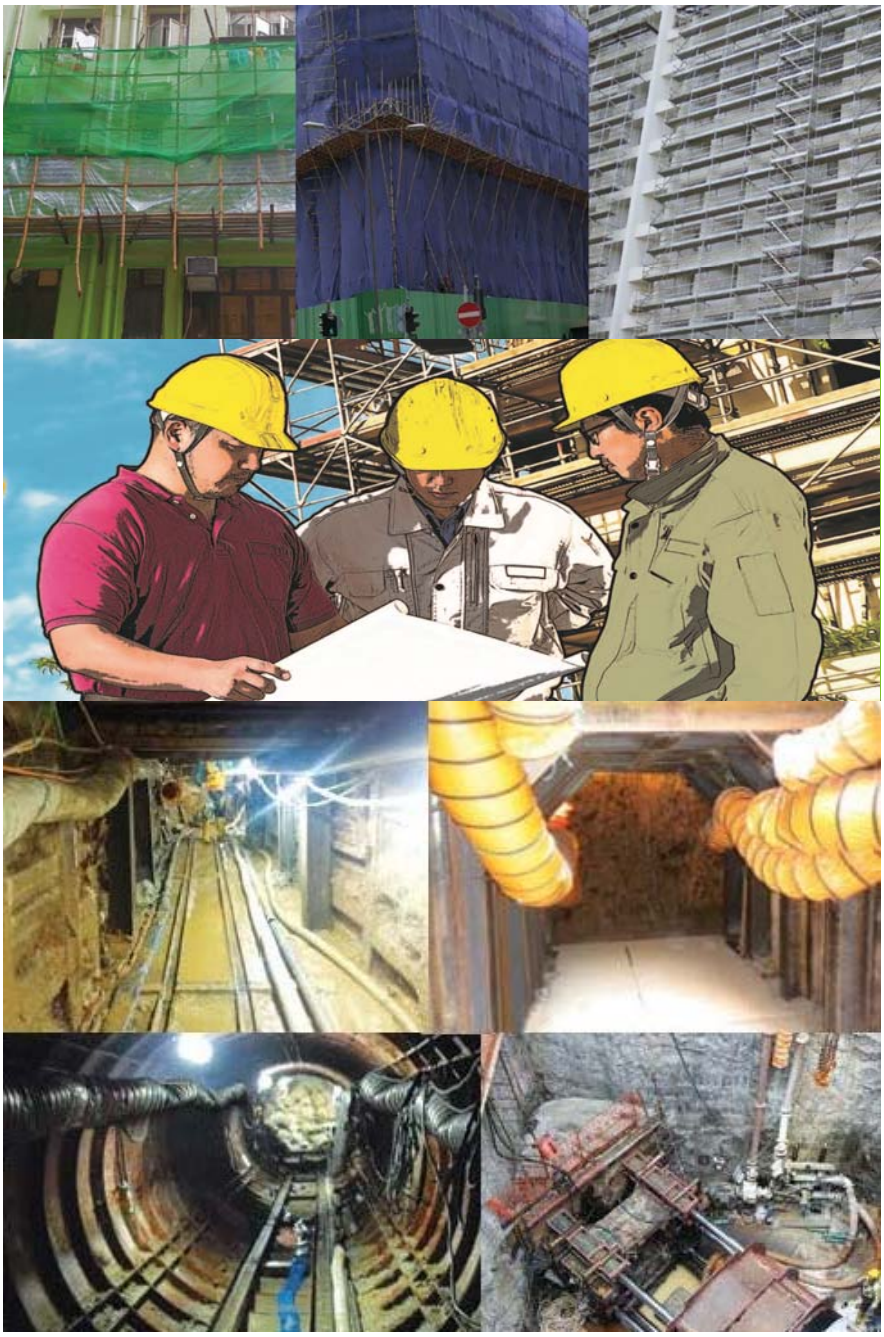
Refresher & Tutorial Materials for Mandatory Basic Safety Training Course (Construction Work)



Occupational Safety and Health Branch
Labour Department

This set of refresher & tutorial materials is prepared by the
Occupational Safety and Health Branch
Labour Department

This Edition November 2023

This set of refresher & tutorial materials aim to assist the employees of the construction industry to prepare for and revise the main points of the mandatory basic safety training courses and enables them to grasp the key knowledge in occupational safety. However, the reader should note that refresher & tutorial materials written in simple and plain language is not applicable for explaining the relevant legislation.

