SCAFFOLDING SAFETY ASSESSMENT IN CONSTRUCTION SITES IN PENANG

Norzalili Abu Bakar[1], Mohd Rodzi Ismail[2] and Tan Guat Lin[3]
[1,2,3]School of Housing Building and Planning,
Universiti Sains Malaysia,
11800 USM, Penang, Malaysia.
epax2020@yahoo.com[1], rodzi@usm.my[2], gltan@usm.my[3]

ABSTRACT This paper discusses about the scaffolding safety in construction sites in Penang. Safety of workers at construction sites is one of the major concerns in construction industry. It is well recognized that the construction industry is one of the most dangerous industries in which to work in. The reasons for these dangers are the hazards faced by the workers in this industry. The equipment of their use on the construction sites are the cause of many of these hazards. One of the equipments with which injuries and death commonly occur among workers is working with scaffolds. Scaffolds play its role by providing passageway, support the structure and as a working platform. They are commonly used for working at heights and where there is the potential risk for workers to fall from height during job done on scaffolding. Falls are the largest cause of accidental death in the construction industry. Therefore, a study has been carried out to investigate and to emphasize on scaffolding hazards and strategies to prevent the hazards. The main objective is to measure the level of safety factor by using scaffolding awareness among employers and construction workers through case study observations in medium sized housing projects and high-rise projects at construction sites in Penang. Questionnaires have been distributed among the employers and unstructured interviews have been conducted with safety officers and officer from the Department of Safety and Health. The results show that scaffolding safety management at the high-rise projects is in compliance with the act and regulation requirements in Malaysia compared to the medium sized housing projects. The study also shows that all employers are well aware of the safety and health regulations in construction sites including scaffolding safety and their responsibilities to reduce fatalities and injuries in the construction industry.

Keywords: Scaffolding, safety assessment, construction sites

1. INTRODUCTION

The rapid growth of the construction sector coupled with the rise in the number of fatalities within the sector over the last ten years has brought into focus the hitherto low priority placed by the employer on occupational safety and health. The number of fatalities encountered in the construction industry is alarming. Over the years, the Department of Occupational Safety and Health (DOSH) has taken a lot of effort to reduce the number of people killed, injured, or suffering from ill health as a result of construction work. But their initiative alone is insufficient to increase or strengthen safety and health activities within the growing construction industry.

The design and construction of scaffolds must conform to Occupational Safety and Health Act (OSHA) requirements concerning type of equipment, rated capacities,

construction methods, and its use. Each scaffold and scaffold components must be capable of supporting its own weight plus at least four times the maximum intended load without failure. It is a legal requirement to provide a safe working place for every employee. Scaffold working platform is the most commonly seen structure at any construction site but at the same time, it is also one of the most legally abused working provisions in the industry. Current statistics confirm that most fatal accidents occur as a result of a fall from scaffoldings.

2. PROBLEM STATEMENT

The Malaysian Construction Industry has a poor health and safety record, according to the Department of Occupational Safety and Health statistic injuries (2005), where there were 3,150 accidents and 77 deaths reported in the year 2005 alone. Even though the number of accidents and deaths has declined compared to previous years, the statistics are still amongst the highest compared to the other sectors in the economy.

In construction work many of the hazards are obvious; most of them can be found on almost every site. The causes of accidents are well known and often repeated. Falls are the largest cause of accidental death in the construction industry. Most accidents involving falls can be prevented if the right equipment has been provided and properly used. When planning for work at heights, it is essential to provide a safe working platform for all phases of a project. A safe working platform is usually provided by the erection of scaffolding.

Every year, many workers are killed by falls from scaffolds. Besides problems with planks and guardrails, the main causes of injuries and deaths on scaffolds are poor planning for assembling and taking them apart, missing tie-ins or bracing, and being too close to power lines. Some scaffolding have collapsed because of improper erection, some have fallen because the scaffolding could not support the loads placed on it. Also, falling objects can hurt people below the scaffolds. The major causes identified are the lack of appropriate knowledge and skills of those assigned with responsibility for safety and health.

