

Mandatory Basic Safety Training (Construction Work)

Tutorial Materials

(Applicable to the standardised essential course contents to be adopted on 10 October 2011)

This set of tutorial materials aims to assist the employees of the construction industry to prepare for the mandatory basic training safety training course and enables them to grasp the key knowledge in occupational safety.

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1. General Safety

No.	Learning Key Points
1.	The purpose of the Occupational Safety and Health Ordinance (Cap. 509) is to protect the safety and health of employees at work.
2.	Under the Occupational Safety and Health Ordinance (Cap. 509), employers should contribute to the safety and health in a workplace by ensuring the safety and health of employees during work. Employees should also contribute to the safety and health in a workplace by taking care for the safety and health of themselves and others at the workplace.
3.	According to the "General Duties" provisions of the Factories and Industrial Undertakings Ordinance (Cap. 59), proprietors shall provide a safe and health working environment to employees. Proprietors shall also provide employees with safe plant and system of work, necessary information, instruction, training and supervision, and safe access to and egress from a workplace.
4.	Under the General Duties provisions, the main responsibility of employees is to take care of the safety of themselves and other persons.
5.	The main pathways for dangerous substances to enter our bodies are swallowing, body contact, and inhalation.
6.	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.
7.	The compulsory information of a label of chemical includes the chemical name, classification, particular risks, and safety precautions but not the chemical formula.
8.	According to the Factories and Industrial Undertakings (Dangerous Substances) Regulations (Cap.59), the responsibilities of employees are to understand properties, relevant safe uses and safety precautions required of chemicals, properly use protective clothing and equipment provided by employers, and prohibit smoking and eating at workplaces where chemicals are being used or stored.
9.	According to the Factories and Industrial Undertakings (Dangerous Substances) Regulations (Cap. 59), the following terms are used to classify the properties of chemicals: explosive, oxidising, flammable, toxic, harmful, corrosive and irritant.
10.	For personal safety and the safety of other persons, workers working at a

No.	Learning Key Points
	construction site should not place materials near a floor opening, not to throw materials from height, and not to work near a floor edge without guardrails.
11.	Workers are absolutely not allowed to work underneath suspended goods.
12.	Timber with projecting nails should be flattened or the nails should be extracted from the timber immediately.
13.	To maintain the housekeeping of a construction site, loose substances and building materials shall be properly stored at designated locations and secure places.
14.	According to the Factories and Industrial Undertakings (Protection of Eyes) Regulations (Cap. 59), workers engaged in welding work shall wear approved eye protectors.
15.	According to Construction Sites (Safety) Regulations (Cap. 59), 5 persons or above employed in a construction shall be provided with a first aid box. The number of first aid facilities required depends on the number of employees employed. Wording of "first aid" shall be clearly marked on the first aid box. 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 the first aid box.
16.	There shall be a person trained in first aid where 30-99 workers are employed on a construction site.
17.	A principal contractor of a construction site employing 100 workers or more shall require a full-time registered safety officer.
18.	Whether any personal injury has been caused or not, an employer shall report every dangerous occurrence happened in a workplace to the Labour Department within 24 hours.
19.	According to the Factories and Industrial Undertakings Ordinance (Cap. 59), "Mandatory Safety Training" courses shall be recognised by Commissioner for Labour.

2. Work at Height

No.	Learning Key Points
1.	Work at height causes the most fatal accidents in the construction industry. Proper working platforms are the first consideration by proprietors to prevent accidents of falling from height at work.
2.	Scaffolds and working platforms should be erected by trained scaffolding workmen. A working platform's legally required safety design includes guardrails.
3.	According to the Construction Sites (Safety) Regulations (Cap. 59), a competent person is responsible for inspecting a scaffold within 14 days before it is used or after a scaffold has exposed to adverse weather and issuing a report to state the scaffold is in safe condition. A competent person should inspect the scaffold and fill in Form 5 at least once every 2 weeks.
4.	The main purpose of the guardrails of a working platform is to prevent fall of workers. The main purpose of the toe-boards is to prevent fall of substances and tools.
5.	Construction Sites (Safety) Regulations (Cap. 59) stipulates the heights of guardrails are: 900mm-1150mm for top guardrails, and 450mm-600mm for intermediate guardrails. The height of toe-boards shall not be less than 200mm. The minimum width of a working platform is 400mm.
6.	Working platforms should be provided and used for working at height whenever necessary. When a worker uses a safety belt for conducting scaffolding maintenance work outside the external wall of a building, the most proper position for anchoring the safety belt is an independent lifeline. The most appropriate method for anchoring a safety belt is to anchor it at a level higher than the user's waist. A full body harness should be used with an independent lifeline by a worker working at height.
7.	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 available, and whether the relevant standard is met or not.
8.	The minimum depth of a cage or receptacle used for carrying persons is 900mm.
9.	All workers working at a gondola shall attain 18 years old, have undergone training and hold valid certificates.
10.	Workers working at a gondola shall wear safety belts anchored to