Information on major labour legislation can be found by visiting our Home Page in the Internet (http://www.labour.gov.hk). Information relevant to the latest Press Releases and Work Safety Alert in connection with Occupational Safety and Health can also be found on the Labour Department's website.

Press Releases
http://www.labour.gov.hk/eng/major/content.php

Work Safety Alert
http://www.labour.gov.hk/eng/news/work_safety_alert.htm

Refresher & Tutorial Materials for Mandatory Basic Safety Training Course (Construction Work)

Contents

1. General Safety

No.	Key Learning Points
1	An employer should ensure the safety and health of his/her employees during work. An employee should take care of the safety and health of himself and others at the workplace.
2	Swallowing, skin contact and inhalation are the main pathway for dangerous substances to enter a worker's body.
3	Potential hazards associated with chemical handling include: ✧ causing fire, explosion; ✧ releasing harmful/toxic gases or airborne particles; ✧ splashing of hot, corrosive or toxic liquids; and ✧ resulting in injuries, ulcer, intoxication and even death.
4	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. The essential information of a chemical label includes the chemical name, classification, particular risks and safety precautions.
5	The following terms are used to classify the properties of chemicals: explosive, oxidizing, flammable, toxic, harmful, corrosive and irritant. In handling chemicals, an employee should properly use the protective clothing and equipment provided by the employer.
6	Implementation of a permit-to-work system can ensure a workplace is safe for work and can help to prevent accidents.
7	On a construction site, workers should not work near floor edges without guardrails. When a ladder is used for the purpose of access/ egress: ✧ the ladder should be of good construction, sound material and adequate strength; ✧ the ladder should be placed on a level and firm footing; and

No.	Key Learning Points
	✧ the ladder's upper or lower end shall be securely fixed or secured by another worker.
8	Workers engaged in welding work shall wear approved eye protectors.
9	The quantity of first aid facilities required in a construction site depends on the number of workers employed. A construction site with 30-99 workers employed shall have at least one person trained in first aid.
10	A proprietor of construction work can employ only workers holding a Green Card (Construction Work) to carry out construction work.
11	New construction workers are often unfamiliar with the site condition and operation. In lack of construction work experience and insufficient personal safety awareness, the new construction workers would face higher risks at work.
12	Safety Hints for Construction Workers, especially for the new one: ✧ get familiar with work-related hazards and risks; ✧ use suitable working platform instead of ladder for work above ground; ✧ wear properly personal protective equipment, such as safety helmet with chin strap, full body harness, safety goggle, respirator, gloves, safety shoes, etc; ✧ attach the safety harness to an independent lifeline with a fall arrester or to a fixed anchorage, e.g. eye bolt; ✧ stop unsafe work and refuse to carry out work in unsafe environment. Report to your supervisor immediately if you notice any unsafe condition; and ✧ stay alert of high risk work process, such as work above ground, electrical works, lifting operation, confined spaces operation, woodworking, movement of heavy machinery, excavation, road works, etc.
13	Construction workers (new or not) should not: ✧ fear of speaking up in case of doubts or questions on safety issue; ✧ drink or take drug while working; ✧ do unsafe act which endangers yourself or others; and ✧ carry out hazardous work without relevant training.

2. Work-above-Ground / Work-at-Height

No.	Key Learning Points
1	Most fatal accidents in the construction industry are imputed to work-above-ground / work-at-height. The basic principles for preventing workers from falling during work-above-ground / work-at-height are: ✧ Work-above-ground / work-at-height should be avoided where possible; ✧ if work-above-ground / work-at-height cannot be avoided, risk assessments should be conducted to eliminate work-related hazards or to control the risks before commencing work; and ✧ adequate and proper safety facilities should be provided for work-above-ground / work-at-height.
2	Falling of workers from toppling or collapsing working platforms or scaffolds is a potential hazard of work-above-ground / work-at-height.
3	Before commencement of work-above-ground / work-at-height, work-related hazards should be eliminated or the risks controlled. The process should include the following procedures: ✧ examine the work-above-ground / work-at-height to look for the hazards and decide who might be harmed; ✧ evaluate the risks of the hazards; ✧ formulate safe working methods; and ✧ implement proper safety precautions.
4	Adopting working platforms should be the first priority while working above ground / working at height. For work-above-ground / work-at-height (e.g. external wall work of a building or installing