3. METHODOLOGY

Methodology is a systematic approximation that involves in a data collection process. The data collection been analyzed to obtain the results of the study. Several methods

had been used to meet the objectives of the research on the scaffolding safety awareness in construction sites. The first stages are collected a secondary data through the literature studies from the textbooks, handbooks, newsletter, journal, articles, thesis and also through the multimedia such as Internet and television. This is to verify the element of scaffolding including the basic scaffolds elements, types of the scaffolding, the provision of act and regulation based on Malaysia Standard, the statistic of injuries cases that has been related due to the constructions industry, potential hazards that may occur and also the guidelines to preventing the hazards and reduces the injuries cases in Malaysia

Second stages, collected a primary data through the case studies observations, questionnaires for the employer and unstructured interviews. The observations at the construction sites are to examine the real situation of the scaffolding safety, in the mean time to achieve the objectives of the study. The case studies are concentrated in comparison between the high-rise and medium housing construction project regarding measures on the level of awareness of the scaffolding safety.

3.1 The Case Studies:

a. 32 units of The Residence Bungalows Projects, Bayan Mutiara. Sg. Nibong, Pulau Pinang.
b. 1 Block unit Apartments 29th storey, Persiaran Minden Tiga, Pulau Pinang.

The observations based on evidence of safety and health issues in construction site requirement and in the same time identify the problems of scaffold components failure and personal protective equipments (PPE) requirement via checklist and photographs.

The checklist consists of 2 sections:

a. Section A – Scaffolding Safety Due To The Component

This section is to compare scaffolding components at case studies project with Factories And Machinery Act (Building Operations And Works Of Engineering Construction) (Safety) Regulations 1986, Part X (scaffold) accordingly to Malaysia Standard.

b. Section B – Worker Safety While Using the Scaffolding.

This section will measures the level awareness due to safety and health at the constructions sites.

3.2 Questionnaire for Employer

The questionnaire is to obtain the feedbacks among the employers on their understanding and their knowledge about the scaffolding safety, and in the same time the questionnaire analysis represent the level of awareness among them due to scaffolding safety in construction sites.

The questionnaires were distributed to the 55 respondents personally by hand directly to the employers in ten construction sites around the Pulau Pinang. This is the best method in order to get an immediate response and to prevent any non-returns or non-feedbacks from the responders instead of using snail posted mail or via email. A sample of respondents from the construction site management includes the safety officer, site supervisor, clerk of work, resident engineer and the contractor or subcontractor.

The questionnaire consists of 3 parts:

a. ***Part 1 – Background of the Respondents***
b. ***Section A – General Questions Related to Safety and Health Issues in Construction Sites.***
c. ***Section B – Scaffolding Safety.***

Table 1: List Name of Construction Project that Involved in Questionnaires.

No.	Project Name	Number of Respondents
1.	32 units Residence Bungalows Projects, Bayan Mutiara. Sg. Nibong.	6
2.	Jelutong Sewerage Treatment Plant, Jelutong.	7
3.	1 Block Apartment 29th storey Persiaran Minden Tiga.	6
4.	Project Sek.Men.Keb.Pondok Upeh, Lot 2011, Mukim 6, Jalan Balik Pulau. Balik Pulau.	7
5.	Pembinaan 4 Tingkat Bangunan Mahkamah Rendah Syariah Daerah Barat Daya. Balik Pulau.	6
6.	Pembinaan 1 Blok pejabat/kedai 3 tingkat (56 unit), 1 Blok Pangsapuri 9 tingkat, 1 Blok Pangsapuri 8 tingkat dan 1 Blok Pangsapuri 21 tingkat. Jalan Bukit Gambir. Mukim13. Penang.	5
7.	Pembinaan Balai Polis dan Kuarters kelas E, F dan G. Bandar Batu Feringgi. Pulau Pinang	5

8.	Pembinaan 32 unit Rumah Berkembar 'Strata Title' 3 tingkat bersambungan dan 1 Blok Rumah Pangsa 5 tingkat. Mukim 13, Lebuh Bukit Jambul.	4
9.	Pembinaan 119 unit Kondominium terdiri daripada 1 blok 36 tingkat dan 1 blok 35 tingkat. Bandar Tanjung Bungah. Jalan Tanjung Bungah. Penang.	6
10.	Pembinaan Pangsapuri 17 tingkat dan 21 tingkat Mukim 13, Jalan Bukit Jambul.	3

