CODE OF PRACTICE

Safety and Health at Work (Land-based Construction over Water — Prevention of Fall)

Occupational Safety and Health Branch
Labour Department

Code of Practice
Safety and Health at Work
(Land-based Construction over Water – Prevention of Fall)

This Code of Practice is prepared by the
Occupational Safety and Health Branch
Labour Department

First Edition October 1999

This Code of Practice is issued free of charge and can be obtained from offices of the Occupational Safety and Health Branch. Addresses and telephone numbers of the offices can be found in the booklet “The Labour Department Offers You its Services” or by telephone 2559 2297.

CONTENT

Page

1. INTRODUCTION

1.1 Purpose

1.1.1 This Code of Practice provides practical guidance and gives recommendations on the safety and health practices at work for land-based construction work carried out on, adjacent to or over water where drowning hazard to workmen exists. It is intended to be read by contractors, supervisors, proprietors and safety personnel of industrial undertakings in which land-based construction over water are involved. The dangers involved include slipping, falling or sweeping workmen away by waves. Duties of the proprietors and the employees to ensure the safety and health of such a workplace are stipulated in Sections 6A and 6B of the Factories and Industrial Undertakings Ordinance, Cap. 59 of the Laws of Hong Kong and the Construction Sites (Safety) Regulations made thereunder.

1.1.2 The Code of Practice is approved and issued by the Commissioner for Labour under Section 7A of the Factories and Industrial Undertakings Ordinance. The recommendations contained in the Code of Practice should not be regarded as exhausting those matters which need to be covered by the relevant safety legislation. Compliance with the Code of Practice does not confer immunity from relevant legal requirements.

1.1.3 Although failure to observe any provision of the Code of Practice is not itself an offence, that failure may be taken by a court in criminal proceedings as a relevant factor in determining whether a person has breached the relevant safety and health legislation under the Factories and Industrial Undertakings Ordinance or not. It will then be open to that person to satisfy the court that he has complied with the legislation in some other way.

1.1.4 Throughout the Code, we will quote the relevant safety standards of the British Standards Institution. However, other national, international

standards or provisions which are equivalent to the British standards may be acceptable as alternatives.

1