No.	Learning Key Points
	independent lifelines.
11.	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 serve as handrails is 1.0 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.
12.	When somebody has fallen from height, inform the first aider immediately and look after the injured person. Do not move the injured person.

3. Use of Personal Protective Equipment

No.	Learning Key Points
1.	Use of personal protective equipment is the last resort when controlling the accident at source is impracticable.
2.	Personal protective equipment should be provided by employers. Workers should follow instructions to use personal protective equipment issued. When the equipment is damaged, immediately replace the equipment.
3.	The following should be considered when using personal protective equipment: whether the personal protective equipment provides proper protection, whether it fits for the works, and whether it is comfortable to the user. If the personal protective equipment is not fit for the user or damaged, replace it immediately.
4.	The rules for "selection, use, maintenance, fit for the work" of personal protective equipment should be understood by employees.
5.	Safety helmet is for protection of worker's head from falling material. Safety marking, such as European Standard number is the basic requirement for a safety helmet.
6.	The following are common mal-practices of using safety helmets: removal of helmet harness (sufficient clearance should be maintained between the head and the shell of a safety helmet.), drilling holes on helmet to improve ventilation, and applying paintings as identification.
7.	Steel toe caps, steel soles and slip-proof characteristics are essential features for safety shoes. Wearing safety shoes can prevent the sole from being pierced by sharp objects, prevent the user from sliding on a slippery floor and prevent the user's toes from being crushed by falling objects. Sandals or slippers are inappropriate working uniform.
8.	In comparison with a general purpose safety belt, the use of a full body harness can reduce the impact during falling that caused injury to the waist of the user's body.
9.	Aprons, safety shoes, gloves specific for handling chemicals and face shields should be worn for handling chemicals.
10.	Worker engaged in grinding work should use dust respirators for protection of respiratory system.
11.	The occupational disease, silicosis is caused by prolonged inhalation of

No.	Learning Key Points
	silica dust. As such, silicosis is most likely caused by hand-dug caissons.
12.	Respirators and eye protectors should be used by workers for entering a dusty workplace. The tightness between a respirator and the wearer's face is an important factor for proper use of respirator. After using the respirator, clean and wipe it thoroughly.
13.	Use approved ear protectors when entering an ear protection zone as prolonged exposure to high levels of noise causes hearing damage.
14.	An ear protector should not be used unless its model and brand have been approved by the Labour Department. Ear muffs have the best sound insulating performance.
15.	Piling work would generate high levels of noise. Workers who need to work in a noise affected area shall appropriately wear approved ear protectors.
16.	Workers should not wear cotton gloves to operate a machine with revolving parts so as to avoid injury to hands due to entangling of the cotton gloves with the revolving parts.
17.	The following safety measures should be taken for drilling holes in a tunnel: wear dust filters, ear protectors and eye protectors, and adopt wet drilling method or dust removal equipment.