No.	Key Learning Points
	electrical conduits on a 5 metres high ceiling), the responsible contractor should provide proper scaffold and working platforms. Besides, safe access to and egress from the working place should be provided. The working place and the approaches to the working place should be lit.
5	The safety measures for working on a bamboo scaffold include: ✧ risk assessment for work at height; ✧ establishing proper working procedures; ✧ adequate and proper safety facilities should be provided for work-above-ground; and ✧ provision of adequate information, instruction, training and supervision about the work.
6	Workers are absolutely not allowed to work on a single-row bamboo scaffold without a working platform for external wall work.
7	A working platform should have proper design which includes: ✧ a working platform should be closely boarded or planked; ✧ the minimum width of a working platform is 400 mm; ✧ the height of the top guardrails should be 900 mm to 1150 mm; ✧ the height of the intermediate guardrails should be 450 mm to 600 mm; and ✧ the height of the toe-boards should not be less than 200 mm.
8	3 or more anchor bolts should be used to fix each metal bracket of a truss-out bamboo scaffold onto the external wall of a building. When a worker works on a truss-out bamboo scaffold, the employer should provide a safety harness, fall arrester and independent lifeline for the worker to use.
9	Every scaffold and working platform (including a truss-out bamboo scaffold) should be erected by trained scaffolding workmen under the immediate supervision of a competent person. A scaffold or a working platform 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 (2 weeks) immediately preceding each use and after exposure to adverse weather conditions.
10	The proper ratio of the height to the least base dimension of a mobile metal tower used outdoors should be not greater than 3:1. Measures

No.	Key Learning Points
	for stabilising the structure of a mobile metal tower include: ✧ tying the metal tower to the building with work being conducted; ✧ adding bracings; ✧ adding out-riggers; ✧ locking the wheels; and ✧ do not move the metal tower when someone is staying on it.
11	For work-above-ground / work-at-height, suitable working platforms (e.g. mobile working platforms) should be used. For work-above-ground but less than 2 metres where working platforms could not be erected under restrictive work space and the work concerned is of simple nature, use of suitable light-duty working platforms such as step platforms and hop-up platforms can be considered. When ascending or descending a light-duty working platform, the worker should face the light-duty working platform; hands should be free from carrying heavy objects; and the worker should maintain 3 points of contact with the light-duty working platform.
12	When a worker is conducting scaffold maintenance work or dismantling a scaffold at an external wall, he should wear a full body harness attached to an independent lifeline.
13	Every person working at a suspended working platform (gondola) shall wear a safety belt attached to an independent lifeline.
14	Before using a safety belt, whether any suitable anchorage, independent lifeline and fall arresting device is available should be considered. When it is required to use a safety belt as a fall preventive measure, the belt should be attached to a secure anchorage or an independent lifeline. The most appropriate method for anchoring the safety belt is to anchor the safety belt at a level higher than user's waist. The safety harness should not attach to drainage pipe.
15	Ladders should be restricted for access/egress purpose only and should not be used for work. A ladder for the purpose of access/egress should be of good construction, sound material and adequate strength. When a ladder is used for access and egress, it should be ensured that the ladder is stable and resting on an even and solid ground. A ladder should be placed on a 1:4 ratio (75°) of setback distance to height. To

No.	Key Learning Points
	act as handrails, the upper end of a ladder should be at least 1 metre above the landing against which the ladder leans. When climbing up or down a ladder, 3 points of contact with the ladder should be maintained by the user. Short ladders should not be joined to form a long one for use. A ladder should be inspected and maintained at regular intervals.
16	When somebody has fallen from height, inform the first aider immediately and look after the injured person. Do not move the injured person.
17	An electric shock, fire or explosion may occur when the power-operated elevating work platform comes into contact with an overhead electricity line.
18	✧ Power-operated elevating work platform should be operated by trained worker who has been authorized to operate it. ✧ Workplace condition, e.g. the headroom should be taken into account when adopting the use of the power-operated elevating work platform. ✧ Power-operated elevating work platform should be used in accordance with the instructions given in the manufacturer's manuals. ✧ Power-operated elevating work platform should not be moved or transported with workers on its platform. ✧ Before the power-operated elevating work platform is moved, its working platform should be lowered to the cradle position.

