

Approval Conditions for

Operating

Mandatory Safety Training Courses

Part II – Module 1(a)

Course Design and Specifications

For

**(A) Mandatory Basic Safety Training
Course (Construction Work)**

**(B) Mandatory Basic Safety Training
Revalidation Course (Construction
Work)**

Version Control Record

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Inquiry

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1. Overview

- 1.1 The terms and abbreviations adopted in this module follow those defined in Part I. This module is Part II – 1(a) of the AC which covers 2 MBST (Construction Work) courses, i.e. full course and revalidation course. This module should be read together with Part I of this AC.
- 1.2 Section 6BA of the Factories and Industrial Undertakings Ordinance, Cap 59, requires that every employed person carrying out construction work should have successfully completed the relevant safety training course, i.e. MBST (Construction Work) Course, and should have been issued a relevant certificate. In this regard, the CL is empowered by section 6BA(2) of the Ordinance to recognise the following safety training courses:
- (A) Mandatory Basic Safety Training Course (Construction Work) (“full course”); and
- (B) Mandatory Basic Safety Training Revalidation Course (Construction Work) (“revalidation course”).
- 1.3 Procedures for application for course recognition are stipulated in the GN. Applicant who wishes to run full course or revalidation course should submit an application to the CL for course recognition.
- 1.4 Unless stated otherwise, requirements stated in this module are applicable to both full course and revalidation course.
- 1.5 TCP should ensure that the course materials used should comply with the requirements of this AC.
- 1.6 The objective of the full course is to provide basic safety training to employed persons carrying out construction work in order to enhance their safety awareness and therefore to prevent work accidents and occupational diseases. The trainees will be issued with a MBST (Construction Work) certificate upon successful completion of the

course.

- 1.7 Revalidation course aims to provide refresher training to holder of MBST (Construction Work) certificate so as to refresh and update what was learnt in the past MBST (Construction Work) course attended. Upon successful completion of the course, the trainee will be issued a new certificate.
- 1.8 At the end of **full** course, the trainees should be able to:
 - 1.8.1 Describe the basic legal requirements prescribed under relevant safety legislation applicable to construction sites;
 - 1.8.2 Understand the basic principles of work safety;
 - 1.8.3 Comprehend the potential hazards of common work processes on construction sites and their preventive measures;
 - 1.8.4 Analyse the possible causes of, and means of preventing, accidents and diseases that are common on construction sites;
 - 1.8.5 Understand the basic principles of fire prevention;
 - 1.8.6 List the essential elements of emergency preparedness;
 - 1.8.7 Understand the importance of, and procedures for, reporting accidents and dangerous occurrences on construction sites;
 - 1.8.8 Grasp the types, purposes, correct selection procedures and the proper use of personal protective equipment commonly required on construction sites; and
 - 1.8.9 Demonstrate the necessary safety attitude to safeguard themselves and other workers.
- 1.9 At the end of revalidation course, the trainees should be able to:
 - 1.9.1 Understand the general concept of construction site safety and safe working practice;
 - 1.9.2 Grasp the causes, preventive measures and related mandatory requirements of common serious accidents;
 - 1.9.3 Understand the basic principles of fire prevention;
 - 1.9.4 List the essential elements of emergency preparedness;
 - 1.9.5 Understand the importance of, and procedures for, reporting accidents and dangerous occurrences on construction sites;
 - 1.9.6 Grasp the types, purposes, correct selection procedures and the

proper use of personal protective equipment commonly required on construction sites; and

- 1.9.7 Demonstrate the necessary safety attitude to safeguard themselves and other workers.

2. Admission criteria

- 2.1 Full course is run for trainee who does not possess a MBST (Construction Work) certificate or possesses a MBST (Construction Work) certificate which has expired for more than 3 months.
- 2.2 A TCP should ensure that applicant to be admitted to a revalidation course should, at the time of application, be holding a MBST (Construction Work) certificate which either will expire within 6 months or has expired for not more than 3 months.
- 2.3 A TCP should ensure that applicant to be admitted to a full course or revalidation course should meet the requirements stipulated under Regulation 4A of the Construction Sites (Safety) Regulations.

3. Qualifications of trainer

- 3.1 A TCP should ensure that its trainer should at least possess one of the qualifications from 1 to 3 stipulated in **Annex 1**.

4. Trainees to trainer ratio

- 4.1 A TCP should ensure that the maximum ratio of trainees to trainer is 30 to 1 and it is the same for theory session and hands-on session.

5. Class size

- 5.1 A TCP should ensure that the maximum size of a class is 30 trainees and it is the same for theory session and hands-on session.

6. Course duration

- 6.1 A TCP should ensure that the minimum course duration of full course should be 7 hours (break between half-day sessions or lunch time are not included) and it should include a hands-on session of about 1 hour on the practice of using safety harness, an examination session of 30 minutes and a total of not more than 30 minutes recess time.
- 6.2 A TCP should ensure that the minimum course duration of revalidation course should be 3.5 hours and it should include a hands-on session of not less than 30 minutes on the practice of using safety harness, an examination session of 30 minutes and a total of not more than 15 minutes recess time.

7. Attendance

- 7.1 A TCP should ensure that any trainee who is absent from the class for more than 15 minutes for any half-day sessions will be disqualified to attend the examination.

8. Lesson plan

- 8.1 A TCP should ensure that its full course and revalidation course should be taught in accordance with the lesson plans stipulated at **Annex 2** and **Annex 3**, respectively.

9. Course contents

- 9.1 A TCP should ensure the course materials used for **full course and revalidation course** should include all the topics and details stipulated at **Annex 4 and Annex 4A**, respectively. The TCP should also supplement additional materials in accordance with the needs of the trainees and the latest safety information.

10. Display, demonstration and practising

- 10.1 A TCP should provide suitable and sufficient equipment (such as safety helmet, safety shoes/boots, safety gloves, ear and eye protectors, respirator, portable fire extinguisher and etc.) for the purpose of display or demonstration. A set of safety harness with lifeline and fall-arresting device should also be provided for each trainee for hands-on practice. The TCP should ensure that every trainee should safely complete the hands-on practice.

11. Examination

- 11.1 A TCP should ensure that every trainee attending the examination should meet the required attendance and the requirement of completing the hands-on practice.
- 11.2 A TCP should ensure that the examination papers used are issued and specified by LD.
- 11.3 A TCP should provide the answer sheet at **Annex 5** to the trainee for the examination.
- 11.4 A TCP should ensure that the invigilator and the trainee should sign on the answer sheet.
- 11.5 Time allowed for the examination is 30 minutes and the passing mark

is 60%.

12. Validity period of certificate

- 12.1 A TCP should ensure that the validity period of MBST (Construction Work) certificate issued is 3 years.
- 12.2 For full course, validity period of the certificate should be counted from the date when the trainee successfully completes the course.
- 12.3 For revalidation course, validity of the certificate should be counted from the day—
 - 12.3.1 immediately after the expiry date of the current certificate if the revalidation course is successfully completed within 6 months prior to expiry of the current certificate, or
 - 12.3.2 of completing the revalidation course if the revalidation course is successfully completed within 3 months after expiry of the current certificate.

13. Standard certificate format

13.1 A TCP should ensure that front side of the MBST (Construction Work) certificate should be designed with the required words, in the format as shown in **Figure 1** and according to the specifications below. The reverse side is left to the TCP to include other information as appropriate, which should be commensurate with the purpose of the certificate.

Figure 1: Required Words and Design Format of the Front Side of MBST (Construction Work) Certificate

建造業安全訓練證明書
Construction Industry Safety Training Certificate
工廠及工業經營條例第 6BA(2)條
Section 6BA(2) of the Factories and Industrial Undertakings Ordinance

持證人姓名 Holder's Name
(中文) :
(English) :

編號 Reference No. :

完成課程日期 Date of Course Completion :
(日日/月月/年年年年) (dd/mm/yyyy)

有效期限 Validity Period : 由 From 至 To 止
(日日/月月/年年年年) (dd/mm/yyyy)

本證明書由 [某發證機構] 簽發
Issued by [provider of recognised training course]

此證明書須由持證人擁有及保存。
This certificate is owned and should be kept by the certificate holder.

(not to scale)

- 13.1.1 The certificate should be made of durable materials, either laminated or plastic, and in standard size of 85 mm x 55 mm;
- 13.1.2 A photograph (minimum size of not less than 20 mm x 25 mm) of the trainee should be incorporated into the certificate for easy identification;
- 13.1.3 For laminated card, the corner of the trainee's photo should be stamped with the TCP's company's chop;
- 13.1.4 For plastic card, the trainee's photo should be printed on the card;
- 13.1.5 Unless otherwise specified, information on the certificate should be printed in both Chinese and English;

13.1.6 The certificate should contain the following information:

- The name of certificate, i.e. “建造業安全訓練證明書” and “Construction Industry Safety Training Certificate”;
- The empowering legislation, i.e. “工廠及工業經營條例第6BA(2)條” and “Section 6BA(2) of the Factories and Industrial Undertakings Ordinance”;
- The Chinese and English name as printed on the Hong Kong Identity Card (or equivalent identity documents) of the certificate holder;
- Reference number of the certificate (an “R” should be appended to the last digit of the reference number to denote that the certificate is issued for a revalidation course);
- Date of Course Completion (in the format of DD/MM/YYYY);
- Validity period with starting date and expiry date (in the format of DD/MM/YYYY);
- Name of the certificate issuing course provider; and
- The wordings of “此證明書須由持證人擁有及保存。” and “This certificate is owned and should be kept by the certificate holder.”

14. Training records

- 14.1 A TCP should submit the record of every certificate issued according to the required details stipulated in Table 1 as well as the name of the course.

Table 1 : Example of Training Records

HKID/ Passport No. (TRT1)	Name of trainee (TRT2)	Class Ref. (TRC1)	Name of Trainer (TRC2)	Date of Course completion (TRC3)	Certificate Effective Date (TRT3)	Certificate Expiry Date (TRT4)	Certificate Serial No. (TRT5)
A123456(1)	Chan Siu On	ABC1	HAU To-si	13/06/2011	13/06/2011	12/06/2014	W396000201R
A123457(2)	Chan Siu Chuen	ABC1	HAU To-si	13/06/2011	23/09/2011	22/09/2014	W396000202R
A123458(3)	Chan Siu Feng	ABC2	HAU To-si	18/06/2011	18/06/2011	17/06/2014	W396000203
A123459(4)	Chan Siu Lin	ABC2	HAU To-si	18/06/2011	18/06/2011	17/06/2014	W396000204

Annex 1

Qualifications of Trainer for MBST (Construction Work) Courses

Qualifications			
1.	A Registered Safety Officer under the Factories and Industrial Undertakings (Safety Officers and Safety Supervisors) Regulations; or		
2.	A person possessing at least any one of the following qualifications and experience from (i) to (iv); or		
	Academic Qualifications	Experience	
i.	A recognised degree or post-graduate diploma in occupational safety and health, or equivalent.	A cumulative total of <u>not less than one year</u> of experience directly involving occupational safety and health related work.	or
ii.	A degree in Science or Engineering, or equivalent, and a recognised certificate, diploma or higher diploma in occupational safety and health.	A cumulative total of <u>not less than one year</u> of experience directly involving occupational safety and health related work.	or
iii.	A recognised certificate, diploma or higher diploma in occupational safety and health.	A cumulative total of <u>not less than two years</u> of experience directly involving occupational safety and health related work, <u>one year</u> of such experience must be obtained after the academic qualification on the left column.	or
iv.	A recognised certificate in construction safety.	A cumulative total of <u>not less than two years</u> of experience directly involving occupational safety and health related work, <u>one year</u> of such experience must be obtained after the academic qualification on the left column.	
3.	A person recognised by the CL as being competent to teach training course of MBST (Construction Work).		

Lesson Plan for Mandatory Basic Safety Training Course (Construction Work)

Section	Topic	Duration
1.	Course Description	15 minutes
	Overview of Relevant Occupational Safety and Health Legislation Applicable to Construction Sites:	
2.	<ul style="list-style-type: none">• Occupational Safety and Health Ordinance• Factories and Industrial Undertakings Ordinance and its subsidiary regulations• Codes of Practice	1 hour
3.	General Concept of Work Safety	30 minutes
	Recess	15 minutes
4.	Potential Hazards in Various Operations and Activities on Construction Sites and their Preventions	1 hour
5.	Emergency Preparedness	15 minutes
6.	Accidents and Dangerous Occurrences Reporting System and Procedures	15 minutes
	Break between half-day sessions or lunch	
7.	Analysis of the Possible Causes of, and Means of Preventing, Accidents and Diseases that are Common on Construction Sites	1 hour
8.	Fire Prevention Measures and Use of Fire Extinguisher	15 minutes
9.	Personal Protective Equipment	15 minutes
	Recess	15 minutes
10.	Practice on the Safe Use of Safety Harness with Lifeline and Fall-arresting Device	1 hour
11.	Conclusion	15 minutes
12.	Examination	30 minutes
	Total no. of hours	7 hours

Annex 3

Lesson Plan for Mandatory Basic Safety Training Revalidation Course (Construction Work)

Section	Course Content	Duration
1.	Course Description	10 minutes
2.	General Concept of Construction Site Safety and Safe Working Practice	20 minutes
3.	Case Study and Analysis of Common Serious Accidents	1 hour
	Recess	15 minutes
4.	Accidents and Dangerous Occurrences Reporting System and Procedures	15 minutes
	Emergency Preparedness Personal Protective Equipment	
5.	Practice on the Safe Use of Safety Harness with Lifeline and Fall-arresting Device	30 minutes
6.	Fire Prevention Measures and Use of Fire Extinguisher	15 minutes
7.	Conclusion	15 minutes
8.	Examination	30 minutes
	Total no. of hours	3.5 hours

**Course Contents for Mandatory Basic Safety Training Course
(Construction Work)**

**Course Contents for
Mandatory Basic Safety Training Course
(Construction Work)**

Section 6BA(2) of Factories and Industrial Undertakings Ordinance



**Occupational Safety and Health Branch
Labour Department**

**This Course Contents prepared by
The Occupational Safety and Health Branch
Labour Department**

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1. Introduction

Under Section 6BA(2) of Factories and Industrial Undertakings Ordinance (“the Ordinance”), from 1 May 2001 onwards, a person shall receive safety training course recognised by the Commissioner for Labour (the Commissioner) and hold a valid certificate (generally known as Green Card) before he can be employed to carry out construction work. And proprietors shall only employ persons who are issued with a valid certificate to carry out construction work. The person shall carry the certificate with him while at work in the industrial undertaking and produce it upon demand by the proprietor or an occupational safety officer of the Labour Department.

The purpose of this Course Contents, prepared by the Occupational Safety and Health Branch of the Labour Department, is to provide teaching guidelines to the course providers who apply for conducting Mandatory Basic Safety Training Course (Construction work) or Mandatory Basic Safety Training Revalidation Course (Construction work). It is hoped that the course providers will have an idea of the contents that should be covered. Flexibility is allowed for individual TCPs to supplement their course contents according to their specific circumstances and needs of their trainees. They should also update their course materials from time to time so as to cope with the latest legislative, socio-economic or technological developments. Nevertheless, they are not required to submit their revised course materials to the CL for prior approval.

The objective of the mandatory basic safety training course is to enhance workers’ safety awareness and prevent work accidents. Upon successfully completing the Course and passing the test, the trainee should be issued with a certificate in a format to be specified by the Commissioner. At the end of either course, the trainees should be able to:

- Describe the basic legal requirements prescribed under relevant safety legislation applicable to construction sites;
- Understand the basic principles of work safety;
- Comprehend the potential hazards of common work processes on construction sites and their preventive measures;
- Analyse the possible causes of, and means of preventing, accidents and diseases that are common on construction sites;
- Understand the basic principles of fire prevention;
- List the essential elements of emergency preparedness;

- Understand the importance of, and procedures for, reporting accidents and dangerous occurrences on construction sites;
- Grasp the types, purposes, correct selection procedures and the proper use of personal protective equipment commonly required on construction sites; and
- Demonstrate the necessary safety attitude to safeguard themselves and other workers.

The Mandatory Basic Safety Training Course (Construction Work) is a 7-hour course. The certificate shall be valid for 3 years.

The Mandatory Basic Safety Training Revalidation Course (Construction Work) is a 3.5-hour course. The certificate shall be valid for 3 years.

2. Overview of Relevant Occupational Safety and Health Legislation applicable to Construction Work

The main sets of safety and health legislation in Hong Kong SAR are :

- Occupational Safety and Health Ordinance (Hong Kong Law Chapter 509)
- Factories and Industrial Undertakings Ordinance (Hong Kong Law Chapter 59)

2.1 Occupational Safety and Health Ordinance

The Occupational Safety and Health Ordinance provides for the safety and health protection to employees in workplaces, both industrial and non-industrial. It is basically an enabling ordinance setting out requirements in general terms.

The Coverage

This ordinance covers almost all workplaces - places where employees work. In addition to factories, construction sites and catering establishments, other places, such as offices, laboratories, shopping arcades, educational institutions also come under the ambit of the law. However, there are a few exceptions, namely:

- an aircraft or vessel in a public place;
- the place occupied by the driver of a land transport vehicle when it is in a public place (but other employees working in the vehicle are covered);
- domestic premises at which only domestic servants are employed; and
- places where only self-employed persons work.

The Roles of the Duty holders

Under this ordinance, everyone has a role to play in creating a safe and healthy workplace.

(1) Employers should contribute to safety and health in their workplaces by:

- providing and maintaining plant and work systems that do not endanger safety or health;
- making arrangement for ensuring safety and health in connection with the use, handling, storage or transport of plant or substances;
- providing all necessary information, instruction, training, and supervision for ensuring safety and health;
- providing and maintaining safe access to and egress from the workplaces; and
- providing and maintaining a safe and healthy work environment.

(2) Occupiers of premises should take responsibility for ensuring that

- the premises;
- the means of access to and egress from the premises; and
- any plant or substance kept at the premises are safe and without risks to health to any person working on the premises, even if they do not directly employ that person on the premises.

(3) Employees should also contribute to safety and health in the workplaces by:

- taking care for the safety of himself and other persons;
- taking care for the safety and health of persons at the workplace; and
- using any equipment or following any system or work practices provided by their employers.

Enforcement of the Ordinance

The Commissioner for Labour is empowered to issue improvement notices and suspension notices against activity of workplace which may create an imminent hazard to the employees. Failure to comply with the notices constitutes an offence punishable by a fine of HK\$200,000 and HK\$500,000 respectively and imprisonment of up to 12 months.

2.2 Occupational Safety and Health Regulation

The Occupational Safety and Health Regulation, made under the above ordinance, sets down some basic requirements for accident prevention, fire precaution, workplace environment control, hygiene at workplaces, first aid, as well as what employers and employees are expected to do in manual handling operations. The main provisions of the Regulation are:

To prevent accidents by:

- ensuring that the plant is properly designed, constructed and maintained and that all dangerous parts are effectively guarded; and
- ensuring that all dangerous areas are securely fenced.

To prevent fire by:

- providing illuminated 'EXIT' signs over all exits and clear directions to them;
- keeping all means of escape in a safe condition and free from obstruction;
- making sure that all exit doors can easily be opened from inside the workplace or are unlocked; and
- providing suitable and adequate fire safety measures.

To provide a safe and healthy work environment by:

- keeping the workplace clean and ensuring that it is adequately lit and ventilated; and
- providing adequate drainage.

To ensure hygiene by:

- providing adequate lavatory and washing facilities, as well as adequate supply of drinking water.

To provide first aid by:

- keeping adequate first aid facilities on the premises and appointing designated employees to look after them.

To ensure safe manual handling operations by:

- assessing and reviewing risks to the safety and health of employees who undertake manual handling operations; and
- providing proper training and other necessary protective measures for employees who undertake manual handling operations.

2.3 Factories and Industrial Undertakings Ordinance

The Factories and Industrial Undertakings Ordinance provides for the safety and health protection to workers in the industrial sector.

The Coverage

This ordinance applies to industrial undertakings, i.e. factories, construction sites, catering establishments, cargo and container handling undertakings, repair workshops and other industrial workplaces.

General Duties

This ordinance imposes general duties on proprietors and persons employed at industrial undertakings to ensure safety and health at work.

(1) Every proprietor should take care of the safety and health at work of all persons employed by him at an industrial undertaking by:

- providing and maintaining plant and work systems that do not endanger safety or health;
 - In those special cases where a permit to work system is needed, there should be a properly documented procedure. Everybody understands which jobs need a formal permit to work. Permits to Work should:
 - (a) Define the work to be done
 - (b) Say how to make the work area safe
 - (c) Identify any remaining hazards and the precautions to be taken
 - (d) Describe checks to be carried out before normal work can be resumed
 - (e) Name the person responsible for controlling the job
 - Jobs likely to need a permit to work system include:

- (a) Working in confined spaces
 - (b) Hot work on plant containing flammable dusts, liquids, gases or residues of these
 - (c) Cutting into pipework containing hazardous substances
 - (d) Work on electrical equipment
- making arrangement for ensuring safety and health in connection with the use, handling, storage or transport of plant or substances;
 - providing all necessary information, instruction, training, and supervision for ensuring safety and health;
 - providing and maintaining safe access to and egress from the workplaces; and
 - providing and maintaining a safe and healthy work environment.

(2) Every person employed at an industrial undertaking should also contribute to safety and health at work by:

- taking care for the safety and health of himself and other persons at the workplace; and
- using any equipment or following any system or work practices provided by the proprietor.

Subsidiary Legislation

Under the Factories and Industrial Undertakings Ordinance, there are 30 sets of subsidiary regulations covering various aspects of hazardous work activities in factories, building and engineering construction sites, catering establishments, cargo and container handling undertakings and other industrial workplaces. The subsidiary regulations prescribe detailed safety and health standards on work situations, plant and machinery, processes and substances.

2.4 Factories and Industrial Undertakings Regulations

To specify workers employed to work underground shall be medically examined at regular intervals and the procedures for reporting accident and dangerous occurrence. To define the requirements of sanitary conveniences and accident prevention of notifiable workplace.

2.4.1 Factories and Industrial Undertakings (Confined Spaces) Regulation

The proprietor shall appoint a competent person to carry out assessment of the working conditions in the confined space. Safety measures have to be taken before the work begins and when the work is being undertaken. Only certified worker is allowed to work in confined space.

2.4.2 Factories and Industrial Undertakings (Notification of Occupational Diseases) Regulations

To specify the notification procedures of cases of silicosis and other occupational diseases.

2.4.3 Factories and Industrial Undertakings (Woodworking Machinery) Regulations

To lay down standards of safety measures for woodworking machinery and impose duties on proprietors to protect persons operating the machinery. At the same time, the Regulations also place a legal obligation on persons employed to use the guards and safety devices provided.

2.4.4 Construction Sites (Safety) Regulations

These regulations control the construction, maintenance, use and operation of hoists, scaffolds, and working platforms. There are also provisions for the use of personal protective equipment for protection against falling of person, falling objects and drowning in a construction site. There are miscellaneous safety requirements such as prevention of inhalation of dust and fumes, protection of eyes, and the provision of first aid facilities.

Under this regulation, on every site at which not less than 5 workmen are employed, a suitable first aid box or cupboard shall be provided and

maintained thereof. At least one person trained in first aid should be employed on site, where 30 to 99 workmen are employed on a site. The booklet “Hints on First Aid” issued by the Labour Department and the substances required statutorily as listed on the booklet shall be placed in a first aid box.

Adequate ventilation shall be provided to prevent workmen from inhaling dust or fumes arising from grinding, cleaning, spraying, mixing or working of any material which causes dust or fumes to be given off of a character and extent likely to be injurious to the health of workmen employed in work.

Suitable and adequate lighting necessary to secure workmen’s safety shall be provided.

2.4.5 Factories and Industrial Undertakings (Lifting Appliances & Lifting Gear) Regulations

The regulations define the meaning of lifting appliance, lifting gear and crane. It is mandatory for the owner to ensure that the lifting appliance and lifting gear shall be examined and inspected by competent examiner and competent person periodically. A certificate shall be obtained from the competent examiner in the approved form in which he has made a statement to the effect that the lifting appliance is in safe working order.

2.4.6 Factories and Industrial Undertakings (Abrasive Wheels) Regulations

Every abrasive wheel shall be mounted by a person who has been appointed in writing by the proprietor for that purpose.

2.4.7 Factories and Industrial Undertakings (Work in Compressed Air) Regulations

To regulate the medical examination of persons employed in compressed air, the safety of compressed air operation, compression procedure and decompression procedure.