4. Fire Safety


No.	Learning Key Points
1.	Inhalation of smoke is the cause that most of the people die in fire.
2.	Burning requires fuel, heat and oxygen.
3.	Portable fire extinguishers require regular inspection. The proper method for prevention of fire is to check fire fighting equipment regularly to ensure the equipment functions properly.
4.	Fire fighting measures include: confirming the location for assembly location after evacuation, always keeping the workplace clean and tidy, and be cautious to machines and tools that would generate sparks and heat, and keeping the smoke doors closed.
5.	Flammable substances should be stored at a metal cabinet. Rags, after cleaning the flammable liquid, should be placed in a metal container with a lid. The proper place for storing large quantities of flammable substances is a dangerous goods store.
6.	The adhesives used to stick PVC floor tiles are usually flammable.
7.	Spraying of flammable liquid is a process of high fire risk.
8.	Burning of paper, cloth, timber, plastic, rubbish and miscellaneous articles is classified as the first category of fire.
9.	The following are methods for fire fighting: cutting off the oxygen supply, isolating the fuel, and cooling.
10.	A water type fire extinguisher is suitable for putting out a timber fire.
11.	Petrol is a flammable liquid. A water type fire extinguisher is not suitable for putting out a fire caused by a flammable liquid.
12.	When using a foam type fire extinguisher to put out a fire caused by burning of an inflammable liquid, one should shoot the foam from top to cover the fire and the inflammable liquid.
13.	A foam type fire extinguisher is not suitable for putting out electrical fire.
14.	A carbon dioxide type fire extinguisher is most appropriate for putting out an electrical fire.
15.	Using a carbon dioxide type fire extinguisher at a narrow and poorly ventilated area may cause oxygen deficiency.
16.	When using a dry powder type fire extinguisher, one should note that the dry powder discharged may reduce visibility and cause disorientation.

5. Machinery Safety

No.	Learning Key Points
1.	Construction Sites (Safety) Regulations (Cap. 59) require a contractor to mark the platform or cage of a material hoist with the safe working load.
2.	Test and thorough examination of a material hoist should be carried out by a competent examiner.
3.	In the following situations, the operation of a material hoist must be suspended: the materials to be lifted exceed the safe working load, the hoist is used for lifting workers, and the gates are opened for loading and unloading of materials.
4.	Factors contributing to accidents involving lifting appliances (such as jib crane and tower crane) include overloading or other factors causing the crane to overturn or broken jib, crane operators not or insufficiently trained, and workers working within the lifting operation area.
5.	Weekly inspection of lifting appliances should be carried out by a competent person.
6.	A lifting appliance or lifting gear (such as a sling) should be used only after test and thorough examination by a registered professional engineer and an approved report stating it is in safe condition.
7.	Before using a lifting appliances (such as jib crane and tower crane), it should be examined by a registered professional engineer with the issuance of an approved form in every 12 months.
8.	A sling should be thoroughly examined by a competent examiner. Besides, it should be marked with the safe working load.
9.	A crane with a maximum safe working load of more than 1 tonne shall be equipped with an automatic safe load indicator.
10.	Crane operators shall attain 18 years old, and have undergone relevant training and hold valid certificates.
11.	If a crane is equipped with outriggers, they should be fully extended and supported on rigid timber blocking.
12.	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 near an overhead cable.
13.	According to the Factories and Industrial Undertakings (Loadshifting Machinery) Regulation (Cap. 59), excavator operators shall attain 18 years

No.	Learning Key Points
	old, have undergone relevant training and hold valid certificates.
14.	Gondolas shall be operated by workers who have undergone approved and recognised training.
15.	A gondola should be checked at least once every week by a competent person and issued with an approved form stating the gondola is in safe condition.
16.	The cage of a passenger hoist or working platform shall be marked with the safe working load and the maximum number of person that can be carried.
17.	Effective measures for controlling the hazards of a passenger hoist and tower working platform include: operation by a competent operator only, marking the safe working load and the maximum number of persons that can be carried, and closing the gates all the time unless there is a need for the movement of passengers.
18.	Accidents in operating machinery are commonly caused by failure of the machine guarding.
19.	To repair the revolving parts of machinery, the machine should be stopped first. One should avoid contacting the revolving parts to prevent from being caught by the machine, adopt measures to prevent personnel not responsible for the repairing work from coming near, and never conduct cleaning work on the machine which is still in motion.
20.	Re-install the dismantled machine guarding before testing the machine is a safe measure for machinery repairing.
21.	Safety measures for using abrasive wheels include providing and keeping safety guard in position, affixing a notice which specify the highest permissible speed and the safety rules, selecting the appropriate size and type of abrasive wheel for the work, and mounting of abrasive wheel by a competent person appointed by the proprietor in writing.

