

**Tutorial Material for
Mandatory Basic Safety Training Course
(Construction Work)**



This tutorial material is prepared by the
Occupational Safety and Health Branch
Labour Department

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

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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_2012.htm

Work Safety Alert

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

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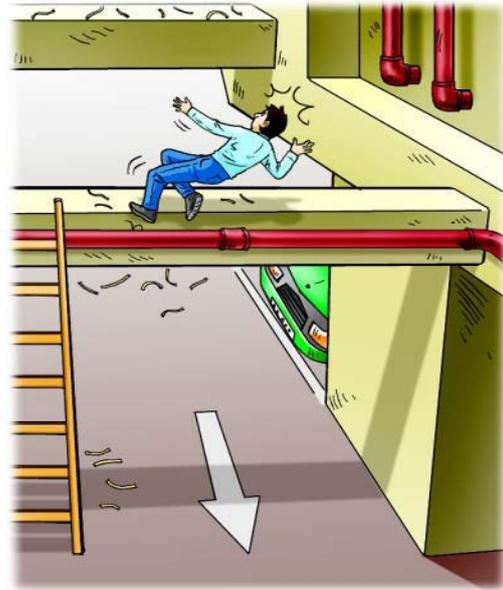
1. General Safety



No.	Key Learning Points
1	The purpose of stipulating the Occupational Safety and Health Ordinance is to protect the safety and health of employees at work.
2	Employers should contribute to safety and health by ensuring the safety and health of the employees during work. Employees should contribute to safety and health by taking care of the safety and health of himself and others at the workplace.
3	According to the "General Duties" provisions, proprietors shall provide employees with a safe and health working environment and necessary safety information, instruction, training and supervision, and safe access to and egress from a workplace.
4	The main pathways for chemical substances to enter a worker's body are swallowing, skin contact and inhalation.
5	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 compulsory information of a chemical label includes the chemical name, classification, particular risks and safety precautions.
6	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.
7	<p>Safety practices on construction sites:</p> <ul style="list-style-type: none"> ✧ Store loose substances and construction materials properly at designated and secure locations. ✧ Place materials far from a floor opening.

No.	Key Learning Points
	<ul style="list-style-type: none"> ✧ Don't throw materials from height. ✧ Don't work near a floor edge or a floor opening without guardrails. ✧ Don't place materials on passageways. ✧ Timber with projecting nails should be flattened or extracted immediately. ✧ Wear approved eye protectors when conducting welding work. ✧ Never work under goods in suspension.
8	A construction site with 5 workers or more employed shall be provided with a first aid box. The number of first aid facilities required depends on the number of workers employed. Wording of "first aid" shall be clearly marked on the first aid box. The booklet "Hints on First Aid" published by the Labour Department and the substances required statutorily shall be placed in the first aid box.
9	A construction site with 30-99 workers employed shall have a person trained in first aid.
10	The principal contractor of a construction site with 100 or more workers employed shall employ a full-time registered safety officer.
11	An employer shall provide his employees with potable water.
12	An employer shall report a dangerous occurrence happened in a workplace to the Labour Department with 24 hours.
13	"Mandatory Safety Training" courses shall be recognized by the Commissioner for Labour.