2.4.8 Factories and Industrial Undertakings (Spraying of Flammable Liquids) Regulations

Source of ignition is not permitted within 6 metres from any spraying area.

Electrical appliance likely to be exposed to flammable atmosphere shall be of such construction, design, installation and maintenance so as to prevent the ignition of the flammable atmosphere.

2.4.9 Factories and Industrial Undertakings (Cartridge-Operated Fixing Tools) Regulations

Suitable protective equipment shall be provided and maintained in good condition for use by every operator.

2.4.10 Factories and Industrial Undertakings (Protection of Eyes) Regulations

The proprietor has the duty to provide approved eye protector for every worker engaged in any of the specified processes listed in the Schedule of the regulations.

2.4.11 Factories and Industrial Undertakings (Noise at Work) Regulation

The regulation stipulates the first, the second, and peak action levels and their corresponding safety actions to be taken by the proprietor. Apart from the use of approved ear protector, the proprietor has the duty to reduce, as far as reasonably practicable, the exposure of the employees.

2.4.12 Factories and Industrial Undertakings (Electricity) Regulations

It is the duty of the proprietor under these regulations to provide and maintain protective equipment to protect against electrical hazard.

2.4.13 Factories and Industrial Undertakings (Asbestos) Regulation

Under this regulation, the proprietor shall ensure that an adequate assessment to determine the nature and degree of exposure of asbestos has been made. He shall then set out the steps that may be taken to prevent the exposure or to reduce it to the lowest level reasonably practicable. He shall provide every workman who is liable to be exposed to asbestos with approved breathing respiratory protective equipment and suitable protection clothing.

2.4.14 Factories and Industrial Undertakings (Blasting by Abrasives) Special Regulations

The proprietor shall provide personal protective equipment to every person working on the process.

2.4.15 Factories and Industrial Undertakings (Safety Officers and Safety Supervisors) Regulations

The proprietor of a construction site, shipyard, or container handling undertaking shall employ a full time safety officer where the total number of persons employed is 100 or more. He shall on the other hand employ a safety supervisor if the employment size is 20 or more. The duties of the safety officer and supervisor are listed out in these regulations.

2.4.16 Factories and Industrial Undertakings (Dangerous Substances) Regulations

To standardize risk symbols and labelling system of dangerous substances and impose duties on proprietors and workers to take all reasonable safety measures in specified industrial undertakings where listed substances are used.

2.4.17 Factories and Industrial Undertakings (Suspended Working Platforms) Regulation

The owner shall provide each person using the suspended working platform with a safety belt and independent lifeline or an anchorage with fittings to prevent serious injury in case of fall of person using it. Besides, the suspended working platform shall be inspected and examined by a competent person and a competent examiner respectively and periodically. Every person working on a suspended working platform shall hold a certificate after having undergone a recognized training provided by the manufacturer of the suspended working platform.

2.4.18 Factories and Industrial Undertakings (Loadshifting Machinery) Regulation

Loadshifting machines used in the industrial undertakings are operated by a person who has attained the age of 18 years, attended a relevant training

course and holds a valid certificate. Fork-lift trucks used in industrial undertakings; bulldozers, loaders, excavators, trucks or lorries, compactors, dumpers, graders, locomotives, and scrapers used on construction site are within the ambit of the Regulation. However, the Regulation does not apply to the operator of a truck or lorry who holds a valid driving licence under the Road Traffic Ordinance (Cap. 374).

2.4.19 Factories and Industrial Undertakings (Gas Welding and Flame Cutting) Regulation

The proprietor has to provide recognised training for every gas welding and flame cutting worker.

2.4.20 Factories and Industrial Undertakings (Safety Management) Regulation

The proprietor and contractor covered by the Regulation shall implement a safety management system which consists of 14 elements. The proprietor and contractor are required to carry out safety audit or safety review as the case may be of their safety management system. A good safety management system should have a proper coordination, communication and supervision.

There should be effective liaison among all parties concerned. Only competent personnel for coordination and supervision should be selected to ensure effective communication at each stage of work.

Adequate documents including safety measures, should be made available to all management personnel and parties concerned in good times. On the basis of the documents, each person responsible for managing or controlling the work can then assess the risk involved and ensure the competence of his workforce.

The proprietor should ensure that all his management personnel including managers, engineers and foremen possess the necessary information about the works before the works start. Such information may include:-

- The workplace conditions
- The proprietor's requirements, including the programme of the activities

- The specification for materials, workmanship and plant
- Method statements for safe operation of all construction work
- The list of contact persons for coordination in various trades

Sufficient number of supervisory staff should be arranged to be present at the workplace to exercise effective control over the activities. These staff should be suitably trained and experienced in the activities. Provision of adequate supervision is to ensure the following:-

- The construction work is carried out as laid down in the action plan on safety and in the method statement
- The workmen follow the proprietor's safety rules and instructions

2.5 Code of Practice

The Code of Practice (hereinafter referred as the Code) is approved and issued by the Commissioner for Labour under Section 7A of the Factories and Industrial Undertakings Ordinance, Chapter 59 of the Laws of Hong Kong (hereinafter referred as the FIUO). It provides a practical guidance to proprietors of industrial undertakings and the employees for compliance with the requirements under the provisions of the Sections 6A and 6B of FIUO concerning the general duties of proprietor and employee. It is important to note that compliance with the Code does not of itself confer immunity from legal obligations.

The Code has a special legal status. Although failure to observe any guidance contained in the Code is not in itself an offence, that failure may be taken by a court in criminal proceedings as a relevant factor in determining whether or not a person has breached any of the provisions of the regulations to which the guidance relates.

- (1) Code of Practice : Safety and Health at Work for Gas Welding and Flame Cutting
- (2) Code of Practice : Safety and Health at Work for Manual Electric Arc Welding
- (3) Code of Practice : Safety and Health at Work for Industrial Diving

- (4) Code of Practice : Safety and Health at Work with Asbestos
- (5) Code of Practice for Bamboo Scaffolding Safety
- (6) Code of Practice for Safe Use and Operation of Suspended Working Platforms
- (7) Code of Practice for Safety and Health at Work (Land-based Construction over water -- Prevention of Fall)
- (8) Code of Practice for Safety and Health at Work in Confined Spaces
- (9) Code of Practice for Safety at Work (Lift and Escalator)
- (10) Code of Practice on Mechanical Handling Safety in Container Yards
- (11) Code of Practice for Metal Scaffolding Safety
- (12) Code of Practice for Safe Use of Tower Cranes
- (13) Code of Practice for Safe Use of Mobile Cranes
- (14) Code of Practice on Safety Management
- (15) Code of Practice on Safe Use of Excavators

Other relevant regulations

1	Boilers and Pressure Vessels Ordinance	Chapter 56
2	Fire Services Ordinance	Chapter 95
3	Dangerous Goods Ordinance	Chapter 295
4	Radiation Ordinance	Chapter 303
5	Shipping and Port Control Ordinance	Chapter 313
6	Lifts and Escalators (Safety) Ordinance	Chapter 327
7	Road Traffic Ordinance	Chapter 374
8	Electricity Ordinance	Chapter 406
9	Builders' Lifts and Tower Working Platforms (Safety) Ordinance	Chapter 470

3. General Concept of Work Safety

Most accidents can be prevented by taking simple measures or adopting proper working procedures. If we work carefully and take appropriate safety measures, there will definitely be fewer work injury cases, and our sites will become a safe and secure place to work in. The Occupational Safety and Health Ordinance, which came into operation on 23 May 1997, covers most workplaces in order to protect the safety and health of employees at work. Other legislation applicable to construction sites includes the Factories and Industrial Undertakings Ordinance and its subsidiary legislation, particularly the Construction Sites (Safety) Regulations. Employees should cooperate with their employers and other persons in complying with the safety legislation and guidelines, and should not do anything to endanger themselves and other persons.

3.1 Definition of Accident

An accident is a single, or a series of, unplanned event which may be causing death, injury, occupational disease, or lead to equipment or property damage, or damage to the working environment.

3.2 Consequences of Accidents

Workplace accidents not only cause sufferings to the victims and their families, they also incur costs arising from work stoppages, insurance claims, medical and rehabilitation expenses, etc.

3.3 Causes of Accidents

- Inadequate control by management
- Improper working procedures
- Unsafe environment
- Unsafe act

3.3.1 Unsafe Acts

- Operating a machine without permission or sufficient training
- Without proper personal protective equipment
- Using unsafe equipment or machines
- Improper method in handling materials
- Horseplay in workplace
- Workers drinking alcohol during the lunch time

3.3.2 Unsafe Working Environment

- Venue, lighting or ventilation system not properly arranged
- Lack of isolation and protective equipment
- Defective tools or tools not suitable for the work
- Obstructed access or egress
- Floor edges and working platform without fencing
- Materials placed on passageway
- While a passenger hoist and a tower working platform are operated, the gates are opened. Besides, no marking shows its safe working load and the maximum number of persons to be carried. And the machine is operated by non-competent operator.
- Lifebuoy not equipped for workplace close to the shore

3.3.3 Prevention of Accidents

- Employer should provide a safe working environment and personal protective equipment
- Employees should use personal protective equipment as instructed by their employers. If both employers and employees cooperated well, most accidents can be prevented
- Employer should provide safety training to their employees. By safety training, employees' safety awareness and vigilance could be enhanced

which in turn reduce accident

- Maintaining good housekeeping at a workplace can reduce the occurrence of accidents, provide a safe and effective working environment, and reduce the economic loss caused by civil claims against accidents
- The purpose of permit to work system is to ensure a workplace is safe for work

4. Potential Hazards in Various Operations and Activities on Construction Sites and their Preventions

4.1 Working at Height

Reference

- Construction Sites (Safety) Regulations
- Code of Practice for Bamboo Scaffolding Safety
- Code of Practice for Metal Scaffolding Safety

Potential Hazards

- Worker falling from toppled working platform
- Worker falling from working platform, scaffold or working place at height

Preventive Measures

- The contractor responsible for any construction site shall take adequate steps to prevent any person on the site from falling from a height of 2 metres or more.
- Work at height is the most significant cause of fatal accidents on construction sites. To prevent worker from falling from height, the contractor should provide suitable working platform and suitable and adequate safe access to and egress from every place of work on the site, as well as proper fencing to dangerous place.
- Only when provision of a safe working platform or safe access and egress is impracticable, safety nets and safety belts should be used and the safety belt should be anchored to a secure anchorage point or an independent lifeline.
- The main purpose of the guardrails at a working platform is to prevent fall of workers. The main purpose of the toe-boards is to prevent fall of substances and tools.

4.1.1 Fencing

- Floor edges and openings shall be installed with secure fencing.
- If you discover any dangerous places that have not been installed with fencing or the fencing has been damaged, immediately reinstall or repair the fencing or fence off the dangerous places and inform your supervisor.

4.1.2 Scaffold

- All scaffolds shall be erected by trained workmen under the immediate supervision of a competent person. Scaffolds and Working platforms shall be properly designed, for example, installation of suitable safe means of access and egress, handrails and guardrails, all joints screwed with bolts easily, and adequate supports to strengthen the stability of the tubular scaffolds.
- The scaffold shall be inspected with a report (Form 5) made by a competent person to certify the scaffold is safe before use for the first time, within 14 days immediately preceding each use and after exposure to adverse weather conditions.
- Strictly follow the instructions of a competent person. Do not alter the scaffold unless authorized to do so. Do not work on an unfinished scaffold.
- When it is necessary to work on a mobile scaffold, lock the wheels of the scaffold before you start working.
- Do not work on a scaffold unless it has been provided with a suitable working platform.
- The width of a working platform should not be less than 400 millimetres.
- The top guard-rail should be fixed at a height between 900 millimetres and 1150 millimetres from the working platform.
- The intermediate guard-rail should be fixed at a height between 450 millimetres and 600 millimetres from the working platform.
- The height of toe-boards should not be less than 200 millimetres.

4.1.3 Truss-out bamboo scaffold

- Every truss-out bamboo scaffold should be properly designed by a professional engineer of structural engineering discipline and relevant working procedures drawn up.
- Construction material of the building wall should be examined prior to the erection work. Selected anchor bolts should be used. Metal brackets (T-shaped metal brackets (should comply with “Guidelines on the Design and Construction of Bamboo Scaffolds” issued by the Building Department)) for supporting the scaffold should be securely fixed to the building wall with three or more anchor bolts. Anchor bolts should be installed in accordance with the installation procedures specified by the manufacturer. The depth and the size of the drill hole should also be appropriate to fit the diameter of the bolt.
- Erection of the truss-out bamboo scaffold should be carried out by trained workmen with adequate training and experience and under the supervision of a competent person who was appointed by the contractor for this purpose.
- Suitable fall arresting equipment, namely safety harness, fall arrester and independent lifeline should be provided and worn by workers who are at risk of falling from a height. An effective monitoring system should be implemented to ensure that the workers make full and proper use of the safety equipment.
- Sufficient information, instruction, training and supervision as may be necessary to ensure safety at work should be provided to the workers.
- If it is difficult to anchor the fall arresting equipment to a fixed anchorage point due to physical constraints, the transportable temporary anchor devices can provide an alternative.

Note: Labour Department and the Occupational Safety and Health Council (OSHC) jointly launched an “SME Sponsorship Scheme for Fall Arresting Equipment for Renovation & Maintenance Work” in October 2005. A subsidy is offered to contractors for purchasing transportable temporary anchor devices, full body harness with relevant safety devices and T-shaped metal brackets to improve work safety at height.

Interested contractors can obtain the application form from the OSHC office or download it from their website (www.oshc.org.hk). Contractors receiving the subsidy should arrange for workers to attend the free safety courses offered by the Council.

4.1.4 Ladder

- Use a ladder which is of good construction, sound material and adequate strength.
- Examine the ladder before using it and inspect it at regular intervals.
- Place the ladder on a level and firm footing.
- Place the ladder at an appropriate angle. For straight ladder, the ladder should be placed on a 1:4 ratio of setback distance to height.
- Ensure that the ladder has a sufficient length. The upper end of the ladder should be at least 1 metre above the landing against which the ladder leans.
- Ladder's upper or lower end shall be securely fixed or secured by another worker.
- When climbing up or down a ladder, the user should avoid carrying heavy objects. The user must face the ladder and maintain a three-point contact with the ladder.
- If there are electrical installations nearby, do not use metal ladders.
- If work is carried out 2 metres or more above the floor, use a suitable working platform.
- An appropriate portable ladder should be adopted by a worker for access to a workplace at height. The minimum height that the top of a ladder should be extended above the landing place to act as handrails is 1 metre. The gradient of resting a slanting ladder should be 75°. When a ladder is used for access and egress, inspect the ladder for any defects before use and ensure the ladder is stable and resting on an even and solid ground. Never join short ladders to form a long one for use. If a portable ladder is insufficient in length for use, replace it with an extension ladder or ladder of sufficient length.

4.2 Use of Machinery

Reference

- Construction Sites (Safety) Regulations
- Factories and Industrial Undertakings (Guarding and Operation of Machinery) Regulations

Potential Hazards

- If dangerous part of a machinery is not properly guarded, worker could be hurt by the dangerous part due to entanglement, shearing, crushing, trapping or cutting

Preventive Measures

- Do not use machineries (such as saw, grinder and drill, etc) unless their dangerous parts have been effectively guarded.
- Worker should not wear cotton gloves while operating or working on machines with revolving parts where there is a possibility that the glove being caught by rapidly moving parts.
- For machinery repairing, worker should not dismantle the protective guard while testing a machine for ease of adjustment.
- For repairing the revolving parts of machinery, avoid contact of revolving parts with the personal belongings to prevent from being caught by the machinery. Do not conduct cleaning work on a machine which is in motion and adopt measures to prevent personnel not responsible for the repairing work from coming near.

4.2.1 Woodworking machinery(mainly in circular saw)

Reference

- Factories and Industrial Undertakings (Woodworking Machinery) Regulations
- Construction Sites (Safety) Regulations

Potential Hazards

- The high speed woodworking machines (such as circular saw, spindle moulders) create nip points which can lacerate body parts
- The blade catches the timber and violently throws it back to the front of the saw, towards the operator

Preventive Measures

- The top of a circular saw shall be covered by a strong and easily adjustable guard.
- There shall be a riving knife behind and in direct line with a circular saw.
- The part of a circular saw below the bench table shall be protected by 2 plates of metal or other suitable materials.
- A suitable push-stick shall be kept available for use at the bench.

4.3 Safe Use of electricity and Maintenance of electrical installation

Reference

- Factories and Industrial Undertakings (Electricity) Regulations

Potential Hazards

- Occupational accidents, such as electric shocks, burns, fires and explosions
- Small currents passing directly through the heart during electrocution can cause fatal arrhythmias

Preventive Measures

- The following situations would lead to electricity accidents: the insulation of the electrical tool being used is damaged, electric arc welding work is conducted at a humid environment, and the electrical tool is modified by the worker rendering the live parts exposed. The

following items are capable of preventing accidents of electric shock: loads should not be placed on electric wires, regularly inspect and maintain electrical tools, and adopt "permit to work" system.

- All hand-held portable tools should be double-insulated. The design of double-insulated electrical tools is targeted at current leakage.
- While a worker is using a portable electrical tool, he should follow the operation rules set by the manufacturer, check the tool before use, and use appropriate plug for connecting the power so as to ensure the tool is in proper function.
- Double-insulated tool is identified by being distinctively marked. This marking consists of the double insulation symbol (a square within a square).
- Non-double insulated hand tool should be grounded to prevent electric shock accident.
- Any electric power tools and extension leads should be checked periodically by a qualified electrician.
- Before using an electric tool, check the tool and its plug and connecting cable.
- Do not use a damaged tool.
- Always comply with the safety measures for electrical works and never insert electric wires into a socket directly.
- Workers should not use electrical appliances if their clothes or hands are wet.
- Place the electric cable and hose of a tool at an appropriate position to avoid tripping hazards.
- Do not use an electric tool unless its connecting cable is well protected.
- Do not use an electric tool unless its metal casing is earthed and its power supply is provided with an earth leakage circuit breaker.
- Do not repair or alter any electrical installation unless competent to do so.

- If you meet any fault or problem, report it to your supervisor immediately.
- The wiring and connections for any electrical appliance using outdoors must be waterproof.
- Avoid using electrical equipment in congested and wet workplace. Use suitable personal protective equipment such as insulating gloves and mat if necessary.
- Electrical work should only be carried out by a registered electrical worker of appropriate grade. Before and during electrical installation work, the electricity source should be cut and isolated. As far as practicable, work with live parts should be avoided.
- Risk assessment should be conducted by a competent person before commencement of work to identify any risk of electrical hazard. Appropriate safety precautions should be devised to eliminate or control the electrical hazards involved.
- Before and during electrical installation work, effective arrangements should be in place to ensure that the electricity source is safely isolated, e.g. by locking out off the power supply source with warning notices displayed so as to avoid carrying out live work.
- Under special circumstances when live work is necessary, the work should be conducted by a registered electrician with relevant knowledge. Adequate precautions, e.g. the use of an insulation screen, should be taken to prevent any person from touching live parts unintentionally. Suitable personal protective equipment, such as insulating gloves and mat, should be provided and used. A permit-to-work system be implemented. Supervision on the electrical work and the safety measures should be reinforced.
- Adequate information, training, instruction and supervision should be provided for workers engaged in electrical works.

4.4 Material hoist

Reference

- Construction Sites (Safety) Regulations

Potential Hazards

- A worker slip and fall into the hoistway
- A worker is trapped by the moving part of the hoist
- Materials drop through a hole in the hoistway enclosure and hit a worker

Preventive Measures

- Do not ride on a material hoist.
- Do not operate a material hoist without prior proper training.
- The safe working load should be marked on the platform or cage of a material hoist.
- Do not exceed the safe working load of a material hoist.
- Do not use a material hoist unless it has been examined and certified safe by a competent examiner.
- Do not use a material hoist unless its gates have been installed with an effective interlocking safety system. The hoist is only to be operated after all the gates have been closed.
- Do not use a material hoist unless it has been repaired and maintained by a competent person. No unauthorized repair is allowed.
- Do not put loose materials into receptacles unless properly secured.
- Ensure good communication with the operator of a material hoist. All signals should be understood and followed.

4.5 Lifting operation using lifting appliances and gear

Reference

- Factories and Industrial Undertakings (Lifting Appliances and Lifting Gear) Regulations
- Code of Practice for Safe Use of Tower Cranes
- Code of Practice for Safe Use of Mobile Cranes

Lifting appliances commonly used on construction site

- Tower crane
- Crawler-mounted crane
- Truck-mounted crane
- Wheel-mounted telescopic crane

Lifting gear commonly used on construction site

- chain sling
- rope sling
- ring
- hook
- plate clamp
- shackle
- swivel
- eyebolt

Potential Hazards

- Overturning of the crane
- Overloading of the crane leading to breaking and collapse of the lifting boom

- Objects falling down during lifting operation and hit workers below
- Lifting boom collided with obstacles
- Lifting boom touched overhead power lines

Preventive Measures

- Lifting appliances and lifting gear must be regularly tested and examined by competent examiners. (Regarding colour coding of lifting gear, please refer to the relevant guidance of Works Branch of Development Bureau).
- All cranes shall be maintained regularly by competent person so as to ensure they are always kept in good operating conditions.
- Follow the safe working instructions of the manufacturer of a lifting appliance.
- Automatic safe load indicator shall be installed at a crane.
- 6-month period - The owner of any chain, rope, or lifting gear used for raising or lowering or as a means of suspension shall ensure that each chain, rope or lifting gear in use has been thoroughly examined by a competent examiner with the issuance of approved form in the preceding 6 months before it is used.
- 12-month period - Lifting appliances shall be thoroughly examined by a competent examiner with the issuance of approved form at least once in the preceding 12 months.
- Crane operators shall attain 18 years old, have undergone relevant training and hold valid certificates.
- Before using lifting gear such as hook, shackle or chain sling, check whether there is any wear and tear.
- Lifting gear used in lifting operation shall be marked with safe working load.
- Check the weight of the load to be lifted.
- Do not exceed the safe working load of a lifting appliance or lifting gear;
- Mobile cranes should only be operated on uniform, level and firm ground

with sufficient load bearing capacity to withstand the maximum in-service loadings of the crane;

- In order to avoid the sinkage or collapse of the supporting surface and overturning or collapse of the crane, the loading should be distributed over a sufficiently large area. Steel plates of adequate strength, suitable mats or suitable timber blocking should therefore be used;
- If outriggers are provided, the beams should be fully extended as far as practicable. The jacks should be suitably extended so that all the crane tyres are clear of the ground;
- Adopt the correct lifting method. The centre of gravity of goods should be checked to ensure the goods are lifted steadily and securely.
- Do not use a lifting appliance or lifting gear unless it has been inspected weekly and certified safe by a competent person.
- Do not use a lifting appliance unless it has been regularly repaired and maintained by a competent person. No unauthorized repair is allowed.
- Follow the safe working instructions of the manufacturer of a lifting appliance.
- Employ a signaller to assist the lifting when the operator of the lifting appliance does not have a unrestricted view.
- Do not work beneath any suspended load and do not work within the lifting operation area.
- Use appropriate equipment, such as "goal posts" to restrict the height of the jib when there is a need for using a telescoping jib crane underneath a overhead cable.
- The minimum depth of a cage or receptacle used for carrying persons is 900mm.

4.6 Working with chemicals

Reference

- Factories and Industrial Undertakings (Dangerous Substances)

Regulations

Chemicals generally classified in seven category, they are corrosive, explosive, toxic, harmful, irritant, oxidizing and flammable.

Potential Hazards

- Causing fire, explosion
- Releasing harmful/toxic gases or airborne particles
- Splashing of hot, corrosive or toxic liquid
- Resulting in injuries, ulcer, intoxication and even death
- For dangerous substances, the major routes of entry into the human body are ingestion, skin absorption and inhalation

Preventive Measures

- The essential information of a chemical label should include symbol, chemical name, particular risks and safety precautions.
- Studying the label content outside a container is the proper way for identifying the name, classification, risks and precautions of the chemical in the container.
- Always keep the work area well-ventilated.
- Wear proper personal protective equipment. Aprons, safety shoes, rubber gloves and face shields should be used for handling chemicals.
- Don't touch chemicals with bare hands. Wear protective glove.
- Prohibit smoking and eating at workplaces where chemicals are being used or stored.
- Fully understand and follows the safe working procedures.
- Keep away from any ignition source when handling flammable substances.
- Flammable substances should be stored at a metal cabinet. Rags, after used for cleaning a flammable liquid, should be placed in a metal

container with a lid.

