

Chapter Two - Review of the Existing Situation

2.1 General

In this chapter the Hong Kong Legislation on construction safety are introduced, and the Work Bureau safety management system is also discussed. A comparison between the Work Bureau safety management system with Construction (Design & Management) Regulations will also be made. The comparison is to point out the weakness of the Work Bureau safety management system, and also to point out how these weaknesses can be resolved by Construction (Design & Management) Regulation.

2.2 Hong Kong Construction Safety Regulations

In fact, there are three key regulations under the Factories and Industrial Undertakings Ordinance concerning the construction health and safety in Hong Kong, and they are listed as follows:

1. Construction Sites (Safety) Regulations (Ref.15);
2. Safety Officers and Safety Supervisors Regulations (Ref.16); and
3. Lifting Appliances and Lifting Gear Regulations (Ref. 17).

It would be not necessary to repeat all the content of above regulations. Thus, in the following sections, the outlines of each regulation are discussed.

2.2.1 Construction Sites (Safety) Regulations

The construction sites (safety) Regulation is divided into ten parts of which part three and the first schedule was repealed. The remaining parts are Preliminary, Use of hoists, Special provisions as to hoists, Carrying of persons and securing of loads on hoists, Scaffolds, working platforms and ladders, Excavations on construction sites. Miscellaneous safety requirements, Notification of construction work, Health and welfare, Miscellaneous provisions and second schedule for contents of first aid boxes or cupboards. This regulation is aimed to control the actual works execution and activities on the construction site.

2.2.2 Safety Officers and Safety Supervisors Regulations

The Safety Officers and Safety Supervisors Regulation is to regulate compulsory employment of safety officers and supervisors by the firm who undertake the works of the construction contract. The duties of a safety officer are as follows:

1. Advise the employer on safety matter and implement the safety measures;
2. Inspect and report to the employer any potential hazards and recommend solution to eliminate these potential hazards;
3. Accident investigation and recommendation for prevention;
4. Recommend the safety measures for daily operation; and
5. Supervise of safety supervisor.

The duties of safety supervisor are listed as follows:

1. Assist safety officer to carry his duties;
2. Ensure workers comply with safety requirements;
3. Promote safety on site; and
4. Ensure the safety plan requirements on site are fully implemented and report to the safety officer on weekly basis.

From the duty list of the safety officer and supervisor, it can be concluded that they are only limited to safety on site, not taking part in the planning and design stage.

2.2.3 Lifting Appliances and Lifting Gear Regulations

This regulation deals with the safe use of lifting appliances and lifting gears on construction sites. The regulation contains five parts as follows: Preliminary, Lifting Appliances, Chains, ropes and lifting gear, Miscellaneous, Offences and penalties and the First schedule of procedure for testing and examining lifting appliances and lifting gear. Therefore, this regulation is only concerned with site activities.

2.3 Work Bureau Safety Management Organization and System

Work Bureau (WB) is a bureau within the Government Secretariat to control of the Public works policy among the Civil Engineering, Highways Department, Drainage Services Department, Territories Developments Department, Architectural Services Department, Water Supplies Department, and Electrical and

Mechanical Department for all the government's civil engineering, buildings and electrical and mechanical works. Basically, WB's scope of works covered all the public works of the Hong Kong Government.

2.3.1 Works Bureau Occupational and Health Policy

The OH&S policy is given in the Public Works Programme, Construction Site Safety Manual (Ref.18), Chapter 1, Section and Sub-section 1.1.1 to 1.1.3 inclusion. The policy statements are summarized as follows:

1. Safety considerations must be given priority in both design and construction;
2. WB is committed to provide a safe working environment for all personnel in government construction sites; and
3. WB requires all staff to comply with Construction Site Safety Manual.

2.3.2 Works Bureau OHS Objectives and Organization

The objectives of the WB's OHS policy is to achieve zero fatal accident, zero dangerous occurrences and an accident frequency rate of less than 60 reportable accidents per 1000 workers per year.