6. Electricity Safety

No.	Learning Key Points
1.	Electrocution is due to the serious damage to the heart function by the electric current.
2.	While a worker is using a portable electrical tool, he or she should follow the operation rules set by the manufacturer, check the tool before use to ensure the tool is in good working condition, and use an appropriate plug for connecting the power. The worker should not modify the tool by himself.
3.	Improper repairing of electrical appliances will result in: explosion, burnt, and electric shock. Only competent electrician is allowed to repair electrical appliance.
4.	Conducting electric arc welding work at a humid environment would lead to electricity accidents. The following measures will prevent electrical accidents: never apply load on an electric wire, regularly inspect and maintain electrical tools, always use double-insulated electrical tools, and adopt "permit to work" system. Never allow the live parts of the electric wires exposed.
5.	Always comply with the safety measures for electrical works and never insert electric wires into a socket directly.
6.	Workers should avoid using electrical appliances if their clothing are wet as it would cause electric shock. An electrical appliance used in a humid workplace should be water-proof. In a humid workplace, a portable electrical appliance user should stand on an insulated mat to reduce the risk of getting electric shock.
7.	The marking 「  」 on portable electrical appliances means that the appliances are double-insulated which can avoid current leakage. Such electrical appliances can be used without earthing.
8.	Water-proof electric wire connection method should be adopted for outdoor work.

7. Safety of Confined Spaces Operations

No.	Learning Key Points
1.	The hazards of working in a confined space include suffocation caused by insufficient oxygen, the presence of toxic gases, fog, dust or smoke, and fire and explosion. Chambers, tanks, vats, pits, wells, sewers, manholes, tunnels, pipes, flues, boilers, pressure receivers, hatches, caissons, shafts and silos are examples of confined spaces.
2.	All workers entering a confined space for working shall be certified workers.
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 (Cap. 59) to conduct a risk assessment for the confined space.
4.	For working in a confined space, the proprietor shall properly ensure that all safety precautions, e.g. starting the forced ventilation, have been properly implemented before the work starts. Effective forced ventilation is a mandatory safety precaution before entering a confined space.
5.	Before workers enter a confined space, test by appropriate gases detection instrument to ascertain whether there is sufficient oxygen in the confined space and no toxic gases or explosive/ flammable gases.
6.	The purpose of conducting a test in the procedures of confined spaces operations is to determine whether the gas components in a confined space are safe or not.
7.	Before workers enter a manhole, the gas composition should be measured by appropriate gas detection instrument to ensure that the hazards of toxic gases and oxygen deficiency do not exist.
8.	Before worker enters a confined space, a person should stay at the entrance. The duty of the person stationed outside the confined space is to maintain communication with the workers inside the confined space.
9.	Before a certified worker enters a confined space, a work permit (a certificate issued by the contractor) should be obtained first. All persons are prohibited to enter or stay in a confined space in case testing of gases has not been performed. Worker should leave a confined space at once when the period of validity stated in the work permit expires.

8. Manual Handling Operations

No.	Learning Key Points
1.	Frequent, prolonged repetitive movements and jerky motions are improper / risky manual handling operations. Twisting the upper body trunk only for transporting heavy goods is an inappropriate manual handling operation.
2.	Strain and sprain is the most common injury suffered by workers engaged in lifting heavy goods. Waist is most likely to be injured if a worker lifts goods improperly
3.	Sudden quick movement during manual lifting should be avoided.
4.	As far as possible, use mechanical tool to lift goods is a correct measure in manual handling operations.
5.	The proper method of lifting heavy object is to hold the object close to the body. Keeping the back straight and stand up slowly with both legs.
6.	When transporting heavy goods, one should adopt proper postures and keep the back straight as far as possible.
7.	Doing some warm-up exercises before lifting and transporting goods can render the muscle and cardiopulmonary system more adaptable to the change so as to reduce chance of getting injured.
8.	When using a trolley for transporting goods, one should pay attention to the structure of the trolley, any potential hazards in the pathway of transportation, and whether the floor is even or not.