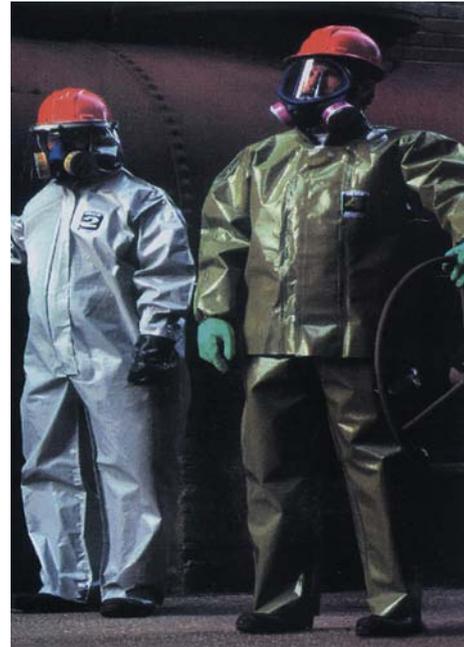
2. Work at Height



No.	Key Learning Points
1	Most fatal accidents in the construction industry are imputed to working at height. Adopting working platforms should be of the first priority while working at height.
2	Scaffolds (including working platforms) should be erected by trained scaffolding workmen. A competent person should inspect a scaffold and issue a Form 5 to state the scaffold is in safe condition within 14 days before the scaffold is used and at least every 2 weeks.
3	A working platform's safety design includes guardrails and toeboards. The main function of guardrails at a working platform is to prevent fall of workers. The main function of toeboards is to prevent fall of persons, objects and tools.
4	The minimum width of a working platform is 400mm. The height of the top guardrail on the working platform shall be 900-1150mm. The height of toeboards on the working platform shall not be less than 200mm. The boards forming working platform should not be less than 200mm in width and not less than 25mm in thickness or not be less than 150mm in width and not less than 50mm in thickness.
5	Before using a safety harness, whether any suitable anchorage, independent lifeline and fall arresting device is available should be considered. When it is required to use a safety harness as a fall preventive measure, the harness should be attached to a secure anchorage or an independent lifeline.

No.	Key Learning Points
6	When a worker conducts scaffold maintenance work at an external wall, the most suitable safety harness anchorage is an independent lifeline. The most appropriate safety harness anchoring method is to anchor it at a level higher than the user's waist.
7	At least 3 anchor bolts should be used to fix each metal bracket of a truss-out scaffold onto the external wall of a building.
8	When a ladder is used for access or egress, it should be ensured that the ladder is stable and resting on an even and solid ground. Never joint short ladders to form a long one for use. The top of a ladder should protrude the landing platform at least 1.0 metre as a handrail.
9	Workers working at a gondola shall wear safety belts anchored to independent lifelines.
10	The minimum depth of a cage or receptacle used for carrying persons is 900mm.
11	When somebody has fallen from height, inform the first aider immediately and look after the injured person. Do not move the injured person.
12	A scaffold with suitable working platform and safe means of access and egress should be provided to workers to ensure the cleaning work at height can be conducted safely.
13	Ladders should be regularly inspected and maintained.
14	A suitable working platform with guardrails and toe-boards should be used while installing electrical conduits on ceiling at height.

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. Employees should understand the matters of “selection, use, maintenance and fit for the work” related to personal protective equipment. Replace unfit or damaged personal protective equipment immediately.
3	A safety helmet is used for protecting a worker's head from direct hit by falling objects. A worker working in a construction site shall wear a safety helmet at all times regardless he is working inside a building or required to work for a few minutes only. One of the basic requirements of safety helmets is bearing a safety marking such as the European Standard number.
4	<p>The following are the safety practices regarding safety helmets:</p> <ul style="list-style-type: none"> ✧ A sufficient clearance should be maintained between the head and the shell of a safety helmet. ✧ Regularly check if there is any damage. ✧ Regularly clean a safety helmet but not with an organic solvent. ✧ Regularly check the expiry date. ✧ Don't remove the helmet harness. ✧ Don't pierce holes on a safety helmet to enhance ventilation.

No.	Key Learning Points
	✧ Don't place a straw hat inside a safety helmet for shading sunlight.
5	Steel toe caps, steel soles and slip-proof characteristics are the basic requirements for safety shoes.
6	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 .
7	Appropriate aprons, safety shoes, gloves and face shields should be worn while handling chemicals. Gloves specific for handling the chemical should be used.
8	The user of a respirator should note the closeness between the respirator and the user's face. After using a respirator, the user should clean and wipe the respirator thoroughly. Appropriate dust filters should be used for protecting the respiratory system of workers engaged in grinding work. Appropriate masks and eye protectors should be used by workers entering dusty workplaces.
9	Prolonged exposure to high levels of noise can lead to hearing damage. Ear muffs have generally the best performance for hearing protection. Only ear protectors including ear muffs with their brands and models approved by the Labour Department can be used. Piling work would generate high levels of noise. Workers working in the noise affected area shall wear approved ear protectors appropriately.
10	Wet drilling method and dust removal equipment should be adopted as safety measures for drilling holes in a tunnel.
11	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.
12	It is inappropriate to wear working uniforms stained with inflammable liquid, sandals and slippers at work.
13	Silicosis is caused by prolonged inhalation of silica dust. Hand-dug caisson workers are most likely to suffer from this disease.