3. Use of Personal Protective Equipment

No.	Key Learning Points
1	Use of personal protective equipment is the last resort when controlling the sources of accident is ineffective.
2	Personal protective equipment is provided by employers. Whether proper protection can be provided should be considered first when selecting personal protective equipment. When the equipment is damaged, it should be replaced immediately.
3	Personal protective equipment includes safety helmets, safety shoes, high visibility clothing (reflective vests), ear muffs, face shields, masks, eye protectors, safety harnesses, gloves, etc.
4	Types of safety gloves include rubber gloves, steel mesh gloves, leather gloves, wrist and arm protective devices.
5	Types of protective clothing include 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.
6	A safety helmet is used for protecting a worker's head from direct hit by falling objects. A worker should wear a safety helmet on a construction site at all times, whether he is working in a building or completing the work in a few minutes. The basic requirement for a safety helmet is appropriate marking indicating the conformity to certain international/ national standards such as European Standard. A

No.	Key Learning Points
	safety helmet should be equipped with a chin-strap. The chin-strap serves to prevent the safety helmet from falling off.
7	Steel toe caps, steel soles and slip-proof characteristics are the basic requirements for safety shoes.
8	In comparison with a general purpose of safety belt, the use of a full body harness can effectively reduce the extent of injury to the waist of the user during falling. When using a safety belt for fall protection, the safety belt should be attached to a proper anchorage point, independent lifeline, or fall arresting system, but never to a horizontal member of bamboo scaffold. When the fall arrester is attached to a lifeline, the upward marking "↑" should be pointing upwards. Each independent lifeline and fall arrester should be used by one person only at one time. The following items should be considered before using a safety belt: ✧ any defect on the safety belt; ✧ any suitable anchorage, independent lifeline and fall arresting device; and ✧ whether the equipment meet the standard or not.
9	The main functions of breathing apparatus are to protect workers against dust, fibres, hazardous gases and fumes and prevent workers from oxygen deficiency. When using breathing apparatus, the closeness between the respirator and the wearer's face must be checked. Breathing apparatus should be cleaned and wiped thoroughly after each use.
10	Piling work would generate high levels of noise. Workers who work in such noise-affected areas shall wear approved ear protectors appropriately. Ear muffs have generally the best performance for hearing protection.
11	Appropriate aprons, safety shoes, gloves and face shields should be worn while handling chemicals.
12	When operating a machine with revolving parts, workers should not wear cotton gloves so as to avoid causing injury to hands due to entangling of cotton gloves with the revolving parts of the machine.
13	Appropriate masks and eye protectors should be used by workers for entering a dusty workplace.

No.	Key Learning Points
14	When working inside a tunnel, workers should put on reflective vests.
15	When breaking concrete, welding or using abrasive wheels, workers should wear eye protectors.

4. Fire Safety

No.	Key Learning Points
1	Inhalation of smoke is the cause accounting for most of the fatalities in fires.
2	Fuel, heat and oxygen are the elements in the formation of fire.
3	Type of fire can be divided into three categories: ✧ burning of paper, cloth, textiles, wood, plastic; ✧ burning of inflammable liquids, solvent, oil, grease; and ✧ burning of electrical appliances, motors, electrical switches.
4	Isolating the fuel, cooling and cutting off the oxygen supply are the methods for fire fighting.
5	Types of fire extinguisher include carbon dioxide gas type extinguishers, water type extinguishers, dry powder type extinguishers, clean agent fire extinguishers and foam type extinguishers. The selection of a fire extinguisher for use depends on the type of fire to be put out. Before using a fire extinguisher, a person should assess the scale of the fire and ensure his/her own safety.
6	A water type extinguisher is suitable for putting out a timber fire but not for a fire caused by a flammable liquid, e.g. petrol.
7	A foam type extinguisher is not suitable for a fire caused by failure of electrical appliances. A carbon dioxide gas type extinguisher is most appropriate for putting out an electrical fire.
8	Before squeezing the lever of a dry powder type extinguisher, a person should pull out the safety pin. The ejection of dry powder from a dry powder type extinguisher should be aimed at the base of the fire. When using a dry powder type extinguisher, one should note that the discharged dry powder may cause disorientation.

No.	Key Learning Points
9	Flammable substances should be stored in metal cabinets. Used rags soaked with flammable liquid should be placed in covered metal containers. At any storage area of flammable or explosive materials, no smoking and naked flame is allowed.
10	Withdraw to open area after using carbon dioxide gas type extinguisher or clean agent fire extinguisher. Carbon dioxide gas type extinguisher is not suitable for putting out of fire arising from paper, textiles, wood and plastic
11	Carbon dioxide gas type extinguishers, dry powder type extinguishers and clean agent fire extinguishers are suitable for putting out fires arising from electrical appliances, motors, electrical switches