9. Welding Safety

No.	Learning Key Points
1.	Under the Factories and Industrial Undertakings (Gas Welding and Flame Cutting) Regulation (Cap. 59), workers engaged in gas welding and flame cutting shall attain 18 years old, have undergone relevant training and hold valid certificates.
2.	Safety measures for welding work include that gas cylinders for welding work should be equipped with flashback arresters, gas cylinders should be kept in an upright position and stored in a cool and well-ventilated place, and if there are other people, a screen should be used for segregating the sparks to avoid injuring others.
3.	In oxy-acetylene welding, the common colour of an oxygen cylinder is black and that of an acetylene cylinder is maroon.
4.	Common hazards of electric arc welding include electric shock, arc radiation, and inhalation of harmful gases.
5.	Chronic fibrosis of a welder's lung tissue is caused by prolonged inhalation of metal dust which exceeded the prescribed concentration.
6.	The ultraviolet generated in electric arc welding would cause eyes injury.
7.	Eye shields, gloves and insulated shoes should be worn by electric arc welders.
8.	Workplaces for welding work should be installed with sufficient lighting, equipped with appropriate fire extinguishers, and well-ventilated. Flammable substances should not be stored in these workplaces.

10. Safety of Excavation Work

No.	Learning Key Points
1.	The most important excavation safety measure is obtaining written information of the layout of the underground pipes, cables and public facilities.
2.	An excavation should be examined by a competent person at least once every 7 days.
3.	Form 4 should be filled in by a competent person to prove a pit is safe for work after weekly examination of the pit.
4.	The most dangerous outcome for excavation is collapse of pits. Therefore, no vehicles and machines should be parked or placed at the edge of a pit, as the load would render the pit to collapse. Stacking of debris, machines and heavy tools should be kept far away from the pit to prevent the occurrence of vibration and overload which causes the pit collapse. The purpose for providing suitable support at the edge of the excavation is to avoid the damage caused by the collapse of the pit.
5.	During excavation, if there are any signs of ground crack, broken or loosened supports, stop the work immediately, leave the pit and report to the superiors.
6.	When a worker discovers unidentified underground pipes and electric cables during excavation works, he or she should stop the work immediately and inform the supervisor.
7.	To maintain a good ventilation system for tunnel works, always regularly test and inspect the air quality, avoid accumulating the exhaust gases inside the tunnel, and ensure the fresh air ducts extend to all locations of the workplace.

11. Other Safety Matters

No.	Learning Key Points
1.	Many accidents are caused by unsafe working environment, workers' unsafe behaviour, and insufficient training and information. A worker should be responsible for his/her unsafe acts and take care of co-workers' safety.
2.	The consequences of industrial accidents are death, injury, and occupational disease.
3.	The Government, employers and workers are responsible for preventing industrial accidents.
4.	Maintaining good housekeeping at a workplace can reduce the occurrence of accidents, provide a safe working environment, and reduce the economic loss caused by accidents.
5.	Placing materials in a passageway without planning is a factor causing accident.
6.	It is the duty of a proprietor to provide safety training. Training can enhance workers' safety awareness so as to reduce accidents.
7.	A comprehensive first aid and emergency contingency plan can minimise the loss caused by accidents, and render the scene and the environment under control as quick as possible.
8.	In order to effectively control hazards in a workplace, a contingency plan including the procedures should be devised and drilled regularly so as to allow workers to familiarise with the procedures and contents of the contingency plan, fully understand their responsibilities in the contingency plan, and identify the deficiencies during the drill so as to make improvements and amendments.
9.	Workers working in the construction industry shall undergo mandatory basic safety training. The validity of the mandatory basic safety training certificate for the construction industry is 3 years.
10.	The main purpose of implementing the mandatory basic safety training in the construction industry is to enhance workers' safety awareness and prevent accidents.
11.	The following are effective measures to prevent traffic incidents in construction sites: installation of traffic signs, and designated pedestrian walkways so as to segregate pedestrians from moving vehicles.
12.	If asbestos is discovered during building demolition work, workers should

No.	Learning Key Points
	stop the demolition work immediately and report to the management.
13.	The purpose of a permit to work system is to ensure all the safety measures have been in place prior to the commencement of the high risk operation, and also during the work proceeding.
14.	To ensure work safety, during the lunch time, construction workers should not drink alcohol.
15.	In a hot and humid environment workers would most likely get heat stroke. Therefore, working under direct sunlight should be avoided and temporary sunshade should be set up whenever possible. All or most of the work should be rescheduled to cooler periods in the daytime, such as early morning, and cooler places, such as covered or shaded area. Cool potable water should be provided at all times during work. Light-coloured and loose-fitting clothing should be worn to minimise heat absorption and enhance heat dissipation and sweat evaporation.
16.	An employer should report to the Labour Department after an accident causing the death of an employee at a workplace within 24 hours.