The strategic to achieving these safety objectives is set out in below:

1. Secure commitment of all parties involved in construction project including all the works departments, Labour department contractor, sub-contractors, workers unions and utilities undertakers;

2. Contractual provision is to be made in the construction contract to require the contractors to prepare, implement and monitor safety plan; the contractors have to ensure that their sub-contractors also comply to these safety plans;
3. Contractors will be selected with a proper consideration to construction safety and a high weighting of safety must be given in contractors pre-selection exercises;
4. the Government site staff and the contractor site staff should set up a site safety management committees to monitor each construction project construction safety plan.

2.3.3. Responsibility for OHS within the Works Departments

Basically a Principal Assistant Secretary (PAS) of the WB is to chair a safety advisers' committee. This committee consists of senior professional engineer/safety advisor of all works departments responsible for formulating and implementation safety policies. Each senior engineer/safety adviser is also responsible for the followings:

1. To review the general approach to construction safety for contracts;
2. To suggest addition or revisions to construction legislation and contractual term to be entered into the construction contract;
3. To keep and review site accident statistics;
4. To promote the construction safety; and

5. To set up working groups to investigate specific construction safety subjects and accidents.

The government resident site staff is assigned duties to look after the OH&S on a construction site through outline safety plan. The outline safety plan is the plan submitted by the contractor in the constructional contract tender stage as formal statements in relation to OH&S including the follows:

1. An assessment of the draft of risk associated with the activities to be encountered in carrying out the works;
2. An outline of the safety procedures and protective controls to be developed; and
3. The manner by which they will be implemented and monitored to ensure OH&S on site.

After awarding of the constructional contract, the contractor is under contractual requirements to identify the contractor staff organization including site agent, safety officer and safety supervisor responsible for the works. The contract also assign all the statutory and contractual obligations regarding OH&S to the contractor to supervise, monitor and audit the OHS&E program on site.

In fact, the site agent is the representative of the contractor on site as a manager to look after the works. The safety officer shall be registered under the Factories and Industrial Undertakings (Safety Officer and Safety Supervisors) Regulations and shall carry out all duties stipulated in the OH&S Regulations and;

1. Supervise and monitor implementation of the constructional safety plan;

2. Ensure workers are made aware and comply with the relevant part of the safety plan; and
3. Carry out audits and training.

Safety supervisors have at least three years experience of similar construction work and to assist safety officer to carry out safety inspections audits, reporting, training and all alike.

The sub-contractors are also required to submit a written statement the government staff that they also will comply with the contractor safety plan.

2.3.4. Communication of the WB's OHS Policy

The safety adviser committee chaired by a PAS from the WB sets up the government safety policy. In order to communicate the WB safety policy to the contractor, a special condition is to be entered into the constructional contract. This special conditions requires the contractor within 28 days on acceptance of the tender to give a OH&S policy statement signed by the managing director of the contractor declaring that the contractor will ensure that OH&S are given priority in all respects of constructional works and in discharging its contractual obligations. Under the special condition of the contract, the contractor is also required to further develop the outline safety plan which is to be submitted in the tender stage and after the award of the contract then the contractor needs to further develop the outline plan into a formal safety plan. The safety plan should consists of the followings:

1. The risks to OH&S associated with the works and proposals for the satisfactory reduction or elimination of exposure to such risks;

2. The powers vested on the safety staff which would enable the safety staff to take urgent and appropriate action;
3. The communication path between workers and safety staff; and sub-contractors to main contractor safety staff;
4. The method of safety procedures proposed by sub-contractors reviewed for compliance with the OH&S;
5. Formulation of emergency procedures;
6. Methods of promoting awareness of OH&S amongst all persons on site including proposals for on-site publicity and training;
7. The frequency, coverage and application of on-site accident prevention and safety management;
8. The safety methods and equipment responsible for the construction works;
9. The first aid personnel and facilities; and
10. The records and reports to be prepared and maintained by the safety officer.

2.3.5. Pay for Safety Scheme

The Works Bureau introduced the 'Pay of Safety Scheme' at 19.04.96. The objective is to remove site safety from realm of competitive tendering. Therefore, a sum of total possible contract payment to the Contractor of about 2 percent of the estimated contract sum, not including contingency sum or any sum for the payment

fluctuation. The following is a list of safety items that will receive payment;

1. Deliver draft safety plan and hold review meetings;
2. Provide Safety officer
3. Deliver safety plan and distribution;
4. Review safety plan, up dating and distribution;
5. Attend the site safety management committee and complete agenda;
6. Establish site safety committee;
7. Attend site safety committee and complete agenda;
8. Arrange and attend weekly safety walk;
9. Provide safety training in the form of general induction training;
10. Provide site specific safety induction training;
11. Provide safety training in the form of tool box training; and
12. Contingencies.