5. Machinery Safety

No.	Key Learning Points
1	The following are the potential hazards of a material hoist: ✧ a worker slips and falls into the hoistway; ✧ a worker is trapped or hit by the moving platform of the hoist; and ✧ materials drop through the hoistway and hit a worker.
2	The following are the safety measures in using a material hoist: ✧ do not ride on a material hoist (carrying of workers prohibited); ✧ do not operate a material hoist without prior proper training; ✧ do not exceed the safe working load of a material hoist; ✧ do not use a material hoist unless its gates have been installed with an effective interlocking safety system and the hoist is only to be operated after all the gates have been closed; ✧ do not alter the interlocking devices of the gates on the hoistway for convenience in work; ✧ a material hoist should be repaired and maintained by a competent person; the safety devices should be checked daily; 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 and all signals should be understood and followed; and ✧ post notices to remind workers of the safety matters in using the material hoist.
3	A gondola (suspended working platform) should be operated by a worker who has attained 18 years old and holds a valid gondola operation certificate. A gondola should be checked by a competent person every week and issued with an approved form stating that it is in safe condition.

No.	Key Learning Points
4	An excavator operator shall attain 18 years old and hold a valid relevant certificate.
5	The following measures can prevent a worker from being hit by the jib when an excavator is in operation: ✧ the excavator operator should slew the jib with a safe speed; ✧ erect barriers to prevent workers from entering the operation zone; and ✧ exercise supervision to ensure that the excavator operator and workers comply with safety measures.
6	Potential hazards of cartridge-operated fixing tools includes: ✧ through penetration of the material; ✧ eye injury from fragmentation of brittle materials during firing; ✧ noise from explosive source of the tool; and ✧ explosion/fire caused by cartridge ignition particularly in a flammable atmosphere.
7	Behind and in direct line with a circular saw, there shall be a riving knife. Measures to prevent the exposed teeth of a revolving circular saw from contacting the limbs of a worker: ✧ the top of the circular saw shall be covered by a strong and easily adjustable guard; ✧ the part of the circular saw below the bench table shall be protected by 2 plates of metal; and ✧ a suitable push-stick shall be kept available for use at the bench.
8	Accidents in operating machinery are commonly caused by failure of the machine guarding. Do not use machines unless their dangerous parts have been effectively guarded.
9	Safety measures for repairing the revolving parts of machinery include: ✧ Prevent personnel not responsible for the repairing work from coming near. ✧ Shut off (isolate) the power supply before starting the repairing work. ✧ Post notices regarding the repairing at the switches of the machine and also lock up the switches. ✧ Keep the machine guarding in place for testing the machine.

No.	Key Learning Points
	✧ Install back the removed protective guards before re-starting the machine.
10	The following are the safety measures for controlling traffic in a tunnel site: ✧ segregation of pedestrians and vehicles; ✧ provision of adequate lighting; ✧ workers wearing reflective vests; ✧ providing traffic signs; and ✧ flat and even road surfaces.

6. Electricity Safety

No.	Key Learning Points
1	Electrocution is mainly due to serious injury of the heart.
2	Before using an electrical tool, one should check if the tool is functioning properly. A portable electrical tool should be earthed unless it is of double-insulated construction. Earthing of an electrical tool can reduce the risk of electric shock. If a portable electrical tool is neither earthed nor double-insulated, it cannot be used. The marking of "回" on a portable electrical tool means it is of double-insulated construction. Double-insulation of electrical tools can avoid current leakage.
3	An electrical appliance should be repaired after all live parts of the electrical system has been isolated from the electricity supply. A failed electrical appliance should be repaired by a competent electrician. Improper repairing of an electrical appliance may cause explosion, burnt or electric shock.
4	Practices/situations leading to electrical accidents: ✧ allow live parts of electric wires to expose; ✧ directly connect wires to power supply without using an electric plug; and ✧ conduct arc welding in a humid environment.
5	Measures to avoid electric shock/electric accidents: ✧ not allow the live parts of electric wires exposed; ✧ regularly inspect electrical tools; ✧ use earthed or double-insulated tools; ✧ protect the connections to the arc welding machine;

No.	Key Learning Points
	✧ stand on insulation mats; and ✧ adopt water-proof connection for outdoor electric wires.
6	Electrical appliance used in a humid environment should be water-proof. If it is necessary to use electrical tool in a congested and wet workplace, suitable personal protective equipment, e.g. insulating gloves and mats, should be used.
7	Electrical work should be carried out by a registered electrician. Under special circumstances when live electrical work is necessary, the work should be conducted by a registered electrician with relevant knowledge and training. Before commencement of electrical installation work, a risk assessment should be conducted by a competent person.
8	A worker who has obtained a Green Card but is not a registered electrician is not allowed to perform any live electrical work.