4. Fire Safety



No.	Key Learning Points
1	Most fatal cases in fire are caused by inhalation of smoke.
2	The essential conditions for burning are fuel, heat and oxygen. Therefore, isolating the fuel, cooling and cutting off the oxygen supply are fire fighting methods.
3	Rubber floor tiles laying work with the use of adhesive is a high fire risk construction process.
4	Fire is likely caused by spraying of flammable liquid (e.g. paint spraying).
5	Burning of paper, cloth, timber, plastic, rubbish and miscellaneous articles is classified as the first category of fire.
6	<p>The following are fire prevention measures:</p> <ul style="list-style-type: none"> ✧ Check the fire fighting equipment regularly. ✧ Keep the exit doorway free from obstruction. ✧ Keep the workplace clean and tidy. ✧ Keep the smoke doors closed. ✧ Carefully use the machines and tools that would generate sparks and heat. ✧ Confirm the location for assembly after fire evacuation. ✧ Flammable substances should be stored in metal cabinets. ✧ Don't store large quantities of flammable substance in the workshop. ✧ Don't stack miscellaneous articles to block the fire fighting equipment. ✧ Used rags soaked with flammable liquid should be placed in covered metal containers.

No.	Key Learning Points
	✧ Workers should not smoke within a “No Smoking Area” so as to prevent ignition of the inflammable substances nearby.
7	A water type fire extinguisher is suitable for putting out a timber fire but not for a fire caused by a flammable liquid, e.g. petrol.
8	A foam type fire extinguisher is not suitable for a fire caused by failure of electrical appliances.
9	When using a dry powder type fire extinguisher, one should note that the discharged dry powder may cause disorientation.
10	Carbon dioxide type fire extinguisher is most appropriate for putting out an electrical fire.

5. Machine Safety



No.	Key Learning Points
1	A contractor should mark the platform or cage of a material hoist with the safe working load. Carriage of persons by a material hoist is prohibited. The operation of a material hoist is forbidden when any hoistway gate is not closed. A competent examiner is responsible for carrying out the testing and thorough examination for a material hoist.
2	A gondola should be operated by a worker who 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.
3	<p>Factors contributing to accidents of lifting appliances (such as jib crane or tower crane):</p> <ul style="list-style-type: none"> ✧ Overload causing the crane to overturn or the jib to break. ✧ Insufficient training of the crane operator. ✧ Workers working within the lifting operation area. ✧ Misunderstanding between the crane operator and the signaler.
4	A lifting appliance (such as jib crane or tower crane) should undergo a thorough examination by a registered professional engineer once every 12 months. A competent person should be responsible for the weekly inspection of a lifting appliance.
5	A crane operator shall attain 18 years old and hold a valid relevant certificate. Also, an excavator operator shall attain 18 years old and hold a valid relevant certificate.
6	If a crane is equipped with outriggers, they should be fully extended and supported on rigid timber blocks. When operating a telescopic jib crane near an overhead cable, one should use “goal posts” to restrict the working zone of the jib.

No.	Key Learning Points
7	Every piece of lifting gear (e.g. wire sling) shall be marked with its safe working load.
8	Lifting gear (e.g. a sling) should undergo a test and thorough examination by a registered professional engineer.
9	Accidents in operating machinery are commonly caused by failure of the machine guarding.
10	<p>Safety precautions for repairing the revolving parts of a machine:</p> <ul style="list-style-type: none"> ✧ 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 and cleaning the machine. ✧ Install back the removed protective guards before re-starting the machine.
11	<p>Safety precautions for using an abrasive wheel:</p> <ul style="list-style-type: none"> ✧ The safety guard shall be provided and kept in position while the abrasive wheel is in motion. ✧ Affix a notice which specifies the highest permissible speed and the safety rules of using the abrasive wheel. ✧ Replacement of the abrasive wheel can be conducted only by a person authorized by the proprietor in writing. ✧ Select an appropriate abrasive wheel for use.

6. Electricity

Safety



No.	Key Learning Points
1	Electrocution is mainly due to serious injury of the heart.
2	Before using an electrical appliance, one should check if the tool is functioning properly. An 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. 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 the power supply has been completely isolated. 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: <ul style="list-style-type: none"> ✧ Repair electrical tools by an unqualified person. ✧ Unauthorized modification of electrical tools. ✧ Allow live parts of electric wires to expose. ✧ Directly connect wires to power supply without using an electric plug. ✧ Conduct arc welding in a humid environment.
5	Practices/situations to avoid electrical accidents: <ul style="list-style-type: none"> ✧ Repair electrical tools by a competent electrician. ✧ Regularly inspect electrical tools. ✧ Adopt “permit-to-work” for repairing electrical appliances. ✧ Use an appropriate plug to connect power supply. ✧ Stand on an insulated mat.

No.	Key Learning Points
	<ul style="list-style-type: none">✧ Adopt water-proof facilities for outdoor electric wires connection.✧ Use water-proof electrical appliances in a humid environment.