2.3.6. Measuring Performance

A site safety management committee is to be set up to monitor the implementation of the safety plan. The resident engineer shall be the chairman and the contractor site agent, safety officer and safety supervisor shall be committee members. The committee shall hold a meeting once a month and to carry out a safety inspection around the construction works site prior to the meeting. The engineer and the site agent shall sign the meeting minutes. Members of the

committee nominated by the engineer shall conduct additional inspections on a weekly basis and a record shall be kept for any observation made.

In addition to regular site inspection, the site safety officer also needs to carry out safety audit programme to provide in-depth examinations of the construction works operations and activities off all sub-contractors. The safety audits shall be carried out with a comprehensive checklist to ensure compliance with statutory and safety plan requirements. The audit should also be carried out at every four months interval. The results of the audit shall be translated into a written report; and shall be submitted to the site agent and the residential engineer for endorsement, and the corrective action will be forwarded by the contractor and then to be approved residential engineer at the site safety committee meeting prior to implement the corrective measures.

2.3.7. Independent Safety Audit Scheme (ISAS)

This is pilot scheme that had been carried out on previous selected 36 projects within WB's departments. Further to successful promising results from these projects, another 36 projects are put on trail within the WB's department to further verify the effectiveness of this safety-auditing scheme. The purpose, background, arrangement and objective of ISAS are similar to the 'Pay for safety scheme'. To implement the ISAS scheme, a sum equal to 25% of the estimated total safety payment, which is 2% x total contract sum, will be aside. For a 100Millions contract, the total safety payment will be 2% x 100 Millions, which is equal to 2 Millions, and the safety audit sum is equal to 25% x 2 Millions, which is equal to HK\$500,000.

The safety audit is to be carried out at every three months period and performed by competent auditor. The contractor will first select the auditor and to agreement with the client or the designers who normally is the Engineer from a

relevant works department under Civil Engineering contract. An auditing program CHASE, which was originally developed by the industrial wing of the Birmingham University in the United Kingdom and subsequently modified by Hong Kong Occupational Safety and Health Council (OSHC), was used, where OHS is a legislative body in Hong Kong to promote health and safety. The safety audit report is also to be endorsed by OSHC. In order to claim the payment under this safety audit item in the Bill of Quantity, a 70% score must be achieved. The weighting of payment for each safety auditing report is depended on the total sum and the number of time of the safety audit has to be carried out. Using above example, for a project with a 100 Million contract sum with two years period and safety audit to be carried out in every three months, the payment for each successful audit report is equal to HK\$ 65,000 the report.

2.4. Evaluation of the weakness of the WB Safety Management System

By using of the WB existing OH&S programme, the works departments managed to achieve accident statistics attached in Appendix B1 of (Ref.10). From the statistics, the target accident rate has been achieved in January 1996 and the accident rate is going down slowly for the non-Air Core Projects (ACP). However, for the ACP projects, the accident rate per 100,000 man-hours is still at 1.8 above the target value 1.6.

Therefore, there are still rooms for improvement to the WB OH&S program. The followings is a list of evaluations:

2.4.1 Work Bureau Policy

The WB policy statement is contained within the WB technical circular 16/93 and no where else. This form of arrangement gives a very low profile to

constructional safety and most of the engineers regarding the WB safety policy just like additional requirements for construction contract.

Also, the WB policy statement does not require to be shown on any of the Government construction site to show contractors the WB's determination to implement such an safety policy. The policy is never been updated since 1993 and never been translated into Chinese as majority of the workers on site does not know English.

Under the Works Bureau organization, a PAS is specially assigned in safety aspects and to chair a committee meeting involving all senior engineer/safety from works department. This set up of organization seem that the Secretary for Works has delegated all responsibility on to an assistant and does not give OH&S a high priority among other areas. Please note that a PAS is only equivalent to a chief engineer and in the Hong Kong Government organization there should be a chief engineer among four senior engineers and sixteen engineers.