7. Safety of Confined Spaces Operations

No.	Key Learning Points
1	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 includes any chamber, tank (e.g. water tank), vat, pit, well, sewer, tunnel, pipe, flue, boiler, pressure receiver, hatch, caisson, shaft or silo in which such risk arises. The specified risks include a fire or explosion, an increase in body temperature, lack of oxygen, an increase in the level of liquid and entrapment by a free flowing solid.
2	All workers entering a confined space (e.g. a manhole and a sewage pipe) shall be certified workers defined by Factories and Industrial Undertakings (Confined Spaces) Regulation. Before certified workers enter a confined space, a work permit (certificate) should be obtained first. Certified workers should leave the confined space at once when the safe period of the work permit expires.
3	Prior to commencement of work in a confined space, the proprietor shall appoint a competent person specified by the Factories and Industrial Undertakings (Confined Spaces) Regulation to conduct a risk assessment of the working conditions of the confined space. The risk assessment should be displayed at a conspicuous place at the entrance of the confined space. Before workers enter the confined space, the recommendations on necessary precautions to be taken of the risk assessment should have been completed. No worker is allowed to carry out confined space work if no risk assessment has been conducted.

No.	Key Learning Points
4	The duty of the standby person stationed outside a confined space is to communicate with workers inside the confined space.
5	Nobody is allowed to enter a confined space when a detection of the gas inside the confined space has not been performed. Before any worker enters a confined space, a gas detector should be used to determine whether the amounts of gas components in the confined space are safe or not.
6	Where the use of approved breathing apparatus is recommended in the risk assessment report or a certified worker has to enter a confined space for underground pipework, any certified worker entering or remaining in that confined space shall properly wear a suitable approved breathing apparatus with a suitable safety harness connected to a lifeline. The free end of the lifeline shall be held by a standby worker outside the confined space.
7	Effective forced ventilation is a mandatory precaution that the proprietor should provide before workers enter a confined space.
8	Only site personnel who have been suitably trained shall use the appropriate rescue equipment so provided to conduct the rescue operation according to the emergency rescue procedure.

8. Manual Handling Operations

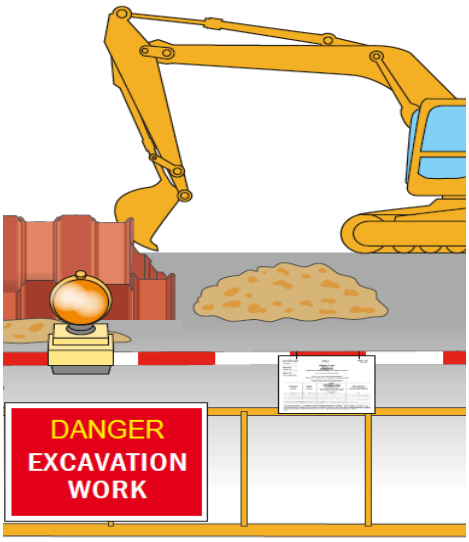
No.	Key Learning Points
1	The proper method of manual handling operations is holding the object close to the body, lifting with the legs by slowly straightening them and keeping the lower back straight. Incorrect manual handling operations may cause injury. Lifting of heavy objects by bending the waist will likely cause injury to the waist.
2	When using a trolley to transport goods, one should note whether the structure of the trolley is good or not, any potential hazards in the pathway and whether the floor is even or not.
3	Before a manual handling operation is conducted, a risk assessment should be carried out, e.g. the weight of the goods. In addition, workers should do some warm-up exercises before conducting manual handling operations.
4	Proper practices of manual handling operations: ✧ adopt a proper posture (i.e. keep the back straight); ✧ use the power of thigh muscles to lift goods; ✧ provide sufficient manpower to conduct a manual handling operation; ✧ use mechanical tools (e.g. trolleys) to transport goods; and ✧ reduce the weight of the goods to be carried.
5	Improper practices of manual handling operations: ✧ suddenly increase the movement speed; ✧ make jerky motions; ✧ frequent and prolonged repetitive movements; ✧ only twist the upper body trunk; and ✧ slippery floor.