4.7 Use of loadshifting machines

Reference

- Factories and Industrial Undertakings (Loadshifting Machinery) Regulation
- Code of Practice on Safe Use of Excavators

A loadshifting machine shall only be operated by a person who has attended a relevant training course and holds a valid certificate.

Potential Hazards

- A worker is struck by a moving loadshifting machine
- Overturning of the loadshifting machine
- Touching of underground cable or overhead power lines

Preventive Measures

- Unless you are a worker concerned, do not work in an area where a loader, an excavator, etc. is in operation.
- When an excavator is working, reasonable measures should be taken to prevent persons from having access to that place, such as by fencing off the place.
- Do not operate any loadshifting machinery without training and approval.
- Operators of forklift trucks, bulldozers, loaders, excavators, trucks or lorries should possess appropriate certificates.
- The proprietor/contractor should ensure that the operator has attained the age of 18 years who holds a valid certificate.
- In order to achieve safe operation of the excavator, each worker engaged in work associated with an excavator should understand and follow instructions and information given by his supervisor on system of work,

work procedures and safety precautions.

4.8 Use of abrasive wheel

Reference

- Factories and Industrial Undertakings (Abrasive Wheels) Regulations
- Factories and Industrial Undertakings (Protection of Eyes) Regulations

Potential Hazards

- Bursting of wheels as the result of:
 - defective wheel
 - overspeeding
 - faulty mounting
 - misuse
- Contact with the wheel
- Injury to the eyes from flying particles

Preventive Measures

- A notice, in English and Chinese, stating the maximum permissible speed in revolutions per minute specified by the manufacturer for every abrasive wheel shall be kept permanently fixed in the grinding room or place where grinding is carried out.
- Every abrasive wheel shall not be operated at a speed in excess of the maximum permissible speed in revolutions per minute specified by the manufacturer for that wheel.
- Select the appropriate abrasive wheel.
- Every abrasive wheel shall be properly mounted.
- Every abrasive wheel shall be mounted by a competent person appointed by the proprietor in writing.
- A guard shall be provided and kept in position at every abrasive wheel in motion.

- Persons carrying out dry grinding operations and truing or dressing an abrasive wheel should wear a dust/mist mask or respirator and eye protectors.

4.9 Excavation works

Reference

- Construction Sites (Safety) Regulations
- Code of Practice on Safe Use of Excavators

Potential Hazards

- Probably the most common hazard when working in excavations and trenches is the threat of cave-in

Preventive Measures

- Detection of underground utilities should be done prior to the commencement of excavation. Make sure enough protection has been given for any exposed utilities when work starts.
- An excavation shall be examined by a Competent Person at least once in every seven days and statutory Form 4 should be filed in as a record of inspection.
- No load or plant shall be placed or moved near the edge of the excavation, shaft, pit or opening in the ground if it is likely to cause the side of those places to collapse.
- Keep the fence on all sides of an excavation intact.
- Use safe access for ingress and egress.
- Make sure that a trench is securely shored before working in it.
- Suitable support should be applied at the edge of the excavation to avoid the damage caused by the collapse of the pit.
- During excavation, if the floor is cracked and the support is broken or loosened, stop the work immediately, leave the pit and report to the

superiors.

- An excavator shall only be operated by a person who has attained the age of 18 years, is trained and holds a valid certificate applicable to excavator.

4.10 Working in confined spaces

Reference

- Factories and Industrial Undertakings (Confined Spaces) Regulation
- Code of Practice for Safety and Health at Work in Confined Spaces

A “confined space” is defined to mean any place in which, by virtue of its enclosed nature, there arises a reasonably foreseeable specified risk, and without limiting the generality of the foregoing, includes any chamber, tank, vat, pit, well, sewer, tunnel, pipe, flue, boiler, pressure receiver, hatch, caisson, shaft or silo in which such risk arises. However, a lightwell is not a confined space.

Potential Hazards

- The major hazards in a confined space include the presence of the following:
 - a flammable, explosive or oxygen enriched atmosphere
 - a harmful or toxic atmosphere
 - an oxygen deficient atmosphere
 - free flowing solids or liquids
 - excessive heat
- The threats against the safety and health of workers include:
 - serious injury arising from a fire or explosion
 - loss of consciousness arising from an increase in body temperature caused by, for example, heat stress in the work environment
 - loss of consciousness or asphyxiation arising from gas, fume, vapour or the lack of oxygen
 - drowning arising from an increase in the level of liquid
 - asphyxiation arising from a free flowing solid or the inability to reach a respirable environment due to entrapment by a free flowing solid

Preventive Measures

- To appoint a competent person to carry out risk assessment for work in the confined space before a worker enters a confined space.
- To carry out an air monitoring to determine if a hazardous atmosphere exists by a competent person using a suitable gas detector which is correctly calibrated before a worker enters a confined space.
- The purpose of testing the gases in the procedures of confined spaces operations is to determine whether the amounts of gas components in a confined space exceed the dangerous levels or not.
- To ensure that no workers other than certified workers enter or work in the confined space.
- Workers working in a confined space should be equipped with appropriate personal protective equipment. With adequate safety precautions being taken, a self-contained respirator should be worn when a worker entering a confined space to rescue an unconscious worker.
- A person shall be stationed outside a confined space to communication with the workers inside when work is being carried out in the confined space.
- To ensure that the risk assessment report and the related certificate issued are displayed in a conspicuous place at the entrance of the confined space.
- Avoid accumulating the exhaust gases inside the confined space, and ensure the fresh air ducts extend to all locations of the workplace.

4.11 Gas welding and flame cutting safety

Reference

- Factories and Industrial Undertakings (Gas Welding and Flame Cutting) Regulation
- Factories and Industrial Undertakings (Protection of Eyes) Regulations
- Code of Practice : Safety and Health at Work for Gas Welding and Flame

Cutting

Normally, the colour of oxygen cylinder and acetylene cylinder are black and maroon respectively

Potential Hazards

- Fires and explosions resulted from the release of flammable fuel gases or oxygen into the atmosphere
- Fires and explosions resulted from flashback at the blowpipe or overheating of gas cylinder
- Explosions from over-pressurisation of the gas supply system
- Due to the radiation and toxic fumes or gases emitted during the process, the resultant health problems include: (i) eye discomfort and burns from the intense light and heat emitted from the operation, and (ii) corneal ulcer and conjunctivitis from foreign particles e.g. slag and cutting sparks
- Illness due to inhalation of fumes or gases formed during the process, such as metal fume fever, bronchial and pulmonary irritation

Preventive Measures

- Do not use the equipment for gas welding or flame cutting unless you have attained the age of 18 years and hold a valid certificate.
- Wear personal protective equipment.
- Do not use any gas cylinder unless it has been fitted with flashback arrestors.
- Keep gas cylinders in an upright position at a ventilated area.
- Place fire extinguishers within reach.
- Keep gas cylinders in an upright position and secure it properly to avoid overturning. Keep them far away from a place where hot processes are being undertaken.
- If gas leakage is detected, report it to your supervisor immediately.

- If there are other people, a screen should be used for segregating the sparks to avoid injuring others.
- Flammable substances should not be stored in workplaces for welding work.

4.12 Electric arc welding safety

Reference

- Construction Sites (Safety) Regulations
- Factories and Industrial Undertakings (Protection of Eyes) Regulations
- Code of Practice : Safety and Health at Work for Manual Electric Arc Welding

Potential Hazards

- The common welding-related hazards include electric shock, radiation, heat and toxic fumes
- Long-term inhalation of metal dust may lead to nonfibrotic pneumoconiosis
- The ultraviolet rays generated in electric arc welding would cause hazards to the eyes of a worker

Preventive Measures

- Avoid conducting welding on wet floor or at open area during rainy day.
- Suitable personal protective equipment, such as eye and face protectors, insulated welding gloves and safety shoes or boots, should be provided to and used by the welding worker.
- Keep the welding area well ventilated, and suitably and sufficiently lit. Make sure suitable fire extinguishers are available.

4.13 Use of suspended working platform

Reference

- Factories and Industrial Undertakings (Suspended Working Platforms) Regulation
- Code of Practice for Safe Use and Operation of Suspended Working Platforms

Potential Hazards

- Workers falling from height
- Falling object hit workers below

Preventive Measures

- A competent person is responsible for on-site inspection, supervision on the installation and use of the suspended working platform.
- Every person working on a suspended working platform shall be at least 18 years old, and has undergone training and obtained a certificate in respect of such training.
- Every person carried on a suspended working platform shall wear a safety belt that is attached to the independent lifeline.
- The safe working load and the maximum number of persons carried shall not be exceeded when the suspended working platform is used.
- A wire rope shall be replaced immediately if there is any damage.
- A suspended working platform shall clearly and legibly mark on the platform the safe working load, the maximum number of persons that may be carried at any one time, every person riding on a suspended working platform shall wear a safety belt properly attached to an independent lifeline.
- Every suspended working platform should be inspected in the immediately preceding 7 days before its use by a competent person. A statement to the effect that it is in safe working order should be entered

into an approved form by the competent person.

4.14 Use of cartridge-operated fixing tool

Reference

- Factories and Industrial Undertakings (Cartridge-Operated Fixing Tools) Regulations
- Factories and Industrial Undertakings (Protection of Eyes) Regulations
- Factories and Industrial Undertakings (Noise at Work) Regulation

Potential Hazards

- Through penetration of the material
- Eye injury from fragmentation of brittle materials during firing
- Noise from explosive source of the tool
- Explosion/fire caused by cartridge ignition particularly in flammable atmospheres
- Electric shock

Preventive Measures

- Do not operate a cartridge-operated fixing tool unless you have possessed a valid certificate.
- Wear suitable eye and ear protectors while operating a cartridge-operated fixing tool.
- Use a cartridge-operated fixing tool with great care.

4.15 Working under noisy environment

Reference

- Factories and Industrial Undertakings (Noise at Work) Regulation

Potential Hazards

- Deafness that results from prolonged exposure to high-intensity sound
- Intermittent work in the noise environment will cause irritability, can distract concentration, can cause hearing damage and increase the risk of accidents

Preventive Measures

- If people have to work in ear protection zone, they will need suitable ear protectors (ear muffs or ear plugs) to reduce the hazard.
- Where there are high levels of impact noise, such as piling work, earmuffs and ear plugs may be used together to provide better noise reduction.

4.16 Manual Handling

Reference

- Occupational Safety and Health Regulation

A manual handling operation means that a load is moved or supported by a person's hands or arms, or by some other forms of bodily effort. It includes lifting, lowering, pushing, pulling and carrying the load.

Potential Hazards

- The waist is most likely to be injured if a worker lifts goods improperly. Incorrect manual handling operations involving awkward posture, incorrect application of bodily force, prolonged or frequently repetitive motions, jerky motion or unexpected movements and pressure, etc. can lead to injuries such as
 - strain and sprain, back pain, hernia and damage to the back
 - damage to the joints, ligaments, muscles and intervertebral discs, etc

Preventive Measures

- Avoid manual handling operations as far as possible to minimize the risk

of injury.

- Estimate the weight of the load.
- Conduct manual handling operations with proper method.
- Lift an object with a correct posture. Holding the object close to the body, lifting with the legs by slowly straightening them and keeping the back straight.
- Sudden increase of the movement speed should not be done to avoid sustaining injury during manual lifting. Don't transport a load by twisting the upper body only.
- Transporting goods with assistance of mechanical tools.
- Seek assistance from someone in lifting a load if necessary.
- Doing some warm-up exercises before conducting manual handling operation can render the muscle and cardiopulmonary system more adaptable to the change so as to reduce injury.
- Wear suitable protective equipment. Put on gloves as far as possible to protect your hands from any cut, scratch or puncture, and wear safety boots or shoes to prevent injury to toes by heavy falling objects.

4.17 Asbestosis

Reference

- Factories and Industrial Undertakings (Asbestos) Regulation
- Factories and Industrial Undertakings (Notification of Occupational Diseases) Regulations
- Code of Practice : Safety and Health at Work with Asbestos

Potential Hazards

- A worker while performing renovation/demolition work may inhale the fibers of asbestos
- Asbestosis is caused by the asbestos fibers penetrating into the lungs,

causing scar tissue by making tiny cuts in the alveoli (air sacs), thus decreasing the amount of oxygen that the lungs can process

- Long-term inhalation of asbestos fibers may lead to lung cancer

Preventive Measures

- Consult or employ a registered asbestos consultant to conduct assessment and remove all the asbestos by registered contractors.
- Prevent the exposure of any workman to asbestos.
- Where it is not reasonably practicable to prevent exposure, reduce the exposure of any workman to asbestos to the lowest level reasonably practicable by measures other than the use of respiratory protective equipment.
- Provide every workman who is or is liable to be exposed to asbestos with approved respiratory protective equipment that is suitable for the circumstances.
- Ensure the full and proper use by each workman of the respiratory protective equipment.

4.18 Working with silica based materials (pneumoconiosis)

Reference

- Factories and Industrial Undertakings (Notification of Occupational Diseases) Regulations

Potential Hazards

- Silicosis is caused by inhalation of fine particles of dust containing crystalline silica. The dust penetrates deep in the lungs where it attacks the tissues and causes progressive deterioration of pulmonary function. The onset of the disease is usually after some years of exposure to silica dust. Silicosis is most likely caused by hand-dug caissons.

Preventive Measures

- Every effort should be made to reduce the formation of dust at source by attention to processes and work method. If all practicable measures fail to confine environment dust contamination within occupational exposure limits, exposed persons should wear suitable respiratory protection.
- Respiratory protection should be selected to protect against the prevalent dust level.
- Ensure that every worker is fully and correctly use the respiratory protective equipment.

4.19 Inclement Weather

Reference

- Code of Practice in Times of Typhoons and Rainstorms

Each year, Hong Kong experiences typhoons, rainstorms and thunderstorms between mid-spring and mid-autumn, and strong monsoon winds in summer and winter. These adverse weather may create danger to people working outdoors, especially in exposed areas. Sometimes, people working in covered structures or indoors may also be affected.

Potential Hazards

- Collapse of temporary structures or plants causing injury to people nearby and damage to property
- Loss of body balance resulting in falls
- Flying or falling objects
- Electric shock or electrocution to people directly or through conductive objects
- Fire
- Electric shock or electrocution due to leakage of current from wet electrical equipment

- Slipping arising from wet floor surface
- Slipping of tools, equipment, or articles from hands
- Flooding leading to drowning and damage to plants or structures
- Landslips as a result of persistent heavy rainfall
- Collapse of roads

Preventive Measures

- Stop work at places with risks of falling objects or fall of persons.
- Remove or secure loose materials.
- Secure plants and scaffolds.
- Use suitable personal protective equipment e.g. safety helmets.
- Protect from breakage of window glasses.
- Stay away from metal pipes, cable, structure or fences.
- Remove metal objects from body.
- Use battery-operated radio for listening weather broadcasts.
- Follow safety instructions.
- Always remain alert on changes of working environment.
- Be familiar with the escape route in case of emergency.
- Use safe means of transport and route for evacuation.
- Evacuate to safe shelters to avoid exposure to strong winds.

4.20 Very Hot Weather Warning

- While a Very Hot Weather Warning is in force, employers should assess the risk of heat stroke to their employees and adopt effective preventive measures such as providing cool drinking water, setting up temporary sunshade and providing mechanical aids to reduce physical exertion of employees. Employees should drink water regularly and be mindful of their physical condition. If early heat stroke symptoms such as

headache and thirst appear, they should inform their supervisors, and seek medical help immediately.

5. Emergency Preparedness

5.1 Action to be taken in case of an emergency

- In the event of fire or emergency in the construction site, employees should know what actions to be taken. Employees should receive sufficient training in safety at workplace that know the relevant information (e.g. means of escape, assembly points, etc.) and safety procedure.

5.2 Action to be taken in times of bad weather

- Employees working outdoors in times of bad weather (e.g. typhoon, thunderstorm and rainstorm), may sustain serious or the fatal accident, the employer should formulate safety measure to prevent any accident in the workplace.
- Employees working outdoors in exposed areas in times of bad weather, should stop work and take shelter.

5.3 Qualified first aider and first aid facilities

- The quantity of the first aid facilities in the construction site depend on the number of employee.
- The contractor responsible for a construction site at which 5 or more workmen are employed shall provide and maintain so as to be readily accessible a separate first aid box or cupboard for every 50 workmen or part thereof employed on the site. The wording “FIRST AID” shall be clearly marked on the first aid box or cupboard.
- The contractor responsible for a construction site at which where not less than 30, but less than 100 workmen are employed, at least one person trained in first aid.

5.4 Evacuation procedure

- The employer should draw up emergency measures and evacuation procedure. For instance, the procedure for fire escape, Preparedness and contingency plans for landslide exist, etc.

5.5 Emergency drills

- A comprehensive first aid and emergency contingency plan can minimize the risks caused by accidents, minimize the loss caused by accidents, and render the scene and the environment under control as quick as possible.
- Emergency preparedness is vital because, when an emergency does occur, a quick and correct response is necessary to reduce injuries, illnesses, property damage, environmental harm and public concern. Management should identify the types of emergencies the organization needs to plan, organize, practice and prepared for. A drill should be regularly conducted so as to allow workers to familiarize with the procedures of contingency plan, fully understand their responsibilities in contingency plan, and identify the deficiencies during the drill so as to make improvements and amendments.

6. Accidents and Dangerous Occurrences Reporting System and Procedures

6.1 Handling of Work Injury

- For any work injury to employee, employee should inform the supervisor immediately and receive suitable treatment.
- When an accident occurs in the construction site, worker should immediately notify his/her supervisor.
- Unless the worker has received adequate first aid training, the worker should not move the victim.
- When the supervisor is informed of the accident:
 - should assist the injured worker to receive the suitable treatment;
 - should carry out the preliminary accident investigation; and
 - if the worker is seriously injured or need to be hospitalized, the supervisor should inform the safety department and call police immediately.

6.2 Reporting Workplace Accident and Dangerous Occurrence

(1) Reports of Accidents resulting in death or serious bodily injury

- For accident that causes the death of, or serious bodily injury to an employee, employer should notify it to an occupational safety officer of the Labour Department (LD) within 24 hours after the time when the accident occurred. Report it in writing to an occupational safety officer of the LD within 7 days after the date of the accident if notification of the accident is not contained in a written report that contains the particulars required below.

(2) Reports of Accidents resulting in Incapacitated

- For accident that results in the employee being incapacitated from working for at least 3 days, employer should report it in writing to an occupational safety officer of the LD within 7 days after the date of the accident.

(3) Reporting Dangerous Occurrences

- Every dangerous occurrence which occurs at a workplace, whether any personal injury has been caused or not, shall be reported to the Labour Department within 24 hours of its occurrence.

7. Analysis of the Possible Causes of, and Means of Preventing, Accidents and Diseases that are common on Construction Sites

This section must be conveyed in an interactive manner through discussion of accident cases with trainees.

Workplace accidents not only cause sufferings to the victims and their families, they also result in financial losses arising from stoppage of work, insurance claims, medical and rehabilitation expenses, etc.

In fact, most of the workplace accidents are preventable. Very often, they share common scenarios and causes. These scenarios and causes should be properly understood in order that lessons are learnt and suitable measures implemented to prevent recurrence of such accidents.

7.1 Case Study, Impact of Accident and Experience Sharing

- To analyse in an interactive manner with the trainees the two accident cases stated in session 7.2 and their common features. For experience sharing purposes, reference can also be made to the accident cases published in the accident casebook series issued by the Labour Department. Furthermore, to discuss in an interactive manner with the trainees the serious consequences of the accidents such as the sorrow of the victims' families, impact on the growth of their children and difficulties faced due to the loss of earning. The Labour Department's relevant homepage address on the accident casebook series is as follows:

http://www.labour.gov.hk/eng/public/content2_8d.htm

- In addition, for the recent trends on accidents and occupational diseases, please refer to the latest statistics and analysis on workplace accidents and occupational diseases provided in the Labour Department's homepage for adding other cases for reference, to analyse with the trainees the recent trends on accidents and occupational diseases and discuss the causes and preventive measures for the cases. Related accident and occupational disease cases can also be included as reference.

The Labour Department's relevant homepage address is as follows:

<http://www.labour.gov.hk/eng/osh/content10.htm>

- The latest occupational safety and health related “Press Releases” and “Work Safety Alert” published in the Labour Department's homepage must be explained to the trainees. Related website addresses are as follows:

Press Releases

http://www.labour.gov.hk/eng/major/content_2013.htm

Work Safety Alert

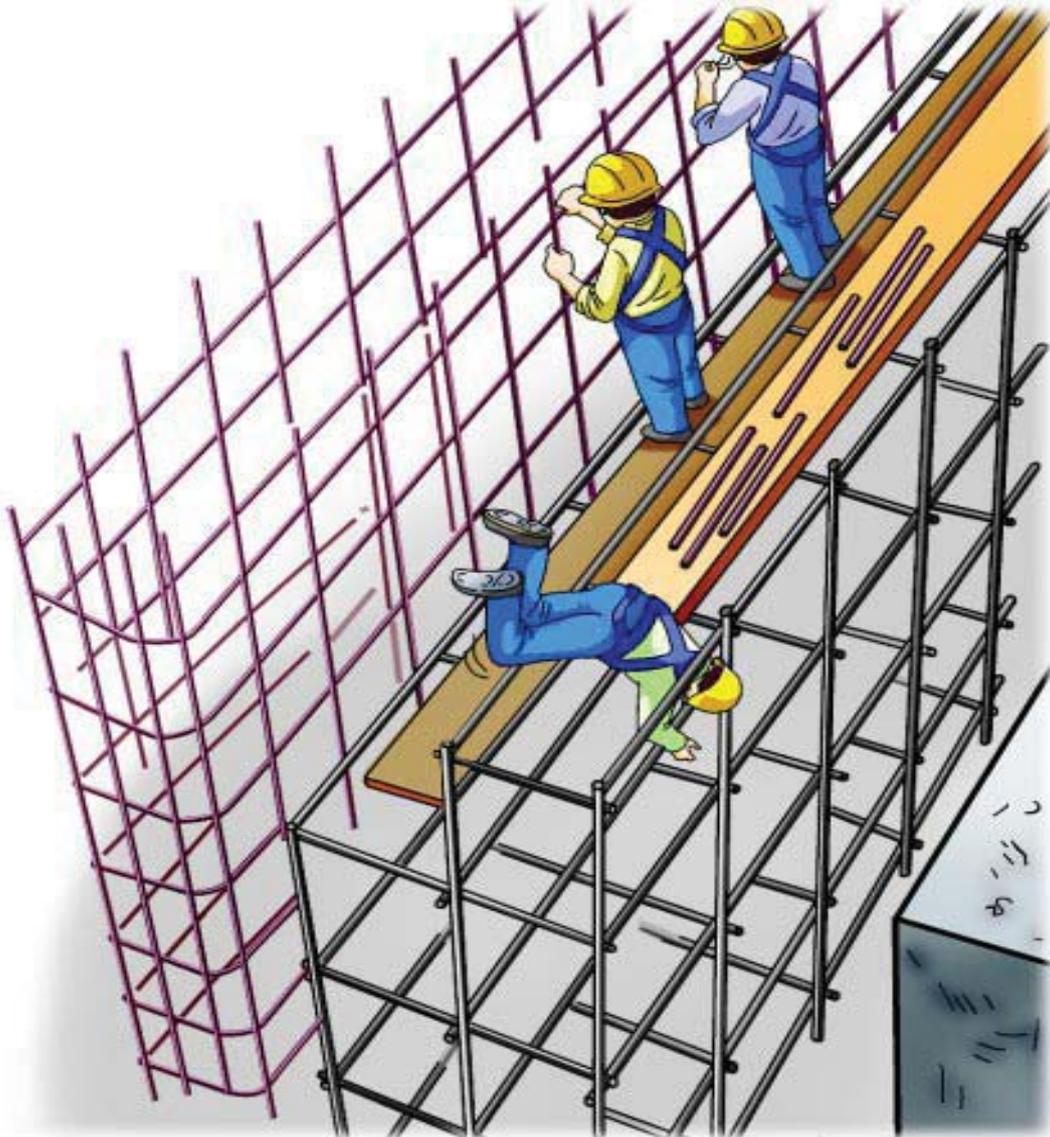
http://www.labour.gov.hk/eng/news/work_safety_alert_2013.htm

Having regard to the specific needs and circumstances which may arise, training course provider may also add in relevant accident cases for the purposes of experience sharing.

7.2 Case Analysis of Serious Construction Site Accidents

Case 1

A bar-fixing worker fell to death from a substandard working platform.