Table 2 : Respondent Category

Position	Number of Respondents
Site supervisor	13
Clerk of work	15
Safety officer	10
Subcontractor	7
Resident engineer	5
Contractor	5

The checklist and questionnaire based on the Scaffold Safety Checklist for use at Inspection by the Armstrong (1980) and Construction Standard (Jobsite Audit Instrument) by Reese & Eidson (1999).

c. Unstructured Interviews

The unstructured interviews were conducted to have an in-depth and better understanding of the real situation on scaffolding safety in construction sites. The sample selected for interviews includes both safety officers in case studies who are the true experts in this area. The interviews also conducted with officers from government agencies, Department of Safety and Heath (DOSH) Putrajaya to obtain the government act and regulations, statistic of injuries in the construction industry and also the government action to reduce the injuries in construction site nowadays.

4. SCAFFOLDING HAZARDS AND RECOMMEND PRACTICAL STRATEGIES

The high number of incidents of injuries and fatalities amongst construction workers has generally been due to the nature of the works (evolving), weather condition and variety of hazards involved. Construction workers who work on scaffolding are exposed

to falling from heights, falling objects, scaffold collapse, overturning of tower scaffolds and electric shock or electrocution.

There are several strategies that have been determination to prevent and at same time reduce the death or injuries cases that is caused by scaffolds hazards. Following are the summarized of the strategies:

i. Assign a competent person to oversee the scaffold selection, erection, use, movement, alteration, dismantling, maintenance and inspection.
ii. Employees who are involved in activities such as erecting, dismantling, repairing, and inspecting scaffolds being trained to recognize hazards associated with those activities.
iii. Make sure that scaffolds must be capable of supporting their own weight and at least four times the maximum intended load.
iv. Scaffolds are to be erected, moved, altered and dismantled by competent and experienced personnel or personnel under the supervision of a competent person to ensure safe installation according to the manufacturer's specifications and other requirements and scaffolding collapse.
v. Provides a complete of fall protection system and personal fall arresting system for construction workers safety.
vi. Installation of toe-boards, screens or guardrail systems or through the erection of debris nets, catch platforms, or canopy structures to catch or deflect falling objects for preventing falling objects.
vii. Scaffolds must be far enough from overhead power lines to prevent any conductive materials (e.g. building materials, paint roller extensions, scaffold components) that may be handled on the scaffold, at a distance greater than 10 feet from the power line.
viii. Maintain scaffolds in good repair and only replacement components from the original manufacturer should be used. Any intermixing scaffold components from different manufacturers should be avoided.

5. RESULTS AND DISCUSSION

5.1 Case Studies

Both projects used the same types and material of scaffolding, which is fabricated frame scaffolds from metal materials. Because the scaffolding in the same types so it easier to makes a comparison between both projects due to scaffolds component. The main scaffolds components including footing, standards, ledger, cross bracing, ties, platform, guardrail and toe-boards which any one of these components missing or loose that will occurs due to scaffolds collapsed or any falls hazards. It is importance to determine all these components are accordance due to the Malaysia Standards scaffolds regulation.

Table 3 : Comparisons of scaffolds component between both case study

COMPONENT	BUNGALOW PROJECT	APARTMENT PROJECT
Footing	Good	Some no base plates
Standards	Good	Some bent
Ledger	Some loose and missing	Good
Putlog and Transom	Good	Good
Couplings	Good	Good
Cross Bracing	Good	Some bent
Ties	Some loose and not enough	Good
Platforms	Not wide enough	Good
Guardrail	Bad	Good
Toe-Boards	Bad	Good
Access	Some obstructed	Good

Footing has a shank in its center to hold the tube and is sometimes pinned to a sole board. Malaysia Standards Regulation 77 states that scaffolds should have a firm footing or be firmly supported, and shall, where necessary, be sufficiently and properly strutted or braced to ensure stability. The scaffold footings at the bungalows project are mostly in good condition compare to the apartment projects, scaffolds did not have base plates at the 5^{th} floor, which is the scaffold are sitting on the floor directly. There are only base plates for the scaffolds that are sitting on the ground.