9. Welding Safety

No.	Key Learning Points
1	A worker performing gas welding or flame cutting shall attain 18 years old; has received proper training and holds a valid relevant certificate.
2	Safe practices of using oxy-acetylene flame for welding include: ✧ the gas cylinders should be equipped with flashback arresters; ✧ the welder should not re-charge the oxygen cylinder; ✧ use screen to avoid the sparks from injuring others; and ✧ keep the gas cylinders upright and far away from a place where hot processes are in progress.
3	Before performing flame cutting of an old pipe, one should purge the residue inside the pipe.
4	Sparks in flame cutting can cause corneal ulcer. Toxic fumes formed in gas welding can cause metal fume fever.
5	During gas welding, fire or explosion would be resulted if the acetylene cylinder overheats. Therefore, the gas cylinders for gas welding should be far away from a place where hot processes are being undertaken. Fire and explosion would also happen if leakage of the fuel gas or oxygen occurs.
6	Flashback at the blowpipe in the course of gas welding can cause fire and explosion.
7	Common hazards of arc welding include electric shock, arc radiation and inhalation of harmful gases. Prolonged inhalation of excessive metal dust can cause damage to welder's lung tissue. The ultraviolet radiation generated in arc welding would cause damage to the eyes of a welder.

No.	Key Learning Points
8	Personal protective equipment required by a welder for arc welding includes eye shield, gloves and insulated shoes.
9	A workplace for arc welding work should be: ✧ provided with adequate lighting; ✧ equipped with appropriate fire extinguishers; ✧ well ventilated; and ✧ arc welding work should not be conducted if the floor is wet.
10	When arc welding is performed to an empty drum which was previously used for storage of diesel, the residual diesel in the drum would turn into vapour and explode. Therefore, the drum should be thoroughly cleaned.

10. Safety of Excavation Work



No.	Key Learning Points
1	The major potential hazards of excavation works are collapse of pits, electric shock due to underground cables damaged and explosion due to underground town gas pipes damaged.
2	During excavation, if the floor of the pit cracks and the support is broken or loosened, stop the work immediately, leave the pit and report to the superiors. Debris and heavy machines should be stacked far away from the pit to prevent their weights causing the pit collapse. The purpose of providing suitable support and shoring at the edge of an excavation is to avoid collapse of the pit. Workers are allowed to work in a trench only when the trench is securely shored.
3	During the excavation work, the excavation including the related pit and slope should be thoroughly examined by a competent person at least once every 7 days. A competent person should fill in Form 4 after a weekly examination of the excavation.
4	The most important excavation safety measure is to obtain the actual locations of the underground pipes, cables and other public facilities.
5	Site personnel working near underground electricity cables should be advised that cables may be found under roads, footpaths or on sites and damaging underground electricity cables is dangerous. Before starting works near underground electricity cables, a

No.	Key Learning Points
	competent person should be appointed by the working party to detect the alignments and depths of the underground electricity cables.
6	The worst consequence would be electric shock, fire or explosion if underground utilities are damaged during excavation work. When a worker uses a tool to carry out excavation work near an underground electricity cable, the tool should keep an adequate safe working distance from the underground electricity cable.

11. Lifting Appliances and Lifting Gear

No.	Key Learning Points
1	Lifting appliances commonly used on construction sites include tower cranes, crawler-mounted cranes, truck-mounted cranes and wheel-mounted telescopic cranes. Lifting gear commonly used on construction sites include chain slings, rope slings, rings and links.
2	Lifting appliances and lifting gear must be regularly inspected, thorough examined and tested by competent examiners.
3	An automatic safe load indicator shall be installed at a crane with a maximum safe working load of above 1 tonne.
4	Crane operators shall attain 18 years old and hold valid relevant certificates. When a crane is used to lift a load, a competent worker who has been trained should be responsible for rigging the load.
5	Before using lifting gear such as a hook, shackle or chain sling, check whether there is any wear and tear.
6	Lifting gear used in lifting operations (such as rope slings and chain slings) shall be marked with the 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. In a lifting operation using a crane, the safe working load of the crane should be larger than the weight of the load (e.g. 1000 Kg : 500 Kg is a proper ratio of the safe working load of the crane to the weight of the load).
7	Major potential hazards in a crane operation include overturning of the crane, the lifting boom colliding with an obstacle and the lifting boom touching an overhead power line. It is unsafe to conduct more than one lifting task simultaneously in the vicinity, for example, using