Circumstances

On Level 5 of a building under construction, a tubular scaffold was erected to facilitate the fixing of a row of reinforcement bars, 4 m high, 10.8 m long and 30 cm thick, for constructing the upper section of a wall. The scaffold consisted of 2 levels: a lower level at the front and an upper level at the back. The lower level of the scaffold had five tiers, and was 5.3 m high, 10.8 m long and 1.9 m wide and facing the wall. The back upper level of the scaffold was right behind the lower one and further away from the wall. It had six tiers and was 6 m high. A working platform was erected on the top of the lower level of the scaffold to support the deceased person and three co-workers to fix the reinforcement bars. Wooden boards and battens were laid on top of the upper level of the scaffold for storage of reinforcement bars, timber material and tools that were for use by the workers. To perform their duties, the deceased person and his co-workers had to move about on the working platform and fetch material and tools from the upper level of the scaffold. At the time of the accident, while the deceased person was taking a reinforcement bar from the upper level of the scaffold, he lost balance and fell 6 m to the ground through an opening on the working platform of the upper level. He sustained serious injuries and subsequently passed away in the hospital.

Case Analysis

- The working platform on which the deceased person and his co-workers worked was not closely boarded. There was a line of void of 20 cm to 40 cm width between the rear edge of the working platform and the adjoining higher section of the scaffold. Neither toe-board nor guard-rail was erected on the working platform.
- The upper level of the scaffold was also not fully covered. There were two large openings on the working platform right behind the position where the deceased person was working before the accident occurred. Each opening was 137 cm long and 144 cm wide. The reinforcement bars were stored close to these openings.
- The deceased person and his co-workers had all worn a safety harness. However, there was no suitable anchorage or independent lifeline on the

scaffold for them to anchor their safety harnesses. Furthermore, no safety net was erected underneath the working platform on the tubular scaffold.

- The working platform on the lower level of the scaffold was erected by the deceased person and his co-workers. After the erection, the site supervisory staff did not check the working platform to see whether it was safe to use.
- No specific instruction, information and training were given to the bar-fixing workers that they needed to erect a closely boarded working platform with suitable guard-rails and toe-boards.
- The upper level of the scaffold was only 65 cm higher than the lower level. The top ledger of the scaffold on the upper level was therefore not a suitable guard-rail for the working platform erected on the lower level of the scaffold.

Lessons to Learn

The principal contractor responsible for the site, the subcontractor responsible for the bar-fixing work and/or the employer should ensure that:

- A risk assessment is conducted and safe working procedures are formulated for the work.
- Working platforms of proper and safe construction are provided to prevent workers from falling from a height.
- The working platform is closely boarded and fitted with suitable guard-rails and toe-boards.
- Any openings on the working platform, through which a person is at risk of falling, are securely covered.
- A safe system of work for the bar-fixing work is provided. The safe

system includes the following elements –

- (a) the formulation and implementation of safe working procedures regarding the erection, inspection and use of the working platform;
- (b) the appointment of a competent person for inspection of the working platform before use;
- (c) the provision of adequate training concerning the safe working procedures to all relevant supervisors and workers and subject to regular surveillance; and
- (d) the provision of adequate information, training and instruction in respect of the system of work to the workers.

Related Legislation Requirements

- The contractors concerned shall provide and ensure the use of suitable working platform and safe means of access and egress to and from the working platform for workmen working at height.
- A scaffold shall be erected or substantially added to, altered, or dismantled by workmen who are adequately trained and possess adequate experience of such work and under the immediate supervision of a competent person.
- A scaffold shall be inspected by a competent person. A report shall be made and signed by the competent person carrying out the inspection in an approved form containing the prescribed particulars which include a statement to the effect that the scaffold is in safe working order.
- Under the general duty provisions,
 - Employers shall provide a safe system of work, necessary information, instruction, training and supervision to their employees to ensure the safety at work of their employees.
 - Employees shall take reasonable care of their own and other persons’

safety while at work. They shall also co-operate with and facilitate their employers to comply with the safety requirements.

Discussion

- The serious consequences of the hazards of working-at-height.
- The selection of safety measures for working-at-height, including the scope of application, methods and limitations for the use of working platform, safety net, safety harness and its anchorage device.
- Safety requirements for working platforms (e.g. the construction of a working platform, safe means of access and egress, guardrail, toe board, etc).
- Qualifications required for trained workmen and competent persons for erection of scaffolds and working platforms.
- Inspection requirements for scaffolds and working platforms (e.g. conditions under which a scaffold should be inspected and the interval for inspections for a scaffold).
- The difficulties encountered by the parties concerned, including the contractors, supervisors, employer and the deceased person, and their responsibilities.

Note: This case is adapted from a real accident for the mandatory basic safety training course providers to use as teaching material for case study session. Trainees are to learn valuable lessons from this case through interactive discussion. Please note that this case is not a reference for the determination of the stakeholders and their liabilities of similar accidents.

Case 2

A worker was electrocuted while working in a building under construction.



Circumstances

The construction site involved was a building site near completion stage. The deceased person was a ventilation duct installation worker employed by the sub-contractor responsible for the installation of ventilation ducts and fans. At the time of accident, such installation work was undertaking at shop units on ground floor by the deceased person and his employer.

A bamboo scaffold was erected to facilitate the installation of the ventilation duct which was 3.8 m above the ground. Ventilation duct installation work had to be carried out on this bamboo scaffold. A wooden ladder was placed leaning against a wall by the side of the scaffold for access and egress. The sub-contractor was required to install the ventilation duct and to connect a cable from a fused spur connection unit mounted at the ceiling to a ventilation fan in each shop unit. The lighting of the shop units was supplied with electricity from a source at 1/F. The fused spur connection unit was also supplied from the same source.

After the installation of the ventilation duct for the shop units, the employer connected the cable between the fused spur connection unit and the ventilation fan. He claimed that he had checked with a tester that the fused spur connection unit was not energized but he was not so familiar with the testing. In fact, he had only checked one of the terminals on the fused spur connection unit. Furthermore, he was not a Registered Electrical Worker under the Electricity Ordinance.

When the employer connected a 3-core flexible cable to the base box of a fused spur connection unit, the deceased person was doing some packing work. Then, he saw the deceased person climbing up the wooden ladder from the ground. Shortly afterwards, he heard the deceased person screamed and found him lying unconscious on the ground with blood stains by the side. The deceased person fell down from the ladder after he received an electric shock. He was certified dead in the hospital.

Case Analysis

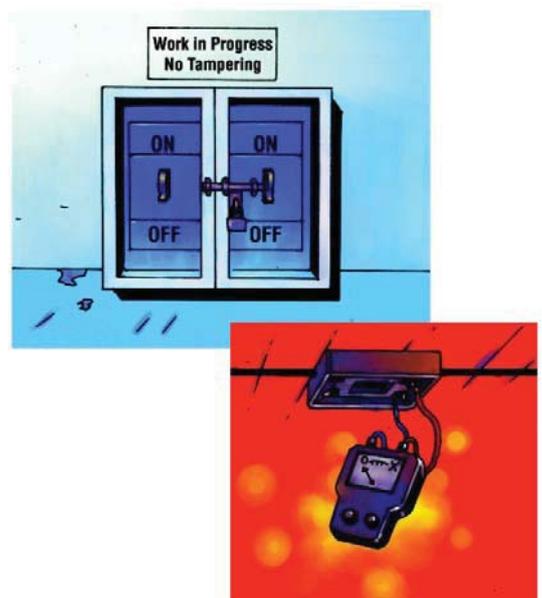
- After the accident, it was found that the fused spur connection unit was still energized, and the lights in the shop units were switched on. While the employer was connecting one end of the cable to the fused spur

connection unit, the cable was hanging on a sprinkler pipe at the ceiling, with its free end 300 mm above the bamboo scaffold, close to the wooden ladder. Simultaneously, the PVC insulation of the cable at this end has been removed exposing the copper cores.

- It was believed that when the employer connected the cable to the fused spur connection unit, the fused spur connection unit had already been energized. The connection made the cable become live. While the deceased person was climbing up the ladder, he might have touched the other end of the cable and thus he received an electric shock. Burn marks were found on the deceased person's right hand.
- The employer claimed that he had been told by the resident electrician that the electrical circuit would be de-energized in that afternoon. He had not got such confirmation before cable connection. However, the resident electrician claimed that he had told the employer to approach him before work. There might have been misunderstanding over their conversation.

Lessons to Learn

- For the prevention of electrical hazard in this situation,
 - Electrical work should be conducted by Registered Electrical Worker or under immediate supervision of authorized person.
 - Fused spur connection unit should be confirmed dead before commencing cable connection.
 - Clear communication should be maintained for work to be safely done.



Related Legislation Requirements

- The contractor and employer responsible for electrical work shall—
 - ensure that all live parts in relation to the electrical work are rendered dead by isolating the power supply source;
 - ensure that the electrical work shall be conducted by Registered Electrical Worker or under immediate supervision of authorized person;
 - ensure that adequate precautions to prevent the conductors from becoming accidentally live shall be taken before starting the electrical work, including isolating and locking up the power supply source, performing test to confirm the conductors are dead, and posting up suitable warning notices; and
 - exercise effective management control to ensure that all persons involved follow strictly the safety measures stipulated for the work.

- Under the general duty provisions,
 - Employers shall provide a safe system of work, necessary information, instruction, training and supervision to their employees, so as to ensure their safety and health at work.
 - Employees shall take reasonable care of their own and other persons' safety while at work. They shall also co-operate with and facilitate their employers to comply with the safety requirements.

Discussion

- Hazards encountered by the deceased person and the employer (for example, electrical hazards and work-at-height hazards). Particular attention should be paid to:-
 - discuss the hazards associated with improper electrical work; and
 - remind trainees not to contact with any conductor or electric cable that has not been confirmed dead.

- Qualification of electrical workers, including introduction to the registration system for electrical workers.

- The comprehensive risk assessment and the suitable safety measures required for the work, including proper procedure of connecting electrical equipment, isolating and locking up power supply source, performing test to confirm conductors are dead, posting up suitable warning notices, permit-to-work system, proper supervision, etc.
 - The importance of suitable arrangement for different work processes and proper communication between responsible persons.
 - The importance of using suitable working platforms to conduct works at height and safety requirements of working platforms.
 - General introduction to protective devices of electrical installations (such as Miniature Circuit Breaker and Residual Current Device), and personal insulating protective equipment (such as insulating gloves).
 - Safety measures for handling of electrical accidents, including the personal safety for the first person who arrives at the accident scene and the rescue personnel.
 - Difficulties encountered by the parties concerned (including the contractors, the employer and the deceased person), solutions and their responsibilities.
- **Note: This case is adapted from a real accident for the mandatory basic safety training course providers to use as teaching material for case study session. Trainees are to learn valuable lessons from this case through interactive discussion. Please note that this case is not a reference for the determination of the stakeholders and their liabilities of similar accidents.**

8. Fire Prevention Measures and Use of Fire Extinguisher

Reference

- Construction Sites (Safety) Regulations

Combustion requires three basic elements: Fuel, Air and Heat Source.

- Fuel - it is the material that can be burnt, and includes flammable materials commonly found at workplaces.
Such as solvent-based adhesives, which are used in laying rubber floor tiles, are highly flammable. In addition, fire is most likely caused by spraying of flammable liquid.
- Air – Oxygen is the most common supporter of combustion. Air generally contains 21% oxygen.
- Heat Source – Examples of common heat sources are : cigarette butts not yet extinguished, sparks generated from metal welding and cutting processes etc.

Potential Hazards

- In fires, people may get hurt by heat and flames, but the majority of people die or get injured in fires due to inhalation of hazardous smoke or toxic gases.

Preventive Measures

- Keep workplace clear and tidy all the time;
- Be careful when using machine and equipment which will generate sparks or heat.
- No smoking and naked flame at any storage area of flammable or explosive materials.
- Knowing the storage place of fire extinguishers and their operation method : generally speaking, fire could be prevented when one or several of the basic elements of combustion are removed :

- Insulating the fuel;
 - Insulating the air; or
 - Cooling down the heat source.
- What type of fire extinguisher you use should depend on what type of fire it is. If you use an inappropriate extinguisher in a fire, it may intensify the fire and/or cause serious injury. For example, burning of metallic sodium solids cannot be put out by a water type fire extinguisher. Oxygen deficiency is caused by using a carbon dioxide type fire extinguisher at a narrow and poorly ventilated area.
 - In order to ensure that the fire service installations will be functioning properly when needed, these installations should be routinely tested and maintained.
 - Smoke doors should be closed at all times.
 - Make sure that workers know the assembly points after fire evacuation.

Type of extinguisher suitable for extinguishing fire involving

Type of fire Type of extinguisher	Class 1 Paper, Textiles, Wood, Plastic	Class 2 Flammable liquids, Solvent, Oil, Grease	Class 3 Electrical Appliances, Motors, Electrical switches	Notes
Carbon Dioxide Gas 	-	✓	✓	Vapours will asphyxiate. Withdraw to open air after use.
Water 	✓	-	-	Never on fires involving electrical or flammable liquids or metals.
Dry Powder 	✓	✓	✓	Discharged dry powder may reduce visibility and cause disorientation.
Foam 	✓	✓	-	Never on electrical fires.

9. Personal Protective Equipment

Reference

- Construction Sites (Safety) Regulations
- Factories and Industrial Undertakings (Noise at Work) Regulation
- Factories and Industrial Undertakings (Protection of Eyes) Regulations
- Factories and Industrial Undertakings (Gas Welding and Flame Cutting) Regulation
- Factories and Industrial Undertakings (Confined Spaces) Regulation
- Factories and Industrial Undertakings (Dangerous Substances) Regulations

Personal protective equipment (PPE) is intended to be worn or otherwise used by a person at work and which protects the person against one or more hazards to his/her safety or health. Use of PPE is the last resort when controlling the sources of accident is impracticable. PPE should be handled with care and stored properly when not in use. Store it in a dry and clean cabinet. The equipment should be kept clean and maintained in good condition.

Employers have duties on guidance, training and supervision with respect to use of PPE. They should ensure that their employees know why and when PPE is used, its maintenance or replacement schedule and limitations.

PPE should be provided by employers. Employees must wear PPE for the entire period of exposure to hazards. Do not put your PPE away just because the work lasts for only “a few minutes”. If any defect on PPE is found, report it to the employer immediately and replace it.

Factors to consider in selecting suitable PPE:

- Can the PPE provide effective protection against the hazards and whether it is suitable for use in the work process? For example, eye protectors designed for metal or rock cutting cannot provide adequate protection for

gas welding or flame cutting workers;

- Can the PPE prevent or reduce the hazards without creating unsafe working conditions?
- Can the PPE be adjusted to fit the user's body properly?
- Has consideration been given to the health of the user?
- What is the load of PPE imposed on the user? For example, duration of use of the PPE, physical strength required for the work and requirements on communication and visibility.
- If one or more types of PPE have to be worn, are they compatible? For instance, will the use of a certain type of respirator prevent the user from wearing an eye protector correctly?

9.1 Safety Helmet

- Wear a safety helmet on a construction site.
- Safety helmets primarily intended to protect the top of the heads from being injured by falling objects.
- A suitable safety helmet should bear appropriate marking indicating the conformity to certain international/ national standards such as European Standard.
- Keep a sufficient buffer distance between the top of the head and the shell of the helmet.
- Keep the harness of the helmet clean and make sure that it fits well.
- Do not drill any holes on the helmet or use it for pounding.

9.2 Safety Shoes

- Safety shoes should have steel toe caps, steel soles, slip-proof and water-proof characteristics.

9.3 Full body harnesses work with independent lifeline and fall arrester

- The most suitable way to use safety belt is to attach its snaphook to higher level than user's waist.
- When falling from height, full body harness (commonly known as parachute type) could better reduce the downward momentum and protect user's waist from injury than the general safety belt.
- Before using a safety belt, the following should be considered: any defects on the safety belt, any suitable anchorage, independent lifeline and fall arresting device, and whether the standard is met or not.

9.4 Safety Gloves

- Protect hands from getting injured by abrasion; cuts and punctures; contact with chemicals; electric shock; skin infection.
- Types of safety gloves including rubber gloves, steel, mesh gloves, leather gloves, wrist and arm protective devices.
- Workers should not wear cotton gloves for operating a machine with revolving parts so as to avoid causing injury to hands due to entangling of cotton gloves with the revolving parts of the machine.

9.5 Ear Protection

- Ear muffs are the most efficient noise isolation ear protectors.
- Wear ear protectors in areas with high noise levels.
- Properly wear ear protectors according to the manufacturer's instructions.
- Do not reuse disposable ear plugs.
- Clean ear protectors regularly.

9.6 Eye Protection

- A wise worker will certainly take good care of his eyesight.
- A small fragment may cause serious consequences if it enters one's eyes.

- When there is a risk of eye injury, such as in concrete breaking or using abrasive wheels, you should wear suitable eye protectors.
- Take proper care of the eye protectors provided to you.
- Replace damaged or defective eye protectors immediately.
- Ensure that eye protectors are comfortable to wear, and keep clean.
- Use eye protectors for eye protection — do not put it on your head or hang it on your neck.
- Bear in mind that eye protectors are replaceable, but not your eyes.

9.7 Breathing Apparatus

- To protect worker against dust; fibres, hazardous gases and fumes and to prevent worker from oxygen deficiency.
- Type of breathing apparatus including : disposable cartridge respirators; full-face/half-face respirators; air-supplied hoods; self-contained respirators.
- When using breathing apparatus, it must be properly fitted on the wearer's face.
- Breathing apparatus should be cleaned thoroughly after each use.

9.8 Protective Clothing

- Protective clothing is being used as working clothes or uniform, it also protects workers against injuries caused by hazards such as contact with chemicals or flame, striking, stabbing, radiation, drowning, extreme cold, hot or adverse weather conditions.
- The types of protective clothing: General purpose protective clothing; disposable overalls; specialized protective clothing such as cold resistant clothing; chemical or radiation protective clothing; high visibility clothing, puncture-resistant aprons and lifejacket used for land-based work carried out adjacent to water.

- Protective clothing should be well fit and comfortable. Try it on before buying. In addition, we should also consider that the protective clothing whether affect the flexibility or movement, the clothing is durable, the clothing can be easily cleaned and what types of under garments should be used with the protective clothing.

10. List of Reference

Part A : Guides to Legislation

1. A Brief Guide to the Factories and Industrial Undertakings (Confined Spaces) Regulation
2. A Brief Guide to the Occupational Safety and Health Ordinance
3. A Brief Guide to the Occupational Safety and Health Regulation
4. A Guide to Section 6BA of Factories and Industrial Undertakings Ordinance Cap 59 - Mandatory Basic Safety Training
5. A Guide to the Factories and Industrial Undertakings (Cartridge - Operated Fixing Tools) Regulations
6. A Guide to the Factories and Industrial Undertakings (Dangerous Substances) Regulations
7. A Guide to the Factories and Industrial Undertakings (Gas Welding and Flame Cutting) Regulation
8. A Guide to the Factories and Industrial Undertakings (Loadshifting Machinery) Regulation
9. A Guide to the Factories and Industrial Undertakings (Noise at Work) Regulation
10. A Guide to the Factories and Industrial Undertakings (Protection of Eyes) Regulations
11. A Guide to the Factories and Industrial Undertakings (Safety Officers and Safety Supervisors) Regulations
12. A Guide to the Factories and Industrial Undertakings (Suspended Working Platforms) Regulation
13. A Guide to the Factories and Industrial Undertakings (Woodworking Machinery) Regulations
14. A Guide to the Factories and Industrial Undertakings Ordinance (Section 6A) - General Duties of Proprietors
15. A Guide to the Factories and Industrial Undertakings Ordinance (Section 6B) - General Duties of Persons Employed
16. A Guide to the Factories and Industrial Undertakings Ordinance (Section 6A & 6B) - Know your General Duties
17. A Guide to the Provisions for Excavations and Miscellaneous Safety under the Construction Sites (Safety) Regulations
18. A Guide to the Provisions for Safe Places of Work under Part VA of the Construction Sites (Safety) Regulations
19. A Guide to the Provisions for Safe Use of Hoists under the Construction Sites (Safety) Regulations

20. A Pictorial Guide to Factories and Industrial Undertakings (Noise at Work) Regulation
21. Handbook on Guarding and Operation of Machinery
22. Reporting Workplace Accidents and Dangerous Occurrences

Part B : Codes of Practice

23. Code of Practice : Safety and Health at Work for Gas Welding and Flame Cutting
24. Code of Practice : Safety and Health at Work for Manual Electric Arc Welding
25. Code of Practice : Safety and Health at Work for Industrial Diving
26. Code of Practice : Safety and Health at Work with Asbestos
27. Code of Practice for Bamboo Scaffolding Safety
28. Code of Practice for Safe Use and Operation of Suspended Working Platforms
29. Code of Practice for Safety and Health at Work in Confined Spaces
30. Code of Practice for Metal Scaffolding Safety
31. Code of Practice for Safe Use of Tower Cranes
32. Code of Practice for Safe Use of Mobile Cranes
33. Code of Practice on Safe Use of Excavators

Part C : Guidance Notes

34. Guidance Notes on Appointment of Competent Persons for Noise Assessment at Workplaces
35. Guidance Notes on Classification and Use of Safety Belts and their Anchorage Systems
36. Guidance Notes on Factories and Industrial Undertakings (Noise at Work) Regulation
37. Guidance Notes on Fire Safety at Workplaces
38. Guidance Notes on Inspection, Thorough Examination and Testing of Lifting Appliances and Lifting Gear
39. Guidance Notes on the Inspection, Thorough Examination and Testing of Suspended Working Platforms
40. Guidance Notes on the Selection, Use and Maintenance of Safety Helmets
41. Guidance Notes on Safe Use of Loadshifting Machines for Earth Moving Operations on Construction sites
42. Guidance Notes on Safety at Work for Maintenance of Low Voltage Electrical Switchgears

43. Guidance Notes for the Safe Isolation of Electricity Source at Work
44. Guidance Notes for Safe Use of Fork-lift Trucks
45. Guide for Safety at Work - Electric Shock Hazard of Manual Electric Arc Welding Work
46. Guide for Safety at Work - Safe Use of Electric Plugs
47. Chemical Safety in the Workplace - Guidance Notes on Risk Assessment and Fundamentals of Establishing Safety Measures
48. Chemical Safety in the Workplace - Guidance Notes on Personal Protective Equipment (PPE) for Use and Handling of Chemicals
49. Chemical Safety in the Workplace - Guidance Notes on Safe Use of Flammable Liquids
50. Guidance Notes: Safety at Work (Falsework - Prevention of Collapse)
51. Guidance Notes to Renovation Safety

Part D : Other Guidebooks

52. A Casebook of Fatal Accidents in Lift Installation, Maintenance and Repairing Work
53. A Casebook of Occupational Fatalities related to Renovation and Maintenance Works
54. A Casebook of Occupational Fatalities related to Truss-out Bamboo Scaffolding Works
55. An Analysis on Occupational Fatalities - Casebook Volume 1
56. An Analysis on Occupational Fatalities - Casebook Volume 2
57. An Analysis on Occupational Fatalities - Casebook Volume 3
58. An Analysis on Occupational Fatalities - Casebook Volume 4
59. A Guide on Employer's Safety Policy
60. A Practical Guide to Industrial Noise Reduction
61. A Safety Guide for Freight Container Inspection
62. A Safety Guide on Gate Work
63. Basic Electrical Safety Measures in the Workplace
64. Beware of Fall at Work
65. Construction Site Safety & Health Checklist
66. Five Steps to Information, Instruction and Training
67. Five Steps to Risk Assessment
68. Guide on Safety at Work in times of Inclement Weather
69. Hazards During Chemicals in Use and Safety Guidelines
70. Industrial Safety (General Duties of Persons Employed)
71. Keep Construction Sites Clean and Hygienic
72. Prevention Against Fall from Height

73. Safe Practices in Operating Fork Lift Trucks
74. Safe Systems of Work
75. Safe Use of Material Hoist - Interlocking Device on Hoistway Gate
76. Safety at Work - A Guide to Ladders and Elevated Working Platforms
77. Safety at Work - A Guide to Personal Protective Equipment
78. Safety at Work - Personal Protective Clothing
79. Safety Guide for Bamboo Scaffolding Work
80. Safety Guide for Work in Manholes
81. Safety Handbook for Construction Site Workers
82. Safety Hints for Demolition of Unauthorized Building Works
83. Safety Hints on Renovation Work
84. Safety Hints on Operation of Suspended Working Platform
85. Safety in the Use of Abrasive Wheels
86. Work for a Safer, Healthier Workplace
87. Working with Employers
88. Working Safely with Flammable Materials
89. Working Safely with Hand Tools



Occupational Safety and Health Branch
Labour Department

Annex 4A

**Course Contents for Mandatory Basic Safety Training
Revalidation Course (Construction Work)**

Course Contents for
Mandatory Basic Safety Training Revalidation Course
(Construction Work)

Section 6BA(2) of Factories and Industrial Undertakings Ordinance



Occupational Safety and Health Branch
Labour Department

**This Course Contents prepared by
The Occupational Safety and Health Branch
Labour Department**

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Information on the services offered by the Labour Department and on major labour legislation can also be found by visiting our Home Page in the Internet.