2.4.2 Organization

The strategy to achieve the OH&S policy objectives is set out in the construction safety manual and the contractors will bear all the responsibility of constructional safety. The contractors have to comply with these contractual safety provisions laid down into safety manual during execution of the constructional contract. With such an arrangement, there are no incentives for Government site staff to actively involve in site safety. It is not only because the WB has treated OH&S as a general contractual provision and the site safety is entirely contractor responsibility. The safety training of government site staff is on voluntary basis therefore the constructional safety awareness of the Government staff in OH&S is varied on personal basis.

Within the contractor own organization, it can be seen that the safety officer and supervisor are under administration of the site agent. The site agent only concern is with the works progress because under all Government construction contracts, there must be a clause on liquidated damage. This means that when the contractor does not complete the works on time, the contractor have to pay back to the client a pre-agreed amount as stipulated in contract as damages caused by the delay of works.

2.4.3 Communication

The communication is only one way which is normal from the resident site staff to contractor pointing out the deficiencies of the safety measures. Other parties, such as the client and designer, have no involvement whatsoever. Therefore, except at the safety meetings, there is no delegated party to relay the message among project parties. One of the typical examples is that most of the construction works are paid by daily wage, and with such as mode of employment, the workers cannot file any complaint because they have to ensure their place of works for tomorrow. There are also no direct communication path between the government site staff and workers. With this daily pay arrangement, there would not be easy to establish any educational program and training for workers.

In the construction safety manual, there are no exact guidelines in evaluation of constructional risks and no comprehensive checklists for inspections of works to carry out safety inspection.

2.4.4 Measurement of performance

In fact, contractor measurement of its own safety performance is varied from contractor to contractor. The safety-auditing scheme is still a pilot scheme. The

benefit of the auditing scheme is still early to estimate. However, the auditing would only review the deficiency areas of the safety management system but it does not mean that the system will improve automatically. It would still need the afford from the contractor to put in resource to correct the deficiency areas.

2.5 Comparison between the Works Bureau safety management system and Construction (Design & Management) Regulation

2.5.1 Responsibility

1. There are no client and designers involvement in for OHS in the planning stage of the project;
2. The control of safety performance is still in the hand of the engineer representatives who is also carrying other duties concerning quality of construction works;
3. All the safety responsibility is rested on the contractor; and
4. There are not designated personals to look after from the administrative side of safety.

2.5.2. Administration Aspect

1. The engineering design does not need to consider safety as an primary issue;
2. Only the safety plan requirements is given;

3. There are no requirements for continuous development of plan during construction stage;

2.5.3 Communication of the Safety Policy or Requirements

1. There are no safety agency to solely take charge of administration and coordination of safety at different stage of works;
2. There are no requirements for creation of a safety file that shall contain all the safety information from planning to completion stage of the project for the client future reference at the operation stage.

2.5.4 Others Conditions

Civil contract does have its own limitation. The most significance defect is that there should not any penalty element. The penalty concept is only restricted to criminal law that is to punish wrongdoing. In practice, the victims of a construction accident could seek compensation through their employer's insurance. After the insurance company compensates the victim or the family of the victim of the accident, there would not be any loss to the client and designers so that reduction of contract payment to the contractor because of loss occurrence will not be enforced.

The 'Pay for Safety Scheme' (Ref. 19) is only supplementing the civil contract deficiency by inducing the contractor to participate in safety by paying for some items of safety cost. The total safety payment would only be up to 2% of the total contract sum. It fails to recognize management concept that the payment for safety precaution works shall begin at the planning and design stage. In practice,

the contractor will concentrate on the safety areas with payment under the bill of quantities.

ISAS is an item under the 'Pay for Safety Scheme'. It intends to measure the deficiency of the contractor's safety management, and by revealing these areas of deficiency, it hopes that the contractor would carry out mitigation action for further improvement of their safety management system.

Both the Payment for safety Scheme and ISAS scheme are using payment as an incentives to draw the contractor attention to improve the defect areas on site, and these two system are not to create a global safety system for construction industry.

After comparison on the present WB's OHS system is a corporate solution trying to resolve the constraints at the territories and industrial level. But the CDM regulation is a global approach to resolve the problems of construction safety at a different level to incorporate safety into the construction system.