No.	Key Learning Points
	a crane to lift wooden boards and a skip for conveying concrete simultaneously in the vicinity may cause collision of the objects being lifted.
8	A crane should only be operated on a uniform, level and firm ground with sufficient load bearing capacity to withstand the maximum in-service loadings of the crane.
9	In order to avoid the sinkage or collapse of the supporting surface and overturning or collapse of a crane, the loading should be distributed over a sufficiently large area. Steel or wooden mats with an adequate strength and a sufficiently large area should therefore be used to support the load of a crane.
10	If a crane is equipped with outriggers, the beams should be fully extended. Steel or wooden mats with an adequate strength and a sufficiently large area or timber blocking should also be used to support the load as far as practicable. The jacks should be suitably extended so that all the crane tyres are clear of the ground.
11	Regarding using a crane for a lifting operation: ✧ a risk assessment should be conducted; ✧ prevent the load being lifted from passing over persons working beneath; ✧ the load should stay away from obstacles; and ✧ Electric shock, fire or explosion as the result of the lifting boom touching overhead electricity lines.
12	When the operator of a lifting appliance (such as a jib crane or a tower crane) does not have an unrestricted view, a signaller should be employed to assist the lifting. The operator of the lifting appliance should coordinate with signaller to prevent accidents.
13	Do not work beneath any suspended load and do not work within the lifting operation area.
14	Minimum safe working distance shall be always maintained for working near overhead electricity lines. 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 an overhead cable.
15	The minimum depth of a cage or receptacle used for carrying persons is 900 mm; and the cage or receptacle shall be clearly marked the safe

No.	Key Learning Points
	working load and the maximum number of persons that may be carried at any one time.
16	Safety measures for the operation of a passenger hoist or tower working platform: ✧ operated by competent operators only; ✧ mark the safe working load and the maximum number of persons can be carried; and ✧ the gates must be kept closed all the time unless passengers go in or out.
17	In developing a safe system of work for a lifting operation, characteristics of the load, the lifting method and the moving path of the lifting operation should be taken into consideration. Before conducting a lifting operation, any loose material should be adequately secured and contained in a suitable receptacle.
18	Do not use a lifting appliance unless it has been inspected weekly and certified safe by a competent person.

12. Miscellaneous Items

No.	Key Learning Points
1	The Government, employers and workers are responsible for preventing industrial accidents. In the aspect of safety of construction workers, the Government's responsibilities include formulating safety laws, organizing promotion activities, educating the stakeholders of the legislative requirements, and supervising the implementation of the laws, etc. The responsibilities of employers and proprietors include providing a safe working environment, providing and maintaining safe work systems and providing information for ensuring safety and health, etc. Workers should be responsible for their own unsafe acts. The consequences of industrial accidents are death, injury and occupational disease.
2	Good housekeeping at a workplace can provide a safe and effective working environment. Stacking materials arbitrarily on a passageway can cause accidents. It is a general duty of the proprietor of a construction site to provide safe means of access to and egress from a workplace. It is the responsibility of an employer to provide personal protection equipment to his workers.
3	Contingency plans such as plans for fire accidents on a construction site should be formulated and drilled regularly so as to allow workers to familiarize with the procedures of the contingency plans.
4	In a hot and humid environment, workers are more likely to sustain heat stroke. Thirst, headache and nausea are common symptoms of heat stroke. Measures for preventing heat stroke: ✧ avoid working under direct sunlight;

No.	Key Learning Points
	✧ setting up temporary sunshade; ✧ providing mechanical aids to reduce physical exertion of employees; ✧ providing cool potable water; and ✧ taking regular rest.
5	Labour Department has established a system of Heat Stress at Work Warning ✧ Amber - indicates the level of heat stress in certain work environments is high; ✧ Red - indicates the level of heat stress in certain work environments is very high; and ✧ Black - indicates the level of heat stress in certain work environments is extremely high.
6	The main purpose of implementing the mandatory basic safety training (Green Card training) is to enhance workers' safety awareness. The validity of a "Green Card" is 3 years.
7	Employees working outdoors in exposed areas in times of bad weather should immediately stop work and take shelter.
8	The purpose of a permit-to-work system is to ensure that a workplace is safe for work.

Secretary for Labour and Welfare

reminds you that:

1	Everyone should take care of his/her own life. You should say "NO" to jobs that disregard danger;
2	Be a considerate employee. Don't forget what the green card course has taught you. Always stay alert. Don't sacrifice your life for speed and convenience;
3	If you see potential occupational hazards or dangers, you should report them immediately;
4	Occupational safety is a shared obligation for employers and employees; and
5	If there is negligence, both employers and employees are liable to be prosecuted.