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1. Introduction

Under Section 6BA(2) of Factories and Industrial Undertakings Ordinance (“the Ordinance”), from 1 May 2001 onwards, a person shall receive safety training course recognised by the Commissioner for Labour (the Commissioner) and hold a valid certificate (generally known as Green Card) before he can be employed to carry out construction work. And proprietors shall only employ persons who are issued with a valid certificate to carry out construction work. The person shall carry the certificate with



him while at work in the industrial undertaking and produce it upon demand by the proprietor or an occupational safety officer of the Labour Department.

The purpose of this Course Contents, prepared by the Occupational Safety and Health Branch of the Labour Department, is to provide teaching guidelines to the course providers who apply for conducting Mandatory Basic Safety Training Revalidation Course (Construction Work). It is hoped that the course providers will have an idea of the contents that should be covered. Flexibility is allowed for individual TCPs to supplement their course contents according to their specific circumstances and needs of their trainees. They should also update their course materials from time to time so as to cope with the latest legislative, socio-economic or technological developments. Nevertheless, they are not required to submit their revised course materials to the CL for prior approval.

The objective of the mandatory basic safety training course is to enhance workers’ safety awareness and prevent work accidents. Upon successfully completing the Course and passing the test, the trainee should be issued with a certificate in a format to be specified by the Commissioner. At the end of either course, the trainees should be able to:

- Describe the basic legal requirements prescribed under relevant safety legislation applicable to construction sites;
- Understand the basic principles of work safety;
- Comprehend the potential hazards of common work processes on construction sites and their preventive measures;

- Analyse the possible causes of, and means of preventing, accidents and diseases that are common on construction sites;
- Understand the basic principles of fire prevention;
- List the essential elements of emergency preparedness;
- Understand the importance of, and procedures for, reporting accidents and dangerous occurrences on construction sites;
- Grasp the types, purposes, correct selection procedures and the proper use of personal protective equipment commonly required on construction sites; and
- Demonstrate the necessary safety attitude to safeguard themselves and other workers.

The Mandatory Basic Safety Training Course (Construction Work) is a 7-hour course. The certificate shall be valid for 3 years.

The Mandatory Basic Safety Training Revalidation Course (Construction Work) is a 3.5-hour course. The certificate shall be valid for 3 years.

2. General Concept of Construction Site Safety and Safe Working Practice

2.1 General Concept of Construction Site Safety

Most accidents can be prevented by taking simple measures or adopting proper working procedures. If we work carefully and take appropriate safety measures, there will definitely be fewer work injury cases, and our sites will become a safe and secure place to work in. The Occupational Safety and Health Ordinance, which came into operation on 23 May 1997, covers most workplaces in order to protect the safety and health of employees at work. Other legislation applicable to construction sites includes the Factories and Industrial Undertakings Ordinance and its subsidiary legislation, particularly the Construction Sites (Safety) Regulations. Employees should cooperate with their employers and other persons in complying with the safety legislation and guidelines, and should not do anything to endanger themselves and other persons.

2.1.1 Definition of Accident

An accident is a single, or a series of, unplanned event which may be causing death, injury, occupational disease, or lead to equipment or property damage, or damage to the working environment.

2.1.2 Consequences of Accidents

Workplace accidents not only cause sufferings to the victims and their families, they also incur costs arising from work stoppages, insurance claims, medical and rehabilitation expenses, etc.

2.1.3 Causes of Accidents

- Inadequate control by management.
- Improper working procedures.
- Unsafe environment.
- Unsafe act.

2.1.3.1 Unsafe Acts

- Operating a machine without permission or sufficient training.
- Without proper personal protective equipment.
- Using unsafe equipment or machines.
- Improper method in handling materials.
- Horseplay in workplace.
- Workers drinking alcohol during the lunch time.

2.1.3.2 Unsafe Working Environment

- Venue, lighting or ventilation system not properly arranged.
- Lack of isolation and protective equipment.
- Defective tools or tools not suitable for the work.
- Obstructed access or egress.
- Floor edges and working platform without fencing.
- Materials placed on passageway.
- While a passenger hoist and a tower working platform are operated, the gates are opened. Besides, no marking shows its safe working load and the maximum number of persons to be carried. And the machine is operated by non-competent operator.
- Lifebuoy not equipped for workplace close to the shore.

2.1.3.3 Prevention of Accidents

- Employer should provide a safe working environment and personal protective equipment.
- Employees should use personal protective equipment as instructed by their employers. If both employers and employees cooperated well, most accidents can be prevented.

- Employer should provide safety training to their employees. By safety training, employees' safety awareness and vigilance could be enhanced which in turn reduce accident.
- Maintaining good housekeeping at a workplace can reduce the occurrence of accidents, provide a safe and effective working environment, and reduce the economic loss caused by civil claims against accidents.
- The purpose of permit to work system is to ensure a workplace is safe for work.

2.2 Safe Working Practice

2.2.1 Potential Hazards in Various Operations and Activities on Construction Sites and their Preventions

2.2.1.1 Working at Height

Potential Hazards

- Worker falling from toppled working platform.
- Worker falling from working platform, scaffold or working place at height

Preventive Measures

- The contractor responsible for any construction site shall take adequate steps to prevent any person on the site from falling from a height of 2 metres or more.
- Work at height is the most significant cause of fatal accidents on construction sites. To prevent worker from falling from height, the contractor should provide suitable working platform and suitable and adequate safe access to and egress from every place of work on the site, as well as proper fencing to dangerous place.
- Only when provision of a safe working platform or safe access and egress is impracticable, safety nets and safety belts should be used and the safety belt should be anchored to a secure anchorage point or an independent lifeline.
- The main purpose of the guardrails at a working platform is to prevent

fall of workers. The main purpose of the toe-boards is to prevent fall of substances and tools.

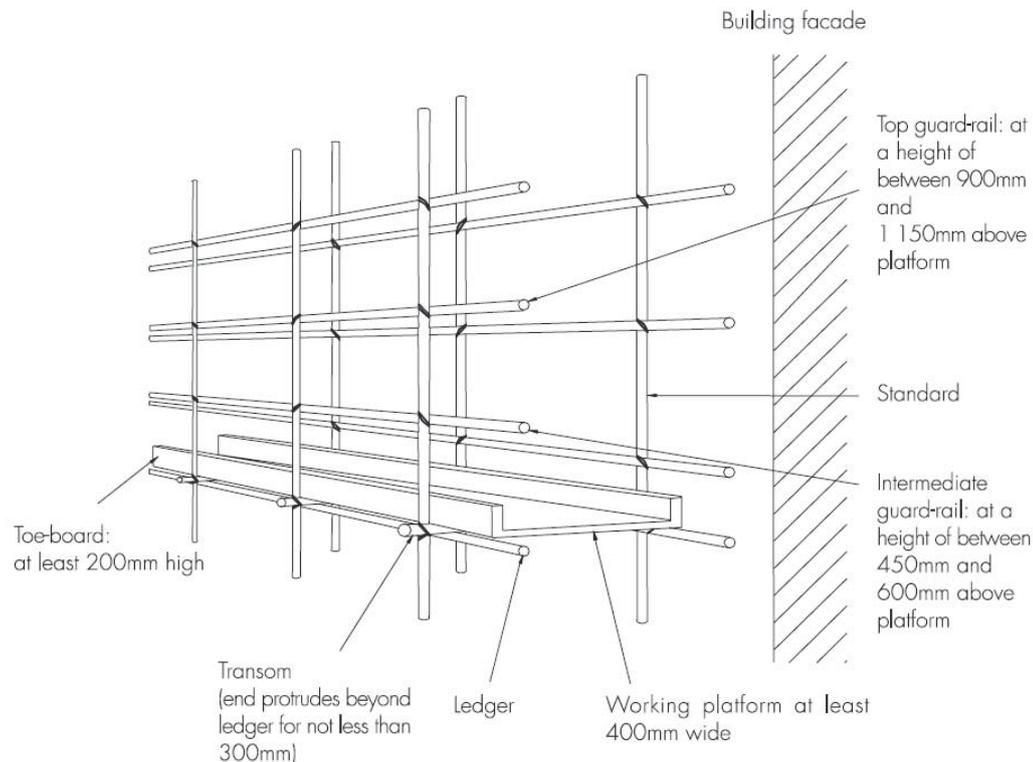
2.2.1.1.1 Fencing

- Floor edges and openings shall be installed with secure fencing.
- If you discover any dangerous places that have not been installed with fencing or the fencing has been damaged, immediately reinstall or repair the fencing or fence off the dangerous places and inform your supervisor.

2.2.1.1.2 Scaffold

- All scaffolds shall be erected by trained workmen under the immediate supervision of a competent person. Scaffolds and Working platforms shall be properly designed, for example, installation of suitable safe means of access and egress, handrails and guardrails, all joints screwed with bolts easily, and adequate supports to strengthen the stability of the tubular scaffolds.
- The scaffold shall be inspected with a report (Form 5) made by a competent person to certify the scaffold is safe before use for the first time, within 14 days immediately preceding each use and after exposure to adverse weather conditions.
- Strictly follow the instructions of a competent person. Do not alter the scaffold unless authorized to do so. Do not work on an unfinished scaffold.
- When it is necessary to work on a mobile scaffold, lock the wheels of the scaffold before you start working.
- Do not work on a scaffold unless it has been provided with a suitable working platform.
- The width of a working platform should not be less than 400 millimetres.
- The top guard-rail should be fixed at a height between 900 millimetres and 1150 millimetres from the working platform.
- The intermediate guard-rail should be fixed at a height between 450 millimetres and 600 millimetres from the working platform.

- The height of toe-boards should not be less than 200 millimetres.



2.2.1.1.3 Truss-out bamboo scaffold

- Every truss-out bamboo scaffold should be properly designed by a professional engineer of structural engineering discipline and relevant working procedures drawn up.
- Construction material of the building wall should be examined prior to the erection work. Selected anchor bolts should be used. Metal brackets (T-shaped metal brackets (should comply with “Guidelines on the Design and Construction of Bamboo Scaffolds” issued by the Building Department)) for supporting the scaffold should be securely fixed to the building wall with three or more anchor bolts. Anchor bolts should be installed in accordance with the installation procedures specified by the manufacturer. The depth and the size of the drill hole

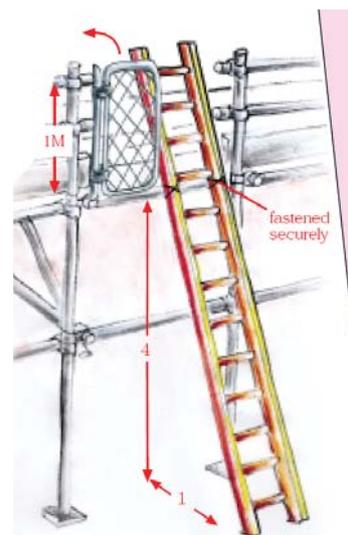
should also be appropriate to fit the diameter of the bolt.

- Erection of the truss-out bamboo scaffold should be carried out by trained workmen with adequate training and experience and under the supervision of a competent person who was appointed by the contractor for this purpose.
- Suitable fall arresting equipment, namely safety harness, fall arrester and independent lifeline should be provided and worn by workers who are at risk of falling from a height. An effective monitoring system should be implemented to ensure that the workers make full and proper use of the safety equipment.
- Sufficient information, instruction, training and supervision as may be necessary to ensure safety at work should be provided to the workers.
- If it is difficult to anchor the fall arresting equipment to a fixed anchorage point due to physical constraints, the transportable temporary anchor devices can provide an alternative.

Note: Labour Department and the Occupational Safety and Health Council (OSHC) jointly launched an “SME Sponsorship Scheme for Fall Arresting Equipment for Renovation & Maintenance Work” in October 2005. A subsidy is offered to contractors for purchasing transportable temporary anchor devices, full body harness with relevant safety devices and T-shaped metal brackets to improve work safety at height. Interested contractors can obtain the application form from the OSHC office or download it from their website (www.oshc.org.hk). Contractors receiving the subsidy should arrange for workers to attend the free safety courses offered by the Council.

2.2.1.1.4 Ladder

- Use a ladder which is of good construction, sound material and adequate strength.
- Examine the ladder before using it and inspect it at regular intervals.
- Place the ladder on a level and firm footing.



- Place the ladder at an appropriate angle. For straight ladder, the ladder should be placed on a 1:4 ratio of setback distance to height.
- Ensure that the ladder has a sufficient length. The upper end of the ladder should be at least 1 metre above the landing against which the ladder leans.
- Ladder's upper or lower end shall be securely fixed or secured by another worker.
- When climbing up or down a ladder, the user should avoid carrying heavy objects. The user must face the ladder and maintain a three-point contact with the ladder.
- If there are electrical installations nearby, do not use metal ladders.
- If work is carried out 2 metres or more above the floor, use a suitable working platform.
- An appropriate portable ladder should be adopted by a worker for access to a workplace at height. The minimum height that the top of a ladder should be extended above the landing place to act as handrails is 1 metre. The gradient of resting a slanting ladder should be 75°. When a ladder is used for access and egress, inspect the ladder for any defects before use and ensure the ladder is stable and resting on an even and solid ground. Never join short ladders to form a long one for use. If a portable ladder is insufficient in length for use, replace it with an extension ladder or ladder of sufficient length.

2.2.1.2 Use of Machinery

Potential Hazards

- If dangerous part of a machinery is not properly guarded, worker could be hurt by the dangerous part due to entanglement, shearing, crushing, trapping or cutting.

Preventive Measures

- Do not use machineries (such as saw, grinder and drill, etc) unless their dangerous parts have been effectively guarded.

- Worker should not wear cotton gloves while operating or working on machines with revolving parts where there is a possibility that the glove being caught by rapidly moving parts.
- For machinery repairing, worker should not dismantle the protective guard while testing a machine for ease of adjustment.
- For repairing the revolving parts of machinery, avoid contact of revolving parts with the personal belongings to prevent from being caught by the machinery. Do not conduct cleaning work on a machine which is in motion and adopt measures to prevent personnel not responsible for the repairing work from coming near.

2.2.1.2.1 Woodworking machinery(mainly in circular saw)

Potential Hazards

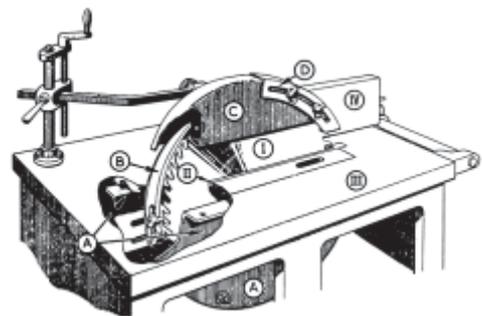
- The high speed woodworking machines (such as circular saw, spindle moulders) create nip points which can lacerate body parts.
- The blade catches the timber and violently throws it back to the front of the saw, towards the operator.



Preventive Measures

The top of a circular saw shall be covered by a strong and easily adjustable guard.

- There shall be a riving knife behind and in direct line with a circular saw.
- The part of a circular saw below the bench table shall be protected by 2 plates of metal or other suitable materials.
- A suitable push-stick shall be kept available for use at the bench.



2.2.1.3 Safe Use of electricity and Maintenance of electrical installation

Potential Hazards

- Occupational accidents, such as electric shocks, burns, fires and explosions.
- Small currents passing directly through the heart during electrocution can cause fatal arrhythmias.

Preventive Measures

- The following situations would lead to electricity accidents: the insulation of the electrical tool being used is damaged, electric arc welding work is conducted at a humid environment, and the electrical tool is modified by the worker rendering the live parts exposed. The following items are capable of preventing accidents of electric shock: loads should not be placed on electric wires, regularly inspect and maintain electrical tools, and adopt "permit to work" system.
- All hand-held portable tools should be double-insulated. The design of double-insulated electrical tools is targeted at current leakage.
- While a worker is using a portable electrical tool, he should follow the operation rules set by the manufacturer, check the tool before use, and use appropriate plug for connecting the power so as to ensure the tool is in proper function.
- Double-insulated tool is identified by being distinctively marked. This marking consists of the double insulation symbol (a square within a square).
- Non-double insulated hand tool should be grounded to prevent electric shock accident.



- Any electric power tools and extension leads should be checked periodically by a qualified electrician.
- Before using an electric tool, check the tool and its plug and connecting cable.
- Do not use a damaged tool.
- Always comply with the safety measures for electrical works and never insert electric wires into a socket directly.
- Workers should not use electrical appliances if their clothes or hands are wet.
- Place the electric cable and hose of a tool at an appropriate position to avoid tripping hazards.
- Do not use an electric tool unless its connecting cable is well protected.
- Do not use an electric tool unless its metal casing is earthed and its power supply is provided with an earth leakage circuit breaker.
- Do not repair or alter any electrical installation unless competent to do so.
- If you meet any fault or problem, report it to your supervisor immediately.
- The wiring and connections for any electrical appliance using outdoors must be waterproof.
- Avoid using electrical equipment in congested and wet workplace. Use suitable personal protective equipment such as insulating gloves and mat if necessary.
- Electrical work should only be carried out by a registered electrical worker of appropriate grade. Before and during electrical installation work, the electricity source should be cut and isolated. As far as practicable, work with live parts should be avoided.
- Risk assessment should be conducted by a competent person before commencement of work to identify any risk of electrical hazard. Appropriate safety precautions should be devised to eliminate or control

the electrical hazards involved.

- Before and during electrical installation work, effective arrangements should be in place to ensure that the electricity source is safely isolated, e.g. by locking out off the power supply source with warning notices displayed so as to avoid carrying out live work.
- Under special circumstances when live work is necessary, the work should be conducted by a registered electrician with relevant knowledge. Adequate precautions, e.g. the use of an insulation screen, should be taken to prevent any person from touching live parts unintentionally. Suitable personal protective equipment, such as insulating gloves and mat, should be provided and used. A permit-to-work system be implemented. Supervision on the electrical work and the safety measures should be reinforced.
- Adequate information, training, instruction and supervision should be provided for workers engaged in electrical works.

2.2.1.4 Material hoist

Potential Hazards

- A worker slip and fall into the hoistway.
- A worker is trapped by the moving part of the hoist.
- Materials drop through a hole in the hoistway enclosure and hit a worker.

Preventive Measures

- Do not ride on a material hoist.
- Do not operate a material hoist without prior proper training.
- The safe working load should be marked on the platform or cage of a material hoist.
- Do not exceed the safe working load of a material hoist.
- Do not use a material hoist unless it has been examined and certified safe by a competent examiner.
- Do not use a material hoist unless its gates have been installed with an

effective interlocking safety system. The hoist is only to be operated after all the gates have been closed.

- Do not use a material hoist unless it has been repaired and maintained by a competent person. No unauthorized repair is allowed.
- Do not put loose materials into receptacles unless properly secured.
- Ensure good communication with the operator of a material hoist. All signals should be understood and followed.

2.2.1.5 Lifting operation using lifting appliances and gear

Lifting appliances commonly used on construction site

- Tower crane
- Crawler-mounted crane
- Truck-mounted crane
- Wheel-mounted telescopic crane

Lifting gear commonly used on construction site

- chain sling
- rope sling
- ring
- hook
- plate clamp
- shackle
- swivel
- eyebolt



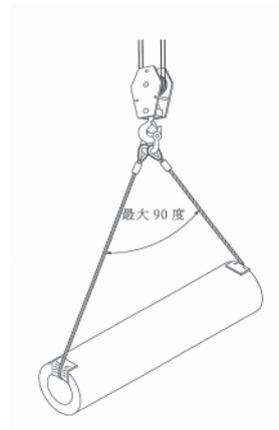
Potential Hazards

- Overturning of the crane.

- Overloading of the crane leading to breaking and collapse of the lifting boom.
- Objects falling down during lifting operation and hit workers below.
- Lifting boom collided with obstacles.
- Lifting boom touched overhead power lines.

Preventive Measures

- Lifting appliances and lifting gear must be regularly tested and examined by competent examiners. (Regarding colour coding of lifting gear, please refer to the relevant guidance of Works Branch of Development Bureau).
- All cranes shall be maintained regularly by competent person so as to ensure they are always kept in good operating conditions.
- Follow the safe working instructions of the manufacturer of a lifting appliance.
- Automatic safe load indicator shall be installed at a crane.
- 6-month period - The owner of any chain, rope, or lifting gear used for raising or lowering or as a means of suspension shall ensure that each chain, rope or lifting gear in use has been thoroughly examined by a competent examiner with the issuance of approved form in the preceding 6 months before it is used.
- 12-month period - Lifting appliances shall be thoroughly examined by a competent examiner with the issuance of approved form at least once in the preceding 12 months.
- Crane operators shall attain 18 years old, have undergone relevant training and hold valid certificates.
- Before using lifting gear such as hook, shackle or chain sling, check whether there is any wear and tear.
- Lifting gear used in lifting operation shall be marked with safe working load.



- Check the weight of the load to be lifted.
- Do not exceed the safe working load of a lifting appliance or lifting gear;
- Mobile cranes should only be operated on uniform, level and firm ground with sufficient load bearing capacity to withstand the maximum in-service loadings of the crane;
- In order to avoid the sinkage or collapse of the supporting surface and overturning or collapse of the crane, the loading should be distributed over a sufficiently large area. Steel plates of adequate strength, suitable mats or suitable timber blocking should therefore be used;
- If outriggers are provided, the beams should be fully extended as far as practicable. The jacks should be suitably extended so that all the crane tyres are clear of the ground;
- Adopt the correct lifting method. The centre of gravity of goods should be checked to ensure the goods are lifted steadily and securely.
- Do not use a lifting appliance or lifting gear unless it has been inspected weekly and certified safe by a competent person.
- Do not use a lifting appliance unless it has been regularly repaired and maintained by a competent person. No unauthorized repair is allowed.
- Follow the safe working instructions of the manufacturer of a lifting appliance.
- Employ a signaller to assist the lifting when the operator of the lifting appliance does not have an unrestricted view.
- Do not work beneath any suspended load and do not work within the lifting operation area.
- Use appropriate equipment, such as "goal posts" to restrict the height of the jib when there is a need for using a telescoping jib crane underneath a overhead cable.
- The minimum depth of a cage or receptacle used for carrying persons is 900mm.

2.2.1.6 Working with chemicals

Potential Hazards

- Causing fire, explosion.
- Releasing harmful/toxic gases or airborne particles.
- Splashing of hot, corrosive or toxic liquid.
- Resulting in injuries, ulcer, intoxication and even death.
- For dangerous substances, the major routes of entry into the human body are ingestion, skin absorption and inhalation.



Preventive Measures

- The essential information of a chemical label should include symbol, chemical name, particular risks and safety precautions.
- Studying the label content outside a container is the proper way for identifying the name, classification, risks and precautions of the chemical in the container.
- Always keep the work area well-ventilated.
- Wear proper personal protective equipment. Aprons, safety shoes, rubber gloves and face shields should be used for handling chemicals.
- Don't touch chemicals with bare hands. Wear protective glove.
- Prohibit smoking and eating at workplaces where chemicals are being used or stored.
- Fully understand and follows the safe working procedures.



- Keep away from any ignition source when handling flammable substances.
- Flammable substances should be stored at a metal cabinet. Rags, after used for cleaning a flammable liquid, should be placed in a metal container with a lid.

2.2.1.7 Use of loadshifting machines

A loadshifting machine shall only be operated by a person who has attended a relevant training course and holds a valid certificate.

Potential Hazards

- A worker is struck by a moving loadshifting machine.
- Overturning of the loadshifting machine.
- Touching of underground cable or overhead power lines.