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, 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. water tank of a building) shall be certified workers defined by Factories and Industrial Undertakings (Confined Spaces) Regulation. A certified worker shall attain the age of 18. 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 to the confined space. Before entering the confined space, the recommendations of the risk assessment should have been completed.
4	The duty of the 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.

No.	Key Learning Points
6	A worker should wear a self-contained respirator when entering a confined space for rescue.
7	Providing an effective forced ventilation is a mandatory precaution before workers enter a confined space.
8	Using a portable generator at the bottom of a lift shaft may cause carbon monoxide poisoning.

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. The most common injury suffered by workers engaged in lifting heavy goods is strain and sprain. Lifting of heavy objects by bending the waist will likely cause injury to the waist. Doing warm-up exercises before transporting goods can render the muscles and cardiopulmonary system more adaptable to the change so as to reduce chance of getting injured.
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 transporting curtain wall glass panels, the responsible person is required to make assessment of the risks.
4	<p>Proper practices of manual handling operations:</p> <ul style="list-style-type: none"> ✧ 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. ✧ Reduce the weight of the goods to be carried.
5	<p>Improper practices of manual handling operations:</p> <ul style="list-style-type: none"> ✧ Suddenly increase the movement speed. ✧ Make jerky motions. ✧ Frequent and prolonged repetitive movements. ✧ Only twist the upper body trunk. ✧ Slippery floor.

9. Welding

Safety



No.	Key Learning Points
1	Workers performing gas welding or flame cutting shall attain 18 years old and hold valid relevant certificates.
2	Safe practices of gas welding: <ul style="list-style-type: none">✧ The gas cylinders should be equipped with flashback arresters.✧ Use screen to avoid the sparks from injuring others.✧ Keep the gas cylinders upright.
3	Before performing flame cutting of an old pipe, one should purge the residue inside the pipe.
4	The common colour of oxygen cylinders used in gas welding is black and that of acetylene cylinders is maroon.
5	An acetylene cylinder should not be laid flat on ground so as to avoid leakage of flammable liquid from the cylinder.
6	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.
7	Personal protective equipment for arc welding includes eye shield, gloves and insulated shoes.
8	Workplaces for welding work should be: <ul style="list-style-type: none">✧ Provided with adequate lighting.✧ Equipped with appropriate fire extinguishers.✧ Well-ventilated.
9	In a poorly ventilated environment, performing welding work may cause oxygen deficiency.

10. Safety of Excavation Work



No.	Key Learning Points
1	The most important excavation safety measure is to obtain the actual locations of the underground pipes, cables and other public facilities.
2	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.
3	The most dangerous outcome of excavation work is collapse of soil. Therefore, debris and heavy machines should be stacked far away from a pit to prevent the occurrence of vibration and overload which cause the pit collapse. The purpose of providing suitable support and shoring at the edge of an excavation is to avoid collapse of the pit.
4	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.
5	When a worker discovers unidentified underground pipes and electric cables during piling works, he should stop the work immediately and inform the supervisor.
6	Measures for maintaining a good ventilation system for a tunnel work: <ul style="list-style-type: none"> ◇ Regularly test and inspect the air quality. ◇ Avoid accumulating the exhaust gases inside the tunnel. ◇ Ensure the fresh air ducts extend to all locations of the workplace.

11. Miscellaneous

Items



No.	Key Learning Points
1	The Government, employers and workers are responsible for preventing industrial accidents. 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. Segregating the pedestrians from the moving vehicles is an effective measure to prevent traffic incidents in a construction site.
3	Contingency plans should be devised and drilled regularly so as to allow workers to familiarize with the procedures of the contingency plans. An emergency contingency plan for fire accidents can minimize the loss caused by fire.
4	In a hot and humid environment, workers are more likely to sustain heat stroke. Thirst and nausea are common symptoms of heat stroke. Measures for preventing heat stroke: <ul style="list-style-type: none">✧ Avoid working under direct sunlight.✧ Setting up temporary sunshade.✧ Rescheduling work to cooler periods in the daytime and cooler places.✧ Providing cool potable water.✧ Wearing light-coloured and loose-fitting clothing.✧ Taking regular rest.
5	The main purpose of implementing the mandatory basic safety

No.	Key Learning Points
	training (green card) is to enhance workers' safety awareness. The validity of "Green Card" is 3 years.
6	When asbestos is discovered during building demolition work, workers should stop the demolition work and report to the management.
7	To ensure work safety, workers should not drink alcohol during lunch time.
8	The purpose of a permit-to-work system is to ensure that all safety measures have been implemented before the work starts.
9	An employer should report a fatal accident to the Labour Department within 24 hours after the time when the accident occurred.