Figure 1 :Good condition of footing scaffolds at Bungalow Project,

Most of the scaffolds standards components in both projects are in good condition and jointed at the same height except some of the standard component at the apartment project, which are bent. All the standards must accordance to Malaysia Standard on scaffolds Regulation 76 which is "standards or uprights of scaffolds shall be where practicable vertical or slightly inclined towards the building; and fixed sufficiently close together to secure the stability of the scaffold having regard to all the circumstances."

Some of the scaffolds at bungalows project are incomplete where no ledgers are connected between standards component at the top of the scaffolds, which may cause of scaffolds collapsed.

Figure 2 : No ledgers and loose of scaffolds components at Bungalow Project.

The entire of cross bracing at bungalow project in good condition compared to apartment project some of the cross bracing are bent. Scaffolds Regulation 97 state, "cross braces should be straightened if bent, and the alignment of the tops of frames should be check and braces realigned if necessary."

Figure 3 :Some of the cross bracing are bent and no base plates at Apartment Project

Ties are the components that connected all the scaffolds components so If any of the ties are loose, missing or some of the physicals are not enough then it will affect the rigidly of the scaffolds and may cause a scaffolds to collapse or workers may fall from height. Loose ties will cause injuries to the workers or anybody at the site because they will be exposed due to falling of some of the ties. Ties of scaffolds component at the apartment project are complete and fulfill the Malaysia Standards Act as compared to the bungalow project which some of the ties are not complete and loose.

Guardrails component at the apartment project are in good condition and specifically accordance due the Malaysia Standards scaffolds Regulation 88. As we know risks of falling from high-rise building are higher than medium housing construction. The situations are different in the bungalow project where the workers are working on scaffolding without guardrail system and toe-boards. Even though this is a medium housing construction however the risks of workers falling from height are still there. Guardrails complete with the toe-boards are used to prevent any objects fall from the top of scaffolds and prevent falling from height.

Bungalow Project

Figure 4 : Construction workers done their jobs above 3meter on incomplete scaffolds that without guardrail systems and fall protection equipments.

Overalls of checklist analysis between the Residence Bungalow Project and Apartment Project worker safety factor at apartment project is more satisfactory than compared to the bungalow project. According to Table 3 almost 73% of scaffolding component at apartment project are in good condition and compliance with the Factories And Machinery (Building Operations And Works Of Engineering Construction) (Safety) Regulations 1986 Part X (Scaffold). It is different with the bungalow project which only 45% of the components are compliance with the Malaysia Act and Regulation. The guardrail system and toe-boards these two are the most important component and should be completed in scaffolding structure to protect workers from falling during done a job on scaffolding. Other component that will cause scaffolds collapsed are the ties of scaffolding which should not be loose or not enough physical to prevent bad situations. Even though bungalow project is a medium size housing project as employer they supposedly provide complete scaffolding components with a guardrail system to prevent any unexpected situation.

Other issue in scaffolding safety is personal protective equipment, fall protection system and attitude of the construction workers while doing their jobs at construction site. Based on the observation, at the apartment project the fall protection system are more complete and almost all workers follow safety and health rules in construction sites. The fall protection system consists of guardrail systems, safety net, safety monitoring and overhead protection. The employer had done a good job by ensure their workers safety to prevent any injuries that might occur in site especially during work

done on scaffolding. Both parties have a good level of awareness on scaffolding safety at construction sites. Compared to bungalow project the scaffolding safety management is not very satisfied because the fall protection systems are not completed. There is only safety monitoring system at these sites to monitor the safety construction workers. Almost of the workers also do not follow the safety rules although as we know at the medium housing project the hazards risky are lower than the high-rise project but safety in construction site still important.

Figure 5 : Complete with safety net and overhead protection at Apartment Project to prevent any injuries or accident.