Preventive Measures

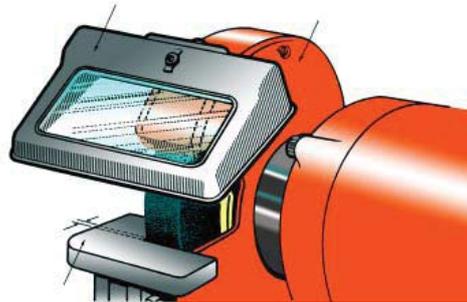
- Unless you are a worker concerned, do not work in an area where a loader, an excavator, etc. is in operation.
- When an excavator is working, reasonable measures should be taken to prevent persons from having access to that place, such as by fencing off the place.
- Do not operate any loadshifting machinery without training and approval.
- Operators of forklift trucks, bulldozers, loaders, excavators, trucks or lorries should possess appropriate certificates.
- The proprietor/contractor should ensure that the operator has attained the age of 18 years who holds a valid certificate.
- In order to achieve safe operation of the excavator, each worker engaged in work associated with an excavator should understand and follow instructions and information given by his supervisor on system of work,

work procedures and safety precautions.

2.2.1.8 Use of abrasive wheel

Potential Hazards

- Bursting of wheels as the result of:
 - defective wheel
 - overspeeding
 - faulty mounting
 - misuse
- Contact with the wheel.
- Injury to the eyes from flying particles.



Preventive Measures

- A notice, in English and Chinese, stating the maximum permissible speed in revolutions per minute specified by the manufacturer for every abrasive wheel shall be kept permanently fixed in the grinding room or place where grinding is carried out.
- Every abrasive wheel shall not be operated at a speed in excess of the maximum permissible speed in revolutions per minute specified by the manufacturer for that wheel.
- Select the appropriate abrasive wheel.
- Every abrasive wheel shall be properly mounted.
- Every abrasive wheel shall be mounted by a competent person appointed by the proprietor in writing.
- A guard shall be provided and kept in position at every abrasive wheel in motion.
- Persons carrying out dry grinding operations and truing or dressing an abrasive wheel should wear a dust/mist mask or respirator and eye protectors.

2.2.1.9 Excavation works

Potential Hazards

- Probably the most common hazard when working in excavations and trenches is the threat of cave-in.



Preventive Measures

- Detection of underground utilities should be done prior to the commencement of excavation. Make sure enough protection has been given for any exposed utilities when work starts.
- An excavation shall be examined by a Competent Person at least once in every seven days and statutory Form 4 should be filed in as a record of inspection.
- No load or plant shall be placed or moved near the edge of the excavation, shaft, pit or opening in the ground if it is likely to cause the side of those places to collapse.
- Keep the fence on all sides of an excavation intact.
- Use safe access for ingress and egress.
- Make sure that a trench is securely shored before working in it.
- Suitable support should be applied at the edge of the excavation to avoid the damage caused by the collapse of the pit.
- During excavation, if the floor is cracked and the support is broken or loosened, stop the work immediately, leave the pit and report to the superiors.
- An excavator shall only be operated by a person who has attained the age of 18 years, is trained and holds a valid certificate applicable to excavator.

2.2.1.10 Working in confined spaces

Potential Hazards

- The major hazards in a confined space include the presence of the following:
 - a flammable, explosive or oxygen enriched atmosphere.
 - a harmful or toxic atmosphere.
 - an oxygen deficient atmosphere.
 - free flowing solids or liquids.
 - excessive heat.



- The threats against the safety and health of workers include:
 - serious injury arising from a fire or explosion.
 - loss of consciousness arising from an increase in body temperature caused by, for example, heat stress in the work environment.
 - loss of consciousness or asphyxiation arising from gas, fume, vapour or the lack of oxygen.
 - drowning arising from an increase in the level of liquid.
 - asphyxiation arising from a free flowing solid or the inability to reach a respirable environment due to entrapment by a free flowing solid.



Preventive Measures

- To appoint a competent person to carry out risk assessment for work in the confined space before a worker enters a confined space.
- To carry out an air monitoring to determine if a hazardous atmosphere exists by a competent person using a suitable gas detector which is correctly calibrated before a worker enters a confined space.
- The purpose of testing the gases in the procedures of confined spaces operations is to determine whether the amounts of gas components in a confined space exceed the dangerous levels or not.
- To ensure that no workers other than certified workers enter or work in the confined space.

- Workers working in a confined space should be equipped with appropriate personal protective equipment. With adequate safety precautions being taken, a self-contained respirator should be worn when a worker entering a confined space to rescue an unconscious worker.
- A person shall be stationed outside a confined space to communication with the workers inside when work is being carried out in the confined space.
- To ensure that the risk assessment report and the related certificate issued are displayed in a conspicuous place at the entrance of the confined space.
- Avoid accumulating the exhaust gases inside the confined space, and ensure the fresh air ducts extend to all locations of the workplace.

2.2.1.11 Gas welding and flame cutting safety

Potential Hazards

- Fires and explosions resulted from the release of flammable fuel gases or oxygen into the atmosphere.
- Fires and explosions resulted from flashback at the blowpipe or overheating of gas cylinder.
- Explosions from over-pressurisation of the gas supply system.
- Due to the radiation and toxic fumes or gases emitted during the process, the resultant health problems include: (i) eye discomfort and burns from the intense light and heat emitted from the operation, and (ii) corneal ulcer and conjunctivitis from foreign particles e.g. slag and cutting sparks.
- Illness due to inhalation of fumes or gases formed during the process, such as metal fume fever, bronchial and pulmonary irritation.



Preventive Measures

- Do not use the equipment for gas welding or flame cutting unless you have attained the age of 18 years and hold a valid certificate.

- Wear personal protective equipment.
- Do not use any gas cylinder unless it has been fitted with flashback arrestors.
- Keep gas cylinders in an upright position at a ventilated area.
- Place fire extinguishers within reach.
- Keep gas cylinders in an upright position and secure it properly to avoid overturning. Keep them far away from a place where hot processes are being undertaken.
- If gas leakage is detected, report it to your supervisor immediately.
- If there are other people, a screen should be used for segregating the sparks to avoid injuring others.
- Flammable substances should not be stored in workplaces for welding work.

2.2.1.12 Electric arc welding safety

Potential Hazards

- The common welding-related hazards include electric shock, radiation, heat and toxic fumes.
- Long-term inhalation of metal dust may lead to nonfibrotic pneumoconiosis.
- The ultraviolet rays generated in electric arc welding would cause hazards to the eyes of a worker.



Preventive Measures

- Avoid conducting welding on wet floor or at open area during rainy day.
- Suitable personal protective equipment, such as eye and face protectors, insulated welding gloves and safety shoes or boots, should be provided to and used by the welding worker.

- Keep the welding area well ventilated, and suitably and sufficiently lit. Make sure suitable fire extinguishers are available.

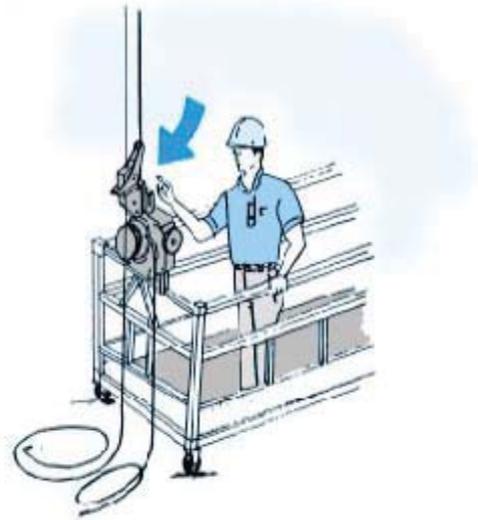
2.2.1.13 Use of suspended working platform

Potential Hazards

- Workers falling from height
- Falling object hit workers below

Preventive Measures

- A competent person is responsible for on-site inspection, supervision on the installation and use of the suspended working platform.
- Every person working on a suspended working platform shall be at least 18 years old, and has undergone training and obtained a certificate in respect of such training.
- Every person carried on a suspended working platform shall wear a safety belt that is attached to the independent lifeline.
- The safe working load and the maximum number of persons carried shall not be exceeded when the suspended working platform is used.
- A wire rope shall be replaced immediately if there is any damage.
- A suspended working platform shall clearly and legibly mark on the platform the safe working load, the maximum number of persons that may be carried at any one time, every person riding on a suspended working platform shall wear a safety belt properly attached to an independent lifeline.
- Every suspended working platform should be inspected in the immediately preceding 7 days before its use by a competent person. A statement to the effect that it is in safe working order should be entered



into an approved form by the competent person.

2.2.1.14 Use of cartridge-operated fixing tool

Potential Hazards

- Through penetration of the material.
- Eye injury from fragmentation of brittle materials during firing.
- Noise from explosive source of the tool.
- Explosion/fire caused by cartridge ignition particularly in flammable atmospheres.
- Electric shock.

Preventive Measures

- Do not operate a cartridge-operated fixing tool unless you have possessed a valid certificate.
- Wear suitable eye and ear protectors while operating a cartridge-operated fixing tool.
- Use a cartridge-operated fixing tool with great care.

2.2.1.15 Working under noisy environment

Potential Hazards

- Deafness that results from prolonged exposure to high-intensity sound.
- Intermittent work in the noise environment will cause irritability, can distract concentration, can cause hearing damage and increase the risk of accidents.

Preventive Measures

- If people have to work in ear protection zone, they will need suitable ear protectors (ear muffs or ear plugs) to reduce the hazard.
- Where there are high levels of impact



noise, such as piling work, earmuffs and ear plugs may be used together to provide better noise reduction.

2.2.1.16 Manual Handling

A manual handling operation means that a load is moved or supported by a person's hands or arms, or by some other forms of bodily effort. It includes lifting, lowering, pushing, pulling and carrying the load.

Potential Hazards

- The waist is most likely to be injured if a worker lifts goods improperly. Incorrect manual handling operations involving awkward posture, incorrect application of bodily force, prolonged or frequently repetitive motions, jerky motion or unexpected movements and pressure, etc. can lead to injuries such as
 - strain and sprain, back pain, hernia and damage to the back.
 - damage to the joints, ligaments, muscles and intervertebral discs, etc.

Preventive Measures

- Avoid manual handling operations as far as possible to minimize the risk of injury.
- Estimate the weight of the load.
- Conduct manual handling operations with proper method.
- Lift an object with a correct posture. Holding the object close to the body, lifting with the legs by slowly straightening them and keeping the back straight.
- Sudden increase of the movement speed should not be done to avoid sustaining injury during manual lifting. Don't transport a load by twisting the upper body only.
- Transporting goods with assistance of mechanical tools.
- Seek assistance from someone in lifting a load if necessary.
- Doing some warm-up exercises before conducting manual handling operation can render the muscle and cardiopulmonary system more

adaptable to the change so as to reduce injury.

- Wear suitable protective equipment. Put on gloves as far as possible to protect your hands from any cut, scratch or puncture, and wear safety boots or shoes to prevent injury to toes by heavy falling objects.

2.2.1.17 Asbestosis

Potential Hazards

- A worker while performing renovation/demolition work may inhale the fibers of asbestos.
- Asbestosis is caused by the asbestos fibers penetrating into the lungs, causing scar tissue by making tiny cuts in the alveoli (air sacs), thus decreasing the amount of oxygen that the lungs can process.
- Long-term inhalation of asbestos fibers may lead to lung cancer.

Preventive Measures

- Consult or employ a registered asbestos consultant to conduct assessment and remove all the asbestos by registered contractors.
- Prevent the exposure of any workman to asbestos.
- Where it is not reasonably practicable to prevent exposure, reduce the exposure of any workman to asbestos to the lowest level reasonably practicable by measures other than the use of respiratory protective equipment.
- Provide every workman who is or is liable to be exposed to asbestos with approved respiratory protective equipment that is suitable for the circumstances.
- Ensure the full and proper use by each workman of the respiratory protective equipment.

2.2.1.18 Working with silica based materials (pneumoconiosis)

Potential Hazards

- Silicosis is caused by inhalation of fine particles of dust containing crystalline silica. The dust penetrates deep in the lungs where it attacks

the tissues and causes progressive deterioration of pulmonary function. The onset of the disease is usually after some years of exposure to silica dust. Silicosis is most likely caused by hand-dug caissons.

Preventive Measures

- Every effort should be made to reduce the formation of dust at source by attention to processes and work method. If all practicable measures fail to confine environment dust contamination within occupational exposure limits, exposed persons should wear suitable respiratory protection.
- Respiratory protection should be selected to protect against the prevalent dust level.
- Ensure that every worker is fully and correctly use the respiratory protective equipment.

2.2.1.19 Inclement Weather

Each year, Hong Kong experiences typhoons, rainstorms and thunderstorms between mid-spring and mid-autumn, and strong monsoon winds in summer and winter. These adverse weather may create danger to people working outdoors, especially in exposed areas. Sometimes, people working in covered structures or indoors may also be affected.

Potential Hazards

- Collapse of temporary structures or plants causing injury to people nearby and damage to property.
- Loss of body balance resulting in falls.
- Flying or falling objects.
- Electric shock or electrocution to people directly or through conductive objects.
- Fire.
- Electric shock or electrocution due to leakage of current from wet electrical equipment.

- Slipping arising from wet floor surface.
- Slipping of tools, equipment, or articles from hands.
- Flooding leading to drowning and damage to plants or structures.
- Landslips as a result of persistent heavy rainfall.
- Collapse of roads.

Preventive Measures

- Stop work at places with risks of falling objects or fall of persons.
- Remove or secure loose materials.
- Secure plants and scaffolds.
- Use suitable personal protective equipment e.g. safety helmets.
- Protect from breakage of window glasses.
- Stay away from metal pipes, cable, structure or fences.
- Remove metal objects from body.
- Use battery-operated radio for listening weather broadcasts.
- Follow safety instructions.
- Always remain alert on changes of working environment.
- Be familiar with the escape route in case of emergency.
- Use safe means of transport and route for evacuation.
- Evacuate to safe shelters to avoid exposure to strong winds.

2.2.1.20 Very Hot Weather Warning

- While a Very Hot Weather Warning is in force, employers should assess the risk of heat stroke to their employees and adopt effective preventive measures such as providing cool drinking water, setting up temporary sunshade and providing mechanical aids to reduce physical exertion of employees.

- Employees should drink water regularly and be mindful of their physical condition. If early heat stroke symptoms such as headache and thirst appear, they should inform their supervisors, and seek medical help immediately.

3. Case Study and Analysis of Common Serious Accidents

This section must be conveyed in an interactive manner through discussion of accident cases with trainees.

Workplace accidents not only cause sufferings to the victims and their families, they also result in financial losses arising from stoppage of work, insurance claims, medical and rehabilitation expenses, etc.

In fact, most of the workplace accidents are preventable. Very often, they share common scenarios and causes. These scenarios and causes should be properly understood in order that lessons are learnt and suitable measures implemented to prevent recurrence of such accidents.

3.1 Case Study, Impact of Accident and Recent Accident Trend

- To analyse in an interactive manner with the trainees the six accident cases stated in session 3.2 and their common features. For experience sharing purposes, reference can also be made to the accident cases published in the accident casebook series issued by the Labour Department.
- To discuss in an interactive manner with the trainees the serious consequences of the accidents such as the sorrow of the victims' families, impact on the growth of their children and difficulties faced due to the loss of earning.
- To analyse with the trainees the recent accident trend and discuss the causes and preventive measures for related accidents. Related accident cases can also be included as reference. The latest statistics and analysis on workplace accidents and occupational diseases are available in the Labour Department's homepage.

<http://www.labour.gov.hk/eng/osh/content10.htm>

- The latest occupational safety and health related “Press Releases” and “Work Safety Alert” published in the Labour Department’s homepage must be explained to the trainees. Related website addresses are as follows:

Press Releases in 2012

http://www.labour.gov.hk/eng/major/content_2012.htm

Work Safety Alert in 2012

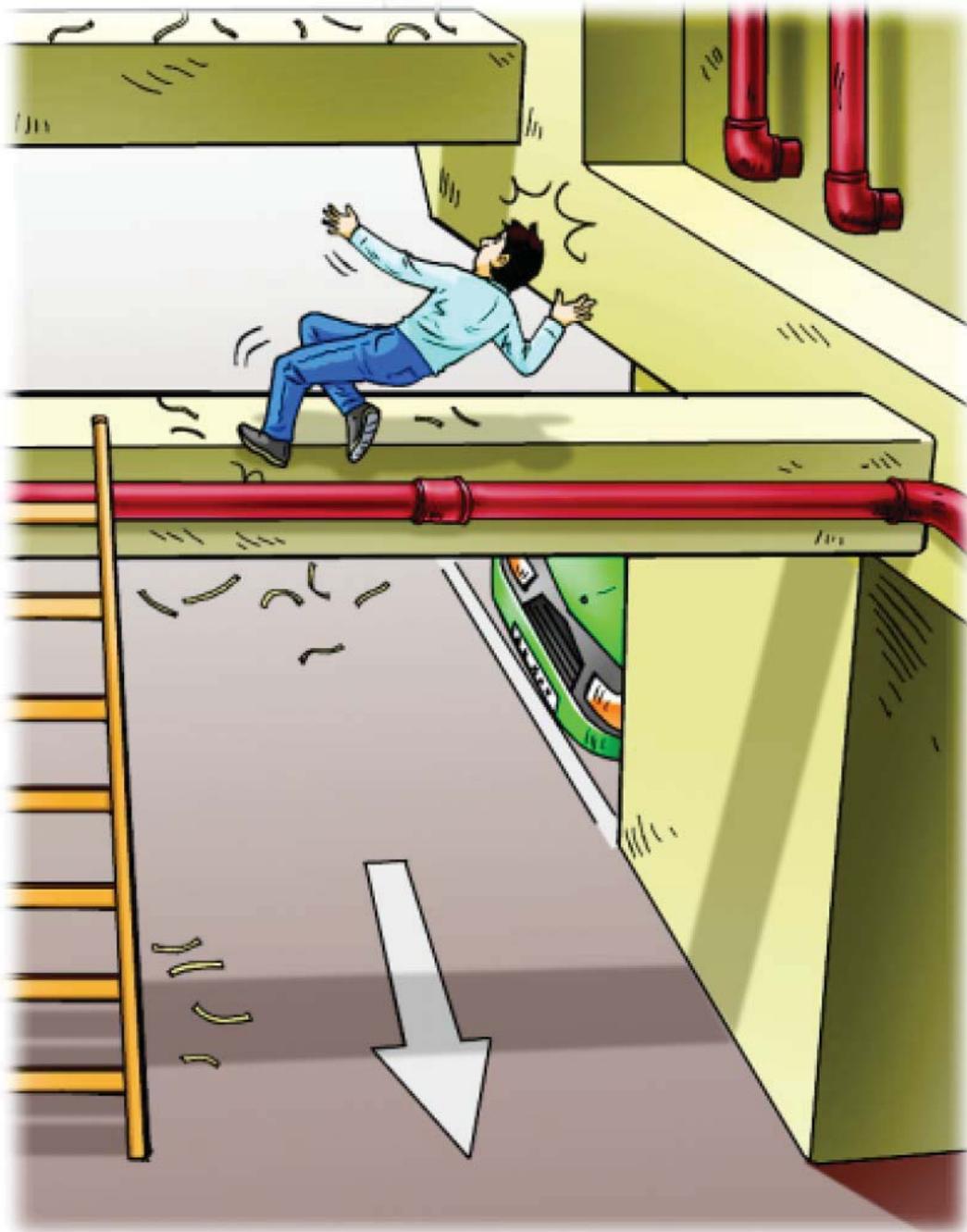
http://www.labour.gov.hk/eng/news/work_safety_alert_2012.htm

- Having regard to the specific needs and circumstances which may arise, training course provider may also add in relevant accident cases for the purposes of experience sharing.

3.2 Case Analysis of Serious Construction Site Accidents

Case 1

A workman fell from a height to death.



Circumstances

The deceased person was appointed to replace part of the drainpipes at the carpark of a building. A bamboo scaffold was erected for the work. After the drainage works were completed, the bamboo scaffold was dismantled. The deceased person intended to clean the workplace before handing over. He climbed up to a beam by a ladder and did the cleaning work. During the work, he fell from the beam and sustained the fatal injury.

Case Analysis

- There were two beams at the carpark. One was 2.8 metres and the other 4 metres above the ground. The beams were 0.3 metres wide. The wooden ladder was 3.7 metres long. It was leaning, at an angle of about 70° to the ground, on a fire services pipe running by the side of the lower beam.
- Discarded nylon ties were found on the top of the upper beam and the ground, but not on the lower beam. It was believed that the deceased person had climbed up to the lower beam by the ladder, walked on the top of the beam and swept away the nylon ties. As the width of the beam was only 0.3 meters wide, he slipped and fell to the ground while working from it.
- At the place of the accident, there was no working platform for the cleaning of the beams. No safety belt was found wearing on the body of the deceased person. In addition, there was no anchorage for the use of safety belt.
- On the day of the accident, nobody supervised the deceased person to clean the beams.

Lessons to Learn

- When cleaning work at height is carried out, a suitable working platform should be provided and used. The working platform includes safe means of access and egress to and from the working platforms
- Working at height should be closely supervised by a competent person.

Related Legislation Requirements

- Contractors are required to provide and ensure the use of suitable working platform and safe means of access and egress to and from the working platform for workman working at height.
- Under the general duty provisions,
 - Employers shall provide a safe system of work and sufficient information, instruction, training and supervision to their employees to ensure the safety at work of their employees.
 - Employees shall take reasonable care of their own safety while at work. They shall also co-operate with and facilitate their employers to comply with the safety requirements.

Discussion

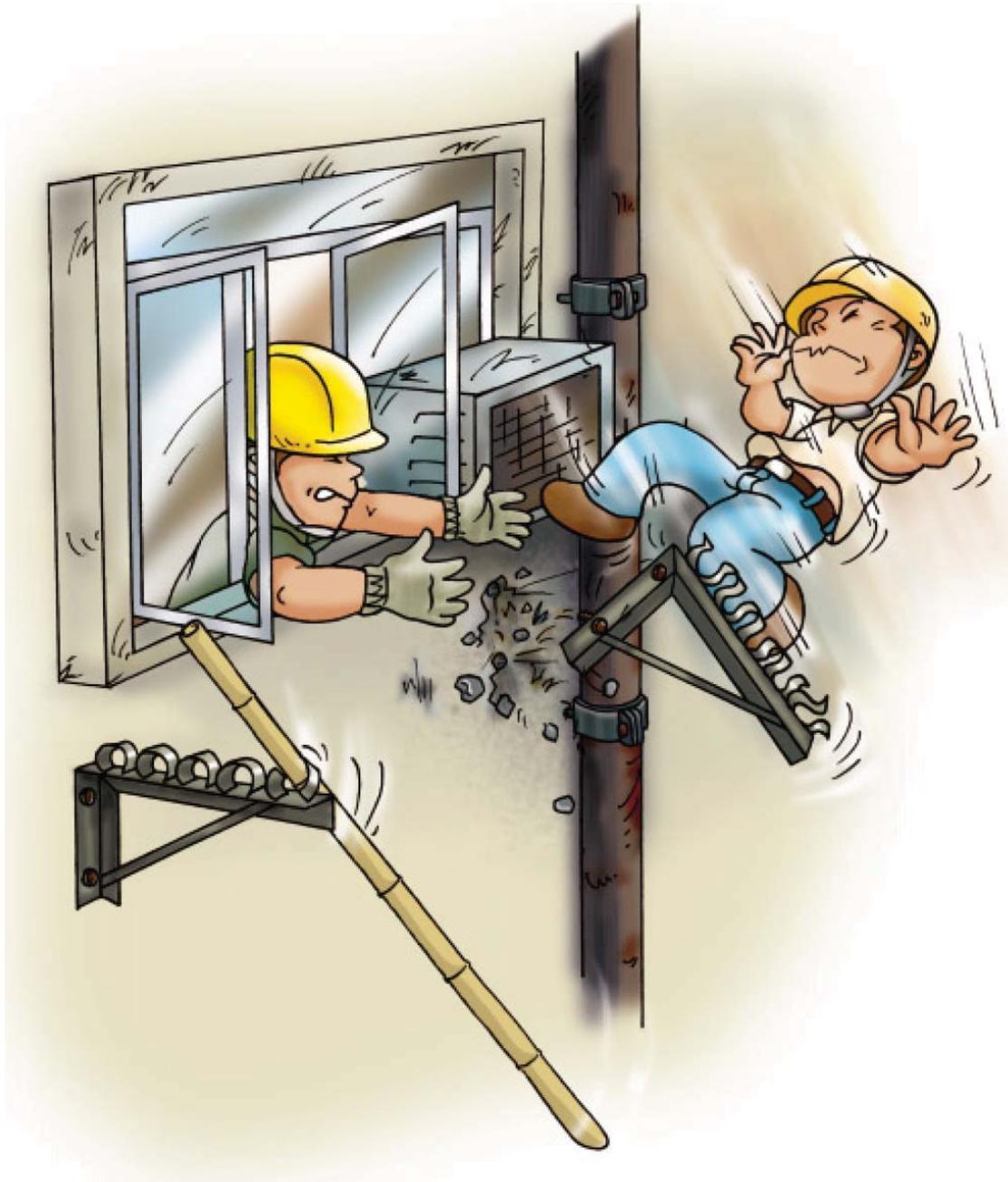
- The requirements for the working platform (e.g. safe means of access and egress, guardrail, toe board, etc).
- The selection of safety measures for working-at-height, including the scope of application and limitations for the use of working platform, safety net, safety belt and its anchorage device.

