attention need to be taken on them. Another issue is concerning other forms of accidents that make up to (9.6%), these accidents are minor like, brushing, and other cutting, etc are accidents that need to be of serious concerns as they too have the capacity to develop into any form of major injuries or illness.

Accident according to Gender

Construction work is a male dominated occupation, in this research work male accident rate is 5529 cases and accounted for (96.5%) while female accidents rate is 201 cases and account for (3.5%) Figure 3.2 Male, 5529(96.50), Female, 201 (3.50)

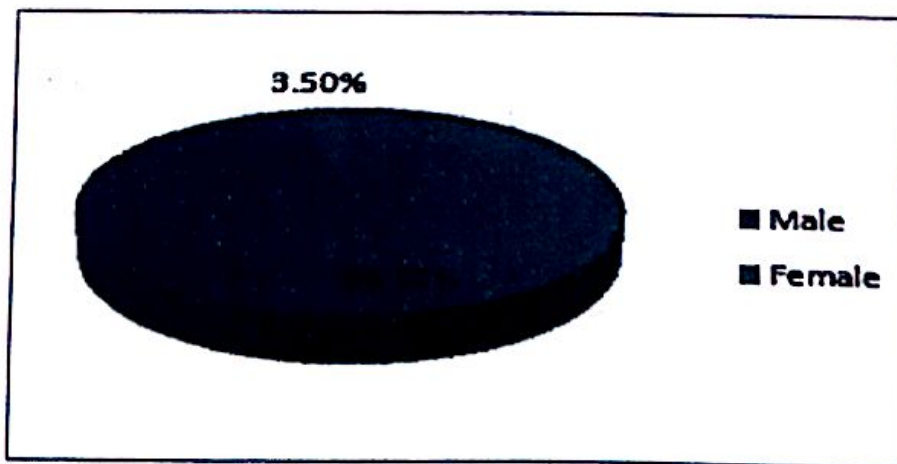


Figure 3.2 Accidents according to gender in percentage

The finding is the same with the finding of Murty *et al*, (2006). The small percentage of female working in the construction trade and the serious health and safety problems unique to female construction workers have a circular effect creating a barrier to women entering and remaining in this field (Advisory Committee on Occupational Safety and Health, 1999). An important policy and initiatives to address and improve the working condition faced by tradeswomen are recommended by the committee.

4. CONCLUSION AND RECOMMENDATION

It can be concluded that Construction industry is a male dominated industry i.e 96.5% and that falls at construction sites were the most common accidents, and accounted for 51.95% of the total accidents occurrence on construction site, followed by falling objects accident 11.85%, crane accidents 5.99% etc. Despite the achievement in accident prevention at most construction sites, it has been identified that such types of accident still exists in construction sites. For any prevention measure to be effective in accident prevention there is need to identify those factors that causes the accident, and at the same time to analysis those factors so as to come up with effective preventive measures. Yi, *et al.*, (2011) said that accident prevention in the construction industry has been approached from multiple perspectives, ranging from improved safety management procedures to the adoption of safer construction technologies. While Ferret & Hughes, (2007) said that without management commitment, there cannot be effective implementation of health and safety measures. As management provide all the necessary resources needed to implement the health and safety plan of action.

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