Table 4 : Workers safety attitude during using scaffolding

No.	Question	Bungalow Project	Apartment Project
1.	Dressed appropriately for the job	No	No
2.	Inspect all fall protection equipment priors before used.	No	No
3.	Inspect the scaffolds every 7 days before use, for damaged of weakened	No	No
4.	No stack construction material on the scaffolding.	No	Yes
5.	Climbing on cross bracing	No	No
6.	Maintain three points on contract at all times while climbing	Yes	Yes
7.	Perform job according to the safety operating procedure	Sometimes	Sometimes
8.	Follow the safety and health rules	Sometimes	Sometimes
9.	Safety attitude	Poor	Good

Both employers and construction workers did not inspect all scaffolds component before used the scaffoldings. It is recommended that every week scaffolds be inspected by the competent person but in both case studies inspection of the scaffolds was only conducted every month or longer. Overall on the safety factor while using scaffoldings, based on the Table 4, the bungalow project workers are poor due to their safety attitude while doing them jobs at construction sites. Compared to the apartment project workers, they have a good safety attitude while using scaffolding. These we can see the level of awareness between the employer and workers in both of the projects.

5.2 Questionnaire Result

Safety officers responsible to create and maintain an awareness of all changes in legislation with full knowledge of all legal requirements, anticipate possible hazards due to scaffolding with a recommendation relevant procedure, the adequate provision of safety equipment to prevent any injuries or accident, which may be caused by scaffoldings. In Occupational Safety And Health Act 1994 (Part VII - Safety And Health Organisations) **Section 29, Safety and health officer** states “that an occupier of a place of work to which this section applies shall employ a competent person to act as a safety and health officer at the place of work. An occupier who contravenes the provisions of this section shall be guilty of an offence and shall, on conviction, be liable to a fine not exceeding five thousand ringgit or to a term of imprisonment not exceeding six months or to both.”

Almost all the construction site have their own safety officer to control and monitoring the safety and health everyone that inside construction sites. But seven respondents, which is one out of ten construction site in these survey state that there is no safety officer. It is at Project Sek.Men.Keb.Pondok Upeh, Lot 2011, Mukim 6, Jalan Balik Pulau. Balik Pulau.

100% of the employers provide a complete first aid kit for construction workers. First aid shall be available and complete in the site office to care for a casualty until recovered or placed under medical care. First aid is important to recover any small injuries that cause by scaffolds for example small bleeding that occurs because of falling object or a dust that stick at safety net and enter into the eyes.

The employers also provide adequate personal protective equipment (PPE) for construction workers. The PPE that required while using scaffolds are safety helmet,

safety boots, safety harness, lanyard and Dee-rings and snap hooks. All these PPE are required to all workers that done their works on the scaffoldings to prevent from fall from height that will cause death.

Most of the constructions site had never injuries or accident case that caused by the scaffolding. All the employers are aware on safety hazards, which may cause of scaffoldings and make sure their workers done their work accordingly to safety rules. Scaffolding will occurs a falling object injuries, fall from heights and scaffoldings collapse that caused death, permanent disable (PD) or non-permanents disable (NPD). A little percentage of employers (27%) respondents admit there is already injuries or accidents caused by the scaffolds but it only a small injuries not committed to serious injuries that happen in their construction sites.

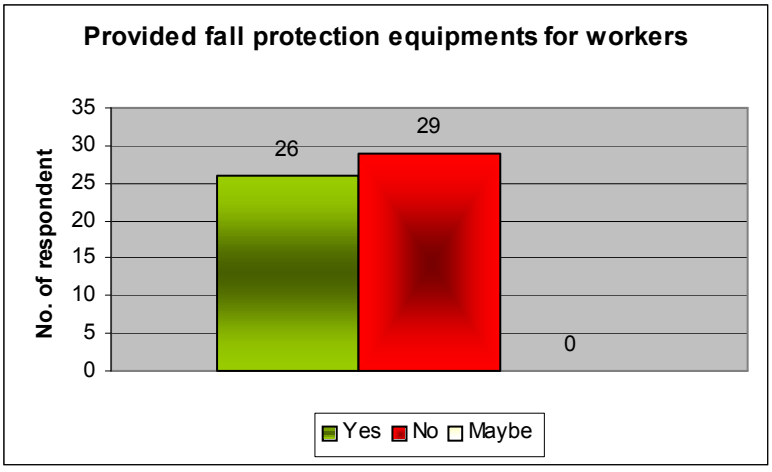

Figure 6 :Employers provides fall protection equipments.

Fall protection equipment consists of personal fall arrest system (e.g. safety harness, lanyard) and fall protection system (e.g. guardrails system, safety net, safety monitoring system). The employer must have a competent person to determine the feasibility and safety of providing fall protection for employees erecting or dismantling supported scaffolds. Only 47% of employers have provided fall protection equipment for their workers. Majority of respondents or 53% are not provided fall protection equipments for construction workers. It is important to provided fall protection equipments and make sure the workers are wearing the equipment while done their job on scaffolding to prevent any injuries. This situation is very anxious because without the fall protection equipment all the workers are exposed to scaffolding hazards, which is fall from height. Falls from height are the major hazards that exist due to works on

scaffolding. According to DOSH statistic of injuries or accident 2006 and 2007 states falls from height are the major injuries or accident that occurs in work on scaffoldings.

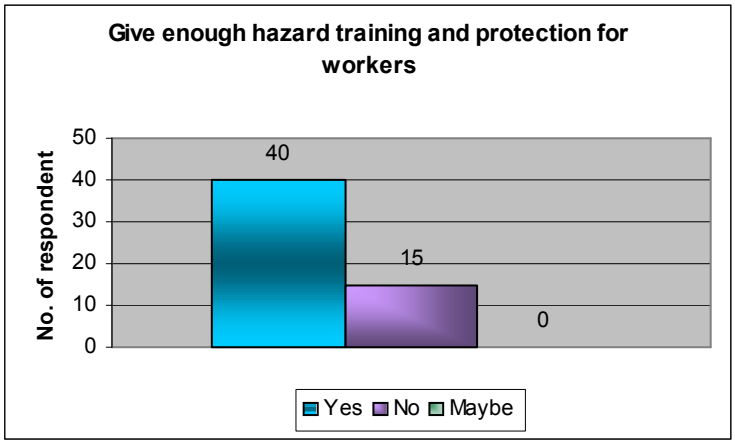

Figure 7: Employers give enough training on hazards and protection to workers to assure their safety while using scaffoldings.

Almost 73% of employers give enough training on hazards and protections among their workers for assure their safety while using scaffoldings. But still 27% are not give enough training on hazard and protection of scaffoldings, that might occurs scaffolding collapse or injuries while done their jobs at site. Based on the survey most of the employers are not provided complete fall protection equipments but still give enough training on hazard and protection to workers to assure their safety while using scaffoldings. They are having budgets problems to provided completes fall protection equipments for all of their workers so they had replace it with giving enough training for workers. So the construction workers will more alert on the potential hazards that may occur during done jobs on scaffolding.

Some of the workers refuse to wear all the protection equipments even though the employers provided complete fall protection equipments. But in the same time some of the employers are still not aware on their workers safety what did they care about is the project must be complete on time without delay. These attitudes become one of the causes of death and injuries cause by scaffolding in construction sites.

Either skilled or unskilled workers it still can do work on scaffolding. Lack of knowledge and training will become one of factor due to death or injuries that cause by scaffolding component. It is important to provided a complete hazards and protection training for workers to prevent any injuries or deaths. Scaffold failure in construction site because of human weakness.

The study show that the level awareness of scaffolding safety in construction sites in Pulau Pinang among the employers and workers are still in the comfort zone where almost all of the sites did not have any cases of death or injuries cause by the scaffolding. All employers are well aware of the safety and health regulations in construction sites including scaffolding safety and their responsibilities to reduce fatalities and injuries in the construction industry.

5.3 Unstructured Interviews

The interview is being conducted with Mr. Sadiyuk Henry Rigit the R&D officer at Pusat Pentadbiran Kemajuan Persekutuan, Putrajaya. It is to know any government agencies action to reduce injuries and death in construction site especially related due scaffolding safety. Presently the government has implement a five year (2005 – 2010) master plan program to be known as the "MASTER PLAN FOR OCCUPATIONAL SAFETY AND HEALTH IN CONSTRUCTION INDUSTRY" (MPOSHCI) to guide the industry stakeholders to strengthen safety and health activities within the industry.

There is 6 strategies that has been implement and planned by the governments agencies to reduce the injuries and death in construction sites:

a. Enforcement and Legislation

Programs identified for implementation include, increasing the number of DOSH officers, appointment of construction safety and health officer instead of general safety and health officers, comprehensive provision of Personal Protective Equipments, registration of all site safety and health supervisors and certification of Contractors Management Systems.

b. Education and Training

To impart safety and health management skills and to inculcate safe working behaviour amongst workers, a number of safety and health training programs has been identified for implementation. It is envisaged that a strong focus on education and training will afford greater opportunity to all in the industry to relearn and equip themselves with the knowledge necessary to produce innovative solutions to safety and health issues in the industry.

c. Promotions

Regulatory bodies are implements consider to sensitizing make promotion through electronic media such as television, radio and Internet. Government's Agencies still in R&D with relevant parties (such as NIOSH) to develop and publish guidelines for the development of standard safety signs in local languages (English and Bahasa Malaysia) in consultation with and for implementation by, industry players (stakeholders, Trade associations and worker unions). CIDB and DOSH had jointly a Special Certificates of Achievement for Best Practice in Occupational Safety & Health in Construction Industry, to first 100 contractors and 20 developers who may achieve a certain pre-determined standard.

d. Incentives

Incentives are in various forms such as award of recognition, financial support and premium discounts for good risk management.

e. ***Standard Development***

Implementation of 'Guideline on Prevention of Falls at Construction Sites 2007' by Department of Safety in Health. Standards design and drawing for Scaffolding material and jointing method, workers housing and amenities produced by DOSH to assist the contractor to erect scaffold safely. Hand Book on Good Practice – Occupational Safety and Health at Construction Sites for the use of every employee or worker at construction sites. As there are quite a number of general workers who could not read or write properly in construction industry, it is proposed that the contents of this handbook be illustrated and explained by using cartoons, drawings and simple & plain language (in Bahasa Malaysia, English, Chinese and Tamil).

f. Research & Development and Technology

Development of new mobile elevation work platform (MEWPS), mast Climbing Work Platforms (MCWPS) and motorized mobile scaffold to reduce risky situations at construction sites. Personal Protective Equipment, Safety tools and Equipment for Working at Height. DOSH or NIOSH still in researching to identify and recommend suitable PPE necessary to secure the safety, health and welfare of the worker working at height and endeavor to make it mandatory the use of safety harness with straps attached to horizontal lifeline.

A lot of program have been conducted and will be done during year 2005 to 2010 due to reduce the death and injuries in construction with collaboration between the employer of construction industry to succeed and achieve a target fatality rate of 26 per 100,000 workers in 2003 be further reduced by 30% by the year 2010. According to Asian-Pacific Newsletter on Occupational Health Safety, current fatality rate in the developed countries like Japan, France and the USA is below 20 per 100,000 workers and Malaysia which is striving to achieve developed nation status by 2020 should strive to achieve the target of reducing fatalities to less than 20 per 100,000 workers.

6. CONCLUSION

Poor management safety in construction sites is the contributor of death and injuries in construction sites. All parties such as government agencies, construction industry management, employer and also construction workers had to realized that scaffolding safety is one of the importance parts to be focused on, preventing is more preferable than to cure.

Based on the case studies analysis the cause of increasing number of injuries and death cases in construction industry within working with scaffolding because of the employer neglecting to provide complete personal fall protection equipments for workers and human weakness. Some of the employer failure to comply an OSHA standard regulation of manufactures guidance regarding proper assembly, dismantle and use of scaffolding.

The present levels of awareness between the employer and workers in construction industry have improved from year to year. Even though some of them have still not realized the importance of scaffolding factor safety in construction sites. It is to reduce the death and injuries cases in construction industry. The government agencies have implemented a lot of program to improve the level awareness all the parties in construction industry at the same time to improve professional image.

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