- The difficulties encountered by the parties concerned, including the contractors, supervisors and the deceased person, and their responsibilities.

Note: This case is adapted from a real accident for the mandatory basic safety training course providers to use as teaching material for case study session. Trainees are to learn valuable lessons from this case through interactive discussion. Please note that this case is not a reference for the determination of the stakeholders and their liabilities of similar accidents.

Case 2

A scaffolder fell from a height while dismantling a truss-out scaffold.



Circumstances

The drainage pipe on the external wall of an upper floor domestic unit was blocked. Two scaffolders, including the deceased person, were called in to erect a truss-out bamboo scaffold outside the unit to facilitate the clearing of the drainage pipe. There was a laundry drying rack erected on the external wall of the unit. The scaffold was erected in such a way that part of its support rested on the two metal brackets of the laundry drying rack.

After the plumber had cleared the blocked pipe, the scaffolders proceeded to dismantle the truss-out scaffold. The deceased person dismantled the scaffold outside the premises and the other scaffolder, staying inside the premises, collected the bamboo members from the deceased person. When the deceased person proceeded to remove the last bamboo member spanning the two metal brackets, one of the metal brackets suddenly detached from the external wall. The deceased person thus fell to the ground together with the metal bracket and was fatally injured.

Case Analysis

- In addition to the two metal brackets of the laundry drying rack, there were other supports for the erected truss-out scaffold. However, at the final stage of the dismantling work, the two metal brackets became the only supports for the scaffold.
- Each metal bracket was mounted on the wall by two anchor bolts. The two metal brackets had been installed for a long time. Both the metal brackets and the anchor bolts were corroded. The pullout resistance of the corroded anchor bolts was drastically reduced.
- The external building wall was constructed of red bricks and its surface was covered by a thin layer of plaster. These structural materials were not strong base materials for anchor bolts. In addition, the laundry rack was not designed to support the body weight of a worker. When the deceased person came close to one of the metal brackets, his body weight caused the bracket to detach from the wall.

- There was no suitable anchorage point or independent lifeline installed for the use of safety belt or harness. Neither safety net nor other fall arresting device was not provided on the site.
- No risk assessment was conducted before carrying out the scaffolding work. The scaffolders were not provided with sufficient information, instruction, training and supervision as were necessary to ensure work safety.

Lessons to Learn

- Truss-out bamboo scaffolds must be carefully designed and constructed with adequate support. The erected scaffold should be inspected by a competent person and certified to be in a safe working condition before use.
- Existing building fixtures with unknown capacity should not be used for supporting a bamboo scaffold.
- Risk assessment should be conducted prior to any scaffolding work. Safe working procedures in respect of the erection and dismantling of the scaffold should be developed and implemented.
- Safety net, so far as reasonable practical, should be erected for the workers engaged in dismantling bamboo scaffolds. They should also be provided with safety harnesses and secure anchorage or independent lifeline.
- The workers should make full and proper use of safety harness attached to a secure anchorage or independent lifeline.
- Sufficient information, instruction, training and supervision as may be necessary to ensure safety at work should be provided to the workers.

Related Legislation Requirements

- Contractors shall ensure that erection, alteration and dismantling of the scaffold should be carried out by trained workmen under the immediate supervision of a competent person.
- Contractors shall provide suitable safety nets or safety harnesses for workers engaged in bamboo scaffold erection, alteration and dismantling.
- Contractors shall install suitable anchorage or independent lifeline for attaching the safety harness of the workers to prevent fall of person.
- Under the general duty provisions,
 - Employers shall provide a safe system of work and sufficient information, instruction, training and supervision to their employees to ensure the safety at work of their employees.
 - Employees shall take reasonable care of their own safety while at work. They shall also co-operate with and facilitate their employers to comply with the safety requirements.

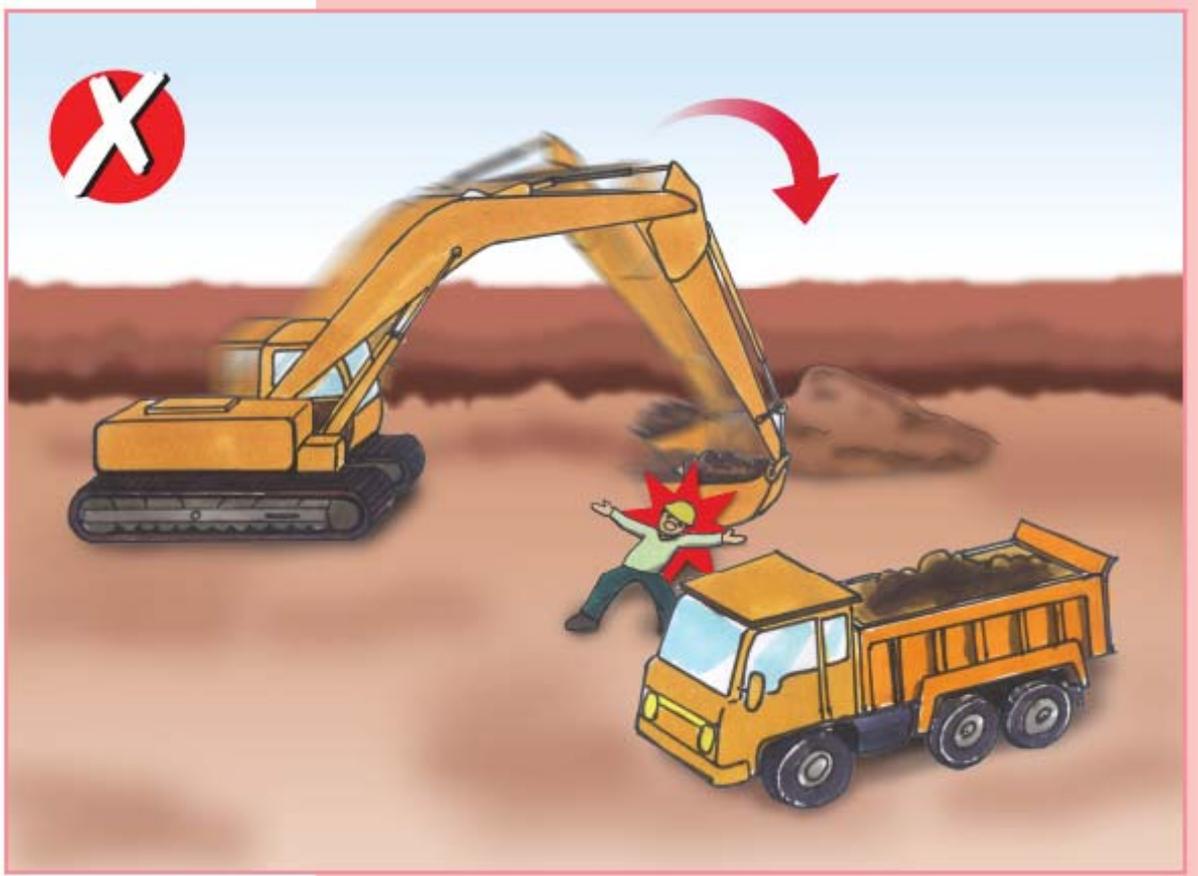
Discussion

- The application scope, safe use and limitations of working platform, safety net, safety harness and anchorage (e.g. Transportable Temporary Anchor Devices and independent lifeline).
- The difficulties faced by the parties concerned (including plumbing contractor, scaffolding contractor and the deceased person) and their responsibilities.

Note: This case is adapted from a real accident for the mandatory basic safety training course providers to use as teaching material for case study session. Trainees are to learn valuable lessons from this case through interactive discussion. Please note that this case is not a reference for the determination of the stakeholders and their liabilities of similar accidents.

Case 3

Excavation Work – worker struck by the turning arm of an excavator.



Circumstances

In a foundation works site, an operator was operating an excavator to dig up the soil from a trench bottom. The soil was then unloaded to a truck. In one delivery operation, a worker in the vicinity was fatally hit by the turning arm of the excavator.

Case Analysis

- The excavator operator turned the arm of the excavator in a high speed. When the operator saw the worker, he failed to stop the arm in time. The worker was thus fatally hit by the fast turning arm. Turning the excavator arm in high speed was obviously one of the major causes of this accident.
- Effective measures including erection of guardrail and display of warning notices had not been taken to prevent workers from entering the operating range of the excavator.

Lessons to Learn

- Take effective steps to prevent workers from entering the operation range of the excavator.
- Supervise the excavator operator to follow the safe practice for excavator operation, including prohibition of fast turning of excavator arm.



Related Legislation Requirements

- The contractor responsible for an excavator shall ensure that—
 - an excavator is only operated by a person who has attained the age of 18 years and holds a valid certificate.
 - when the view of an excavator operator is restricted, a signaller shall be appointed to give effective signals to the operator to ensure the safe working.

- Under the general duty provisions,
 - employers shall provide a safe system of work and sufficient information, instruction, training and supervision to their employees to ensure the safety at work of their employees.
 - employees shall take reasonable care of their own and other persons' safety while at work. They shall also co-operate with and facilitate their employers to comply with the safety requirements.

Discussion

- Potential hazards of excavator operation, e.g. worker in the vicinity being hit by the excavator, trapping hazard between the moving or slewing excavator and the fixture nearby, overturning of the excavator and overhead cable being hit by the arm of the excavator.

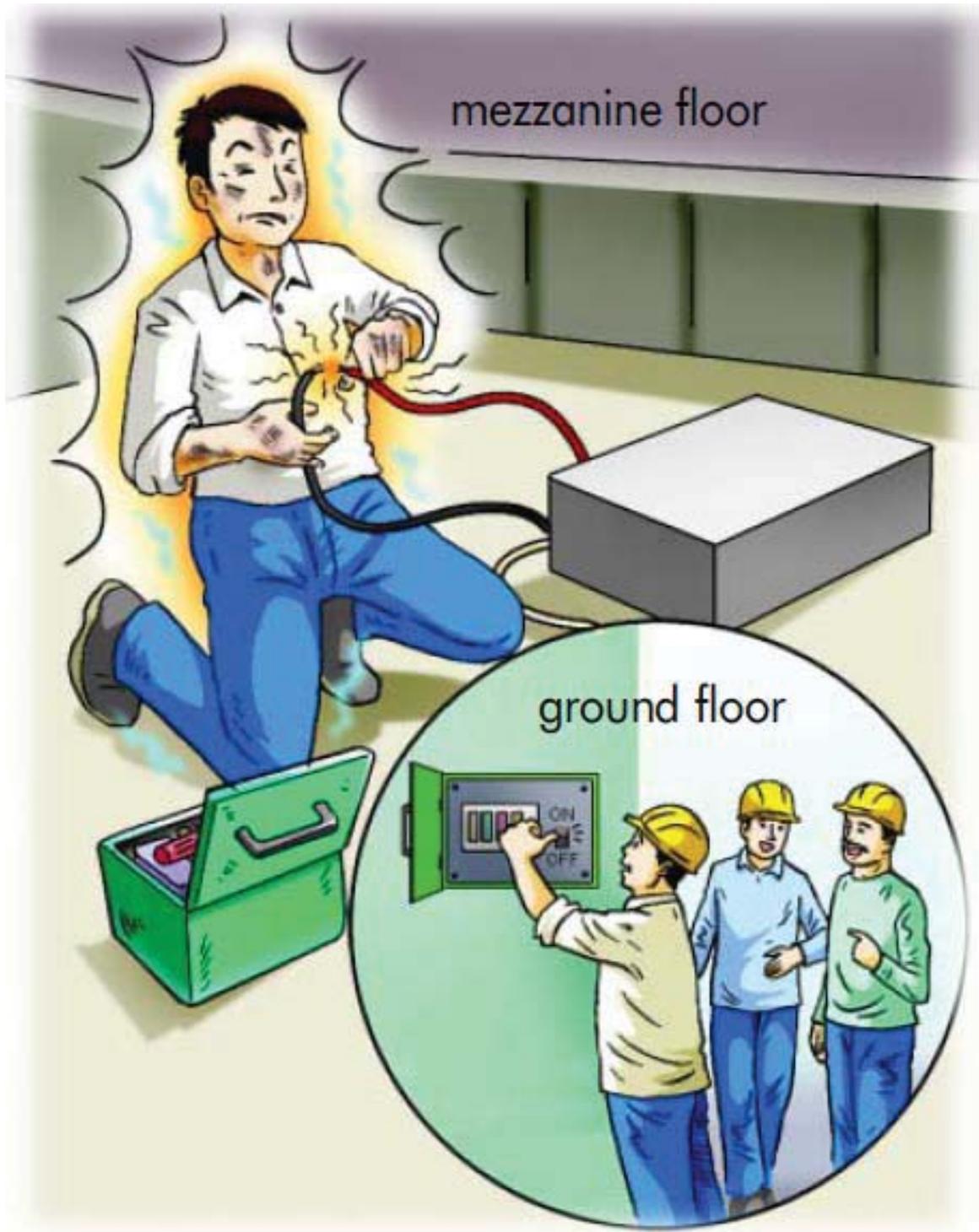
- Precautions against the potential hazards, e.g. provision of an unobstructed passageway, erection of guardrail, display of warning notices and use of signaller.

- Difficulties encountered by the parties concerned (including the contractors, the excavator operator and the deceased person) and their responsibilities.

Note: This case is adapted from a real accident for the mandatory basic safety training course providers to use as teaching material for case study session. Trainees are to learn valuable lessons from this case through interactive discussion. Please note that this case is not a reference for the determination of the stakeholders and their liabilities of similar accidents.

Case 4

An electrician electrocuted by live wire.



Circumstances

The deceased person was an electrician. He was employed by an electrical contractor and was working at a renovation site on the day of the accident. While other renovation workers were taking the afternoon tea break, the deceased person continued with his work. He was connecting the power supply to the electric motor of a roller shutter being installed at the front entrance of the ground floor unit. Before the wiring work, the deceased person went to the distribution panel installed at the rear of the unit beside the internal stairway leading to the mezzanine floor to switch off the electricity supply. He then proceeded with the wire connection work on his own on the mezzanine floor. After the other workers finished their tea break and resumed their work on the ground floor for about 30 minutes, they found the deceased person was electrocuted on the mezzanine floor.

Case Analysis

- The electricity supply from the power company was connected to a main distribution panel installed on the wall at the rear of the unit. All electric circuits on the premises were supplied by this distribution panel and the circuits were protected by circuit breakers. However, identifications of respective electric circuits were not clearly marked on the distribution panel. There was a hinged type metal cover to shield off the circuit breakers. By design, the metal cover was kept closed by its own weight. However, there was no locking device to prevent the circuit breakers from unexpected interference by other workers.
- Power supply to the lighting on the ground floor and mezzanine floor was shut down during the afternoon tea break. After the tea break, without checking why the power supply was switched off or whether someone was carrying out electrical work, one of the renovation workers switched on the power output of the distribution panel to resume the electricity supply for the general lighting and the power driven machinery.

- The distribution panel was located on the ground floor. As the deceased person was working on the mezzanine floor and the other workers who were working on the ground floor could not see the deceased person easily. They thus had a mistaken belief that no one was working on the mezzanine floor. The deceased person was electrocuted by the electric wire he was connecting when the electric supply suddenly resumed. No suitable insulating protective equipment was found beside the deceased person.
- There was no arrangement to lock up the distribution panel to prevent interference by other workers. There was no warning notice informing others that electrical work was in progress. There was no defined work schedule and clear instructions to co-ordinate the work activities of the subcontractors of different trades carrying out work together at the same time. There was no monitoring system to supervise the workers and to regulate their performance such that unsafe conditions could be effectively detected and rectified in a timely manner. The workers apparently did not have sufficient safety awareness and limited safety knowledge.

Lessons to Learn

- Electrical work should be carried out by registered electricians under the supervision of a competent person.
- In carrying out electrical work, live parts in relation to the electrical work should be rendered dead by isolating the electricity supply at the distribution panel to avoid electrical hazard. The panel enclosure or the switchgear should be locked up. Appropriate warning signs and notices should be posted to keep others well informed that electrical work is in progress.
- Suitable insulating protective equipment should be provided for the use of workers engaged in electrical work. Steps should be taken, by supervision or otherwise, to ensure the workers to make full and proper use of the protective equipment so provided.

- A safety management system should be devised and implemented. The system should include the following :
 - a job hazard evaluation programme together with the safety procedures developed in line with the findings of programme should be implemented. Particular attention should be paid to the co-ordination of various activities being performed simultaneously at site by different contractors;
 - suitable training should be provided so that the workers employed by different contractors can carry out their work safely; and
 - adequate information and clear instructions should be provided to all workers so that the work can be carried out safely. A monitoring system should be in place to ensure that the safety performance is properly supervised.

Related Legislation Requirements

- The contractor responsible for an electrical work should—
 - ensure that all live parts of the electrical system in relation to the electrical work are rendered dead by isolating the power supply source;
 - ensure that adequate precautions to prevent the conductors becoming accidentally live shall be taken before starting the electrical work, including switching off and locking up the source of power supply, and posting up of appropriate warning notices, signs or tags;
 - provide suitable insulating protective equipment to the worker and ensure that it is properly used; and
 - exercise effective management control to ensure that the safety measures are strictly followed.

- Under the general duty provisions,
 - Employers shall provide a safe system of work and sufficient information, instruction, training and supervision to their employees to ensure the safety at work of their employees.
 - Employees shall take reasonable care of their own and other persons' safety while at work. They shall also co-operate with and facilitate their employers to comply with the safety requirements.

Discussion

- Proper use of different insulating protective equipment.
- Suitable arrangements to avoid safety problems that arise when different processes are being carried out together at the same time, e.g. locking up of the distribution panel and implementation of a sound safety management system.
- Safety measures for handling of electrical accidents, including the safety for the first person who arrives at the accident scene and the rescue personnel.
- Difficulties encountered by the parties concerned (including the renovation contractors, the electrical contractor, the registered electricians, the worker who switched on the power supply and the deceased person) and their responsibilities.

Note: This case is adapted from a real accident for the mandatory basic safety training course providers to use as teaching material for case study session. Trainees are to learn valuable lessons from this case through interactive discussion. Please note that this case is not a reference for the determination of the stakeholders and their liabilities of similar accidents.

Case 5

Confined spaces – gas poisoning inside a manhole.



Circumstances

A team of workers was assigned to clean up a drainage pipe of about 2 metres in diameter. Before starting the work, testing of the air inside the manhole was done. It indicated that the air inside was safe. Also, a ventilating blower was installed at the opening of the manhole to supply fresh air into the manhole. As the work was almost done, a worker removed the ventilating blower. Afterwards, when another worker entered the manhole for final cleanup, he fainted. His co-workers, without wearing breathing apparatus, rushed into the manhole for rescue but they also collapsed inside the manhole.

Case Analysis

- Toxic gases might have accumulated to a dangerous level in sewage after the mechanical ventilation was removed.
- As there was no continuous monitoring for the air quality inside the manhole, the worker was not aware that the toxic gases had accumulated to a dangerous level and did not wear approved breathing apparatus.
- The workers conducting the rescue operation also collapsed as they did not wear any breathing apparatus either.



Lessons to Learn

- Risk assessment, with recommendations, should be conducted by competent person before work is carried out in confined space.
- Recommendations by competent person and the emergency procedures

laid down by the contractor should be strictly followed.

- Worker without proper safety training and not using suitable protective equipment should not be allowed to enter confined spaces to work or to carry out rescue operation.
- Mechanical ventilation and continuous air monitoring should be maintained while work is being conducted inside the manhole.

Related Legislation Requirements

- Contractor shall ensure that—
 - only certified workers are allowed to enter or work in confined space.
 - safety precautions shall be taken before work begins and when work is being carried out (e.g. conducting gases detection and providing suitable ventilation equipment, etc.).
 - the safety precautions shall be effectively maintained (e.g. providing suitable ventilation equipment and continuous monitoring of the air quality inside the manhole, etc.) while workers are working inside the confined spaces.
 - any person entering a confined space should be using approved breathing apparatus.
 - all workers understand the safe system of work and the emergency rescue procedures formulated and shall provide all necessary rescue equipment for emergency rescue.
- Employees shall—
 - strictly follow safe working procedures and emergency procedures implemented by the employer (e.g. wearing approved breathing apparatus, use of rescue equipment and protective equipment, etc.).
 - make full and proper use of safety equipment provided by the employer.



Discussion

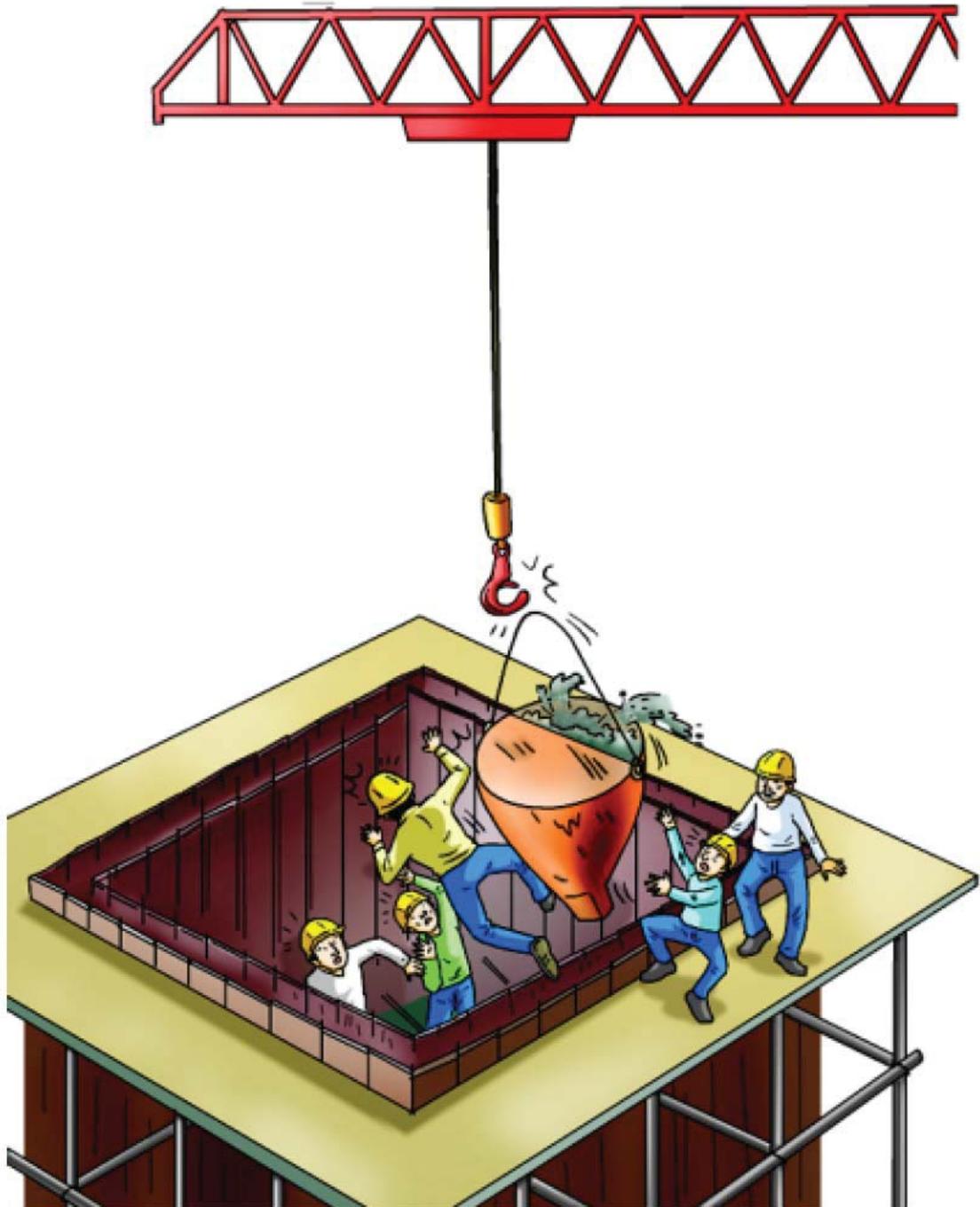
- Common confined spaces in construction site (e.g. chamber, tank, vat, pit, well, sewer, tunnel, pipe, flue, boiler, pressure receiver, hatch, caisson, shaft, silo & etc.).
- Potential hazards associated with confined spaces operation, including all specified risks.
- Mandatory requirements for persons to work in confined spaces.
- The dangers faced by the personnel conducting rescue operation.
- Difficulties encountered by the parties concerned (including the contractors, the workers who removed the ventilating blower, the worker who entered the manhole for final cleanup and the workers who rushed into the manhole for rescue operation) and their responsibilities.

Notes: This case is adapted from a real accident for the mandatory basic safety training course providers to use as teaching material for case study session. Trainees are to learn valuable lessons from this case through interactive discussion. Please note that this case is not a reference for the determination of the stakeholders and their liabilities of similar accidents.

TCP/ trainer should clearly explain to the trainees that completion of the MBST (Construction Work) courses and studying of this case is not sufficient to be qualified as a certified worker/ competent person under Factories and Industrial Undertakings (Confined Spaces) Regulation. The trainees should be reminded that the details described in this accident do not cover all the safety requirements for work in confined spaces.

Case 6

One worker killed and three injured by a falling concrete skip



Circumstances

A water tank was under construction on the ground level of a building construction site. When erection of the formwork had been completed, three workers were assigned to carry out the concrete pouring work. A tower crane was used to convey concrete by means of a skip to the three workers on the working platform erected on the formwork at about 3.3 metres above the ground. While concrete pouring was in progress, another two workers were also performing levelling work at the bottom of the water tank.

When the accident happened, the skip loaded with concrete was conveyed by the tower crane to the workers on the platform. When a worker was about to release the concrete from the skip, the wire sling, hanging the skip to the hook of the tower crane, suddenly slipped out from the crane hook. The skip fell onto the platform, causing the working platform to collapse. The three concrete pouring workers fell into the tank and were injured. The half-loaded concrete skip also fell to the bottom of the tank and struck a levelling worker to his death.

Case Analysis

- The tower crane, wire sling and the skip had been tested, examined and inspected, and were certified safe to be used. No mechanical defect was noted on the lifting gears and they were not overloaded.
- The tower crane operator in the driving cabin could clearly see the whole water tank formwork structure. Therefore, no signaller was deployed. However, the operator's view on the path of the skip might have been partially obstructed by the skip itself.
- Since some reinforcement bars of the formwork were found buckled and some of the wooden battens supporting the formwork were broken, it was likely that there had been a strong impact by the skip against the formwork.
- The hook of the tower crane was fitted with a safety catch but it was found deformed and bent to one side after the accident.

- The detachment of the wire sling from the crane hook was probably caused by the impact of the skip against the reinforcement bars of the formwork. When the movement of the skip was abruptly stopped by the impact, the sling was forced out of the hook. The forceful movement of the sling might have caused the deformation of the safety catch.
- It was not necessary to carry out the water tank concrete pouring and levelling work at the same time. The levelling work could be carried out after concrete pouring had been completed.
- On the day of accident, there was no person supervising the lifting operation.

Lessons to Learn

- Ensure that nobody works or stays under a load being lifted.
- Ensure that the load would not strike against any obstacle during the lifting operation.
- The lifting operation should be closely supervised.

Related Legislation Requirements

- The owner of a lifting appliance shall ensure that—
 - the crane (including the hook) is of good mechanical construction before it is being used;
 - every part of the load is securely suspended during the lifting operation;
 - when the operator of a lifting appliance cannot have a full view of the lifting path, a signaller shall be available to provide the assistance; and
 - person in the vicinity should not be endangered by displacement of an object when it is hit by the load.
- Under the general duty provisions, —

- Employers shall provide a safe system of work and sufficient information, instruction, training and supervision to their employees to ensure the safety at work of their employees.
- Employees shall take reasonable care of their own and other persons' safety while at work. They shall also co-operate with and facilitate their employers to comply with the safety requirements.

Discussion

- The accidents and causes for most of the lifting operation (e.g. the striking of load against obstacles and persons owing to the restricted view of the crane operator).
- The need for a signaller.
- Arrangements to avoid interference among different processes being carried out at the same time (e.g. implementation of a sound safety management system).
- Difficulties encountered by the parties concerned (including the relevant contractors, owner of the crane and hook, the management of the lifting operation and the crane operator) and their responsibilities.

Note: This case is adapted from a real accident for the mandatory basic safety training course providers to use as teaching material for case study session. Trainees are to learn valuable lessons from this case through interactive discussion. Please note that this case is not a reference for the determination of the stakeholders and their liabilities of similar accidents.

4. Emergency Preparedness

4.1 Action to be taken in case of an emergency

- In the event of fire or emergency in the construction site, employees should know what actions to be taken. Employees should receive sufficient training in safety at workplace that know the relevant information (e.g. means of escape, assembly points, etc.) and safety procedure.

4.2 Action to be taken in times of bad weather

- Employees working outdoors in times of bad weather (e.g. typhoon, thunderstorm and rainstorm), may sustain serious or the fatal accident, the employer should formulate safety measure to prevent any accident in the workplace.
- Employees working outdoors in exposed areas in times of bad weather, should stop work and take shelter.

4.3 Qualified first aider and first aid facilities

- The quantity of the first aid facilities in the construction site depend on the number of employee.
- The contractor responsible for a construction site at which 5 or more workmen are employed shall provide and maintain so as to be readily accessible a separate first aid box or cupboard for every 50 workmen or part thereof employed on the site. The wording “FIRST AID” shall be clearly marked on the first aid box or cupboard.
- The contractor responsible for a construction site at which where not less than 30, but less than 100 workmen are employed, at least one person trained in first aid.

4.4 Evacuation procedure

- The employer should draw up emergency measures and evacuation procedure. For instance, the procedure for fire escape, Preparedness and contingency plans for landslide exist, etc.

4.5 Emergency drills

- A comprehensive first aid and emergency contingency plan can minimize the risks caused by accidents, minimize the loss caused by accidents, and render the scene and the environment under control as quick as possible.
- Emergency preparedness is vital because, when an emergency does occur, a quick and correct response is necessary to reduce injuries, illnesses, property damage, environmental harm and public concern. Management should identify the types of emergencies the organization needs to plan, organize, practice and prepared for. A drill should be regularly conducted so as to allow workers to familiarize with the procedures of contingency plan, fully understand their responsibilities in contingency plan, and identify the deficiencies during the drill so as to make improvements and amendments.

5. Accidents and Dangerous Occurrences Reporting System and Procedures

5.1 Handling of Work Injury

- For any work injury to employee, employee should inform the supervisor immediately and receive suitable treatment.
- When an accident occurs in the construction site, worker should immediately notify his/her supervisor.
- Unless the worker has received adequate first aid training, the worker should not move the victim.
- When the supervisor is informed of the accident:
 - should assist the injured worker to receive the suitable treatment;
 - should carry out the preliminary accident investigation; and
 - if the worker is seriously injured or need to be hospitalized, the supervisor should inform the safety department and call police immediately.

5.2 Reporting Workplace Accident and Dangerous Occurrence

(1) Reports of Accidents resulting in death or serious bodily injury

- For accident that causes the death of, or serious bodily injury to an employee, employer should notify it to an occupational safety officer of the Labour Department (LD) within 24 hours after the time when the accident occurred. Report it in writing to an occupational safety officer of the LD within 7 days after the date of the accident if notification of the accident is not contained in a written report that contains the particulars required below.

(2) Reports of Accidents resulting in Incapacitated

- For accident that results in the employee being incapacitated from working for at least 3 days, employer should report it in writing to an occupational safety officer of the LD within 7 days after the date of the accident.

(3) Reporting Dangerous Occurrences

- Every dangerous occurrence which occurs at a workplace, whether any personal injury has been caused or not, shall be reported to the Labour Department within 24 hours of its occurrence.

6. Fire Prevention Measures and Use of Fire Extinguisher

Combustion requires three basic elements: Fuel, Air and Heat Source.

- Fuel - it is the material that can be burnt, and includes flammable materials commonly found at workplaces.

Such as solvent-based adhesives, which are used in laying rubber floor tiles, are highly flammable. In addition, fire is most likely caused by spraying of flammable liquid.



- Air – Oxygen is the most common supporter of combustion. Air generally contains 21% oxygen.
- Heat Source – Examples of common heat sources are : cigarette butts not yet extinguished, sparks generated from metal welding and cutting processes etc.

Potential Hazards

- In fires, people may get hurt by heat and flames, but the majority of people die or get injured in fires due to inhalation of hazardous smoke or toxic gases.

Preventive Measures

- Keep workplace clear and tidy all the time;
- Be careful when using machine and equipment which will generate sparks or heat.
- No smoking and naked flame at any storage area of flammable or explosive materials.
- Knowing the storage place of fire extinguishers and their operation method : generally speaking, fire could be prevented when one or several of the basic elements of combustion are removed :

- Insulating the fuel;
 - Insulating the air; or
 - Cooling down the heat source.
- What type of fire extinguisher you use should depend on what type of fire it is. If you use an inappropriate extinguisher in a fire, it may intensify the fire and/or cause serious injury. For example, burning of metallic sodium solids cannot be put out by a water type fire extinguisher. Oxygen deficiency is caused by using a carbon dioxide type fire extinguisher at a narrow and poorly ventilated area.
 - In order to ensure that the fire service installations will be functioning properly when needed, these installations should be routinely tested and maintained.
 - Smoke doors should be closed at all times.
 - Make sure that workers know the assembly points after fire evacuation.

Type of extinguisher suitable for extinguishing fire involving

Type of fire Type of extinguisher	Class 1 Paper, Textiles, Wood, Plastic	Class 2 Flammable liquids, Solvent, Oil, Grease	Class 3 Electrical Appliances, Motors, Electrical switches	Notes
Carbon Dioxide Gas 	-	✓	✓	Vapours will asphyxiate. Withdraw to open air after use.
Water 	✓	-	-	Never on fires involving electrical or flammable liquids or metals.
Dry Powder 	✓	✓	✓	Discharged dry powder may reduce visibility and cause disorientation.
Foam 	✓	✓	-	Never on electrical fires.

7. Personal Protective Equipment

Personal protective equipment (PPE) is intended to be worn or otherwise used by a person at work and which protects the person against one or more hazards to his/her safety or health. Use of PPE is the last resort when controlling the sources of accident is impracticable. PPE should be handled with care and stored properly when not in use. Store it in a dry and clean cabinet. The equipment should be kept clean and maintained in good condition.

Employers have duties on guidance, training and supervision with respect to use of PPE. They should ensure that their employees know why and when PPE is used, its maintenance or replacement schedule and limitations.

PPE should be provided by employers. Employees must wear PPE for the entire period of exposure to hazards. Do not put your PPE away just because the work lasts for only “a few minutes”. If any defect on PPE is found, report it to the employer immediately and replace it.

Factors to consider in selecting suitable PPE:

- Can the PPE provide effective protection against the hazards and whether it is suitable for use in the work process? For example, eye protectors designed for metal or rock cutting cannot provide adequate protection for gas welding or flame cutting workers;
- Can the PPE prevent or reduce the hazards without creating unsafe working conditions?
- Can the PPE be adjusted to fit the user’s body properly?
- Has consideration been given to the health of the user?
- What is the load of PPE imposed on the user? For example, duration of use of the PPE, physical strength required for the work and requirements on communication and visibility.
- If one or more types of PPE have to be worn, are they compatible? For instance, will the use of a certain type of respirator prevent the user from wearing an eye protector correctly?

7.1 Safety Helmet

- Wear a safety helmet on a construction site.
- Safety helmets primarily intended to protect the top of the heads from being injured by falling objects.
- A suitable safety helmet should bear appropriate marking indicating the conformity to certain international/ national standards such as European Standard.
- Keep a sufficient buffer distance between the top of the head and the shell of the helmet.
- Keep the harness of the helmet clean and make sure that it fits well.
- Do not drill any holes on the helmet or use it for pounding.



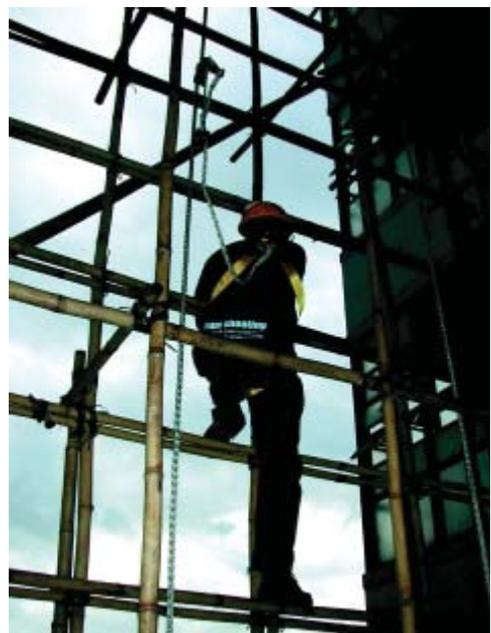
7.2 Safety Shoes

- Safety shoes should have steel toe caps, steel soles, slip-proof and water-proof characteristics.

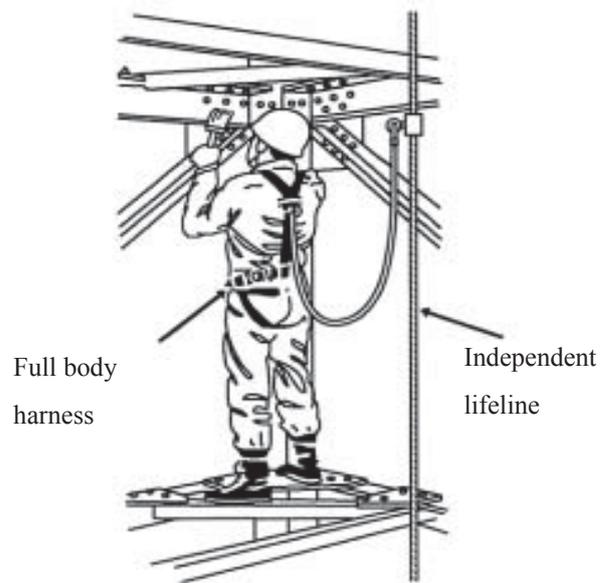


7.3 Full body harnesses work with independent lifeline and fall arrester

- The most suitable way to use safety belt is to attach its snaphook to higher level than user's waist.
- When falling from height, full body harness (commonly known as parachute type) could better reduce the downward momentum and protect user's waist from injury than the general safety belt.
- Before using a safety belt, the following should be considered: any



defects on the safety belt, any suitable anchorage, independent lifeline and fall arresting device, and whether the standard is met or not.



7.4 Safety Gloves

- Protect hands from getting injured by abrasion; cuts and punctures; contact with chemicals; electric shock; skin infection.
- Types of safety gloves including rubber gloves, steel, mesh gloves, leather gloves, wrist and arm protective devices.
- Workers should not wear cotton gloves for operating a machine with revolving parts so as to avoid causing injury to hands due to entangling of cotton gloves with the revolving parts of the machine.



7.5 Ear Protection

- Ear muffs are the most efficient noise isolation ear protectors.
- Wear ear protectors in areas with high noise levels.
- Properly wear ear protectors according to the manufacturer's instructions.
- Do not reuse disposable ear plugs.
- Clean ear protectors regularly.



7.6 Eye Protection

- A wise worker will certainly take good care of his eyesight.
- A small fragment may cause serious consequences if it enters one's eyes.
- When there is a risk of eye injury, such as in concrete breaking or using abrasive wheels, you should wear suitable eye protectors.
- Take proper care of the eye protectors provided to you.
- Replace damaged or defective eye protectors immediately.
- Ensure that eye protectors are comfortable to wear, and keep clean.
- Use eye protectors for eye protection — do not put it on your head or hang it on your neck.
- Bear in mind that eye protectors are replaceable, but not your eyes.



7.7 Breathing Apparatus

- To protect worker against dust; fibres, hazardous gases and fumes and to prevent worker from oxygen deficiency.
- Type of breathing apparatus including : disposable cartridge respirators; full-face/half-face respirators; air-supplied hoods; self-contained respirators.
- When using breathing apparatus, it must be properly fitted on the wearer's face.
- Breathing apparatus should be cleaned thoroughly after each use.

7.8 Protective Clothing

- Protective clothing is being used as working clothes or uniform, it also

protects workers against injuries caused by hazards such as contact with chemicals or flame, striking, stabbing, radiation, drowning, extreme cold, hot or adverse weather conditions.

- The types of protective clothing: General purpose protective clothing; disposable overalls; specialized protective clothing such as cold resistant clothing; chemical or radiation protective clothing; high visibility clothing, puncture-resistant aprons and lifejacket used for land-based work carried out adjacent to water.
- Protective clothing should be well fit and comfortable. Try it before buying. In addition, we should also consider that the protective clothing whether affect the flexibility or movement, the clothing is durable, the clothing can be easily cleaned and what types of under garments should be used with the protective clothing.

8. List of Reference

Part A : Guides to Legislation

1. A Brief Guide to the Factories and Industrial Undertakings (Confined Spaces) Regulation
2. A Brief Guide to the Occupational Safety and Health Ordinance
3. A Brief Guide to the Occupational Safety and Health Regulation
4. A Guide to Section 6BA of Factories and Industrial Undertakings Ordinance Cap 59 - Mandatory Basic Safety Training
5. A Guide to the Factories and Industrial Undertakings (Cartridge - Operated Fixing Tools) Regulations
6. A Guide to the Factories and Industrial Undertakings (Dangerous Substances) Regulations
7. A Guide to the Factories and Industrial Undertakings (Gas Welding and Flame Cutting) Regulation
8. A Guide to the Factories and Industrial Undertakings (Loadshifting Machinery) Regulation
9. A Guide to the Factories and Industrial Undertakings (Noise at Work) Regulation
10. A Guide to the Factories and Industrial Undertakings (Protection of Eyes) Regulations
11. A Guide to the Factories and Industrial Undertakings (Safety Officers and Safety Supervisors) Regulations
12. A Guide to the Factories and Industrial Undertakings (Suspended Working Platforms) Regulation
13. A Guide to the Factories and Industrial Undertakings (Woodworking Machinery) Regulations
14. A Guide to the Factories and Industrial Undertakings Ordinance (Section 6A) - General Duties of Proprietors
15. A Guide to the Factories and Industrial Undertakings Ordinance (Section 6B) - General Duties of Persons Employed
16. A Guide to the Factories and Industrial Undertakings Ordinance (Section 6A & 6B) - Know your General Duties
17. A Guide to the Provisions for Excavations and Miscellaneous Safety under the Construction Sites (Safety) Regulations
18. A Guide to the Provisions for Safe Places of Work under Part VA of the Construction Sites (Safety) Regulations
19. A Guide to the Provisions for Safe Use of Hoists under the Construction Sites (Safety) Regulations

20. A Pictorial Guide to Factories and Industrial Undertakings (Noise at Work) Regulation
21. Handbook on Guarding and Operation of Machinery
22. Reporting Workplace Accidents and Dangerous Occurrences

Part B : Codes of Practice

23. Code of Practice : Safety and Health at Work for Gas Welding and Flame Cutting
24. Code of Practice : Safety and Health at Work for Manual Electric Arc Welding
25. Code of Practice : Safety and Health at Work for Industrial Diving
26. Code of Practice : Safety and Health at Work with Asbestos
27. Code of Practice for Bamboo Scaffolding Safety
28. Code of Practice for Safe Use and Operation of Suspended Working Platforms
29. Code of Practice for Safety and Health at Work in Confined Spaces
30. Code of Practice for Metal Scaffolding Safety
31. Code of Practice for Safe Use of Tower Cranes
32. Code of Practice for Safe Use of Mobile Cranes
33. Code of Practice on Safe Use of Excavators

Part C : Guidance Notes

34. Guidance Notes on Appointment of Competent Persons for Noise Assessment at Workplaces
35. Guidance Notes on Classification and Use of Safety Belts and their Anchorage Systems
36. Guidance Notes on Factories and Industrial Undertakings (Noise at Work) Regulation
37. Guidance Notes on Fire Safety at Workplaces
38. Guidance Notes on Inspection, Thorough Examination and Testing of Lifting Appliances and Lifting Gear
39. Guidance Notes on the Inspection, Thorough Examination and Testing of Suspended Working Platforms
40. Guidance Notes on the Selection, Use and Maintenance of Safety Helmets
41. Guidance Notes on Safe Use of Loadshifting Machines for Earth Moving Operations on Construction sites
42. Guidance Notes on Safety at Work for Maintenance of Low Voltage Electrical Switchgears

43. Guidance Notes for the Safe Isolation of Electricity Source at Work
44. Guidance Notes for Safe Use of Fork-lift Trucks
45. Guide for Safety at Work - Electric Shock Hazard of Manual Electric Arc Welding Work
46. Guide for Safety at Work - Safe Use of Electric Plugs
47. Chemical Safety in the Workplace - Guidance Notes on Risk Assessment and Fundamentals of Establishing Safety Measures
48. Chemical Safety in the Workplace - Guidance Notes on Personal Protective Equipment (PPE) for Use and Handling of Chemicals
49. Chemical Safety in the Workplace - Guidance Notes on Safe Use of Flammable Liquids
50. Guidance Notes: Safety at Work (Falsework - Prevention of Collapse)
51. Guidance Notes to Renovation Safety

Part D : Other Guidebooks

52. A Casebook of Fatal Accidents in Lift Installation, Maintenance and Repairing Work
53. A Casebook of Occupational Fatalities related to Renovation and Maintenance Works
54. A Casebook of Occupational Fatalities related to Truss-out Bamboo Scaffolding Works
55. An Analysis on Occupational Fatalities - Casebook Volume 1
56. An Analysis on Occupational Fatalities - Casebook Volume 2
57. An Analysis on Occupational Fatalities - Casebook Volume 3
58. An Analysis on Occupational Fatalities - Casebook Volume 4
59. A Guide on Employer's Safety Policy
60. A Practical Guide to Industrial Noise Reduction
61. A Safety Guide for Freight Container Inspection
62. A Safety Guide on Gate Work
63. Basic Electrical Safety Measures in the Workplace
64. Beware of Fall at Work
65. Construction Site Safety & Health Checklist
66. Five Steps to Information, Instruction and Training
67. Five Steps to Risk Assessment
68. Guide on Safety at Work in times of Inclement Weather
69. Hazards During Chemicals in Use and Safety Guidelines
70. Industrial Safety (General Duties of Persons Employed)
71. Keep Construction Sites Clean and Hygienic
72. Prevention Against Fall from Height

73. Safe Practices in Operating Fork Lift Trucks
74. Safe Systems of Work
75. Safe Use of Material Hoist - Interlocking Device on Hoistway Gate
76. Safety at Work - A Guide to Ladders and Elevated Working Platforms
77. Safety at Work - A Guide to Personal Protective Equipment
78. Safety at Work - Personal Protective Clothing
79. Safety Guide for Bamboo Scaffolding Work
80. Safety Guide for Work in Manholes
81. Safety Handbook for Construction Site Workers
82. Safety Hints for Demolition of Unauthorized Building Works
83. Safety Hints on Renovation Work
84. Safety Hints on Operation of Suspended Working Platform
85. Safety in the Use of Abrasive Wheels
86. Work for a Safer, Healthier Workplace
87. Working with Employers
88. Working Safely with Flammable Materials
89. Working Safely with Hand Tools



Occupational Safety and Health Branch
Labour Department

Answer Sheet for MBST (Construction Work) Courses

MBST (Construction Work) Courses

Answer Sheet

Name of Course Provider : _____

Class Ref. (TRC1): _____

Examination Paper Code : _____

Date of Examination : _____

Examination Start Time : _____

Name of Trainee : _____

Mark : _____

Instructions to Trainees

1. The examination paper consists of 20 multiple choice questions. Each correct answer carries 5 marks. Please answer all questions.
2. The passing mark of the examination is 60. The examination must be finished in 30 minutes.
3. Please read the questions carefully and put a tick in the answer box you choose for the question.
4. If you tick more than one answer box for one question, no marks will be awarded.
5. Please initial next to your final answer whenever amendment is made.
6. If you have any questions, please raise your hand and ask the examiner or invigilator.

Question	Answer			
	A	B	C	D
1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Question	Answer			
	A	B	C	D
11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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19	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please tick only one box to denote if the trainee has used the question paper reading service and also if it is read in English.

Not required

Read in English

Read in language other than English

Signature of Trainee : _____

Date: _____

Name and
Signature of Invigilator : _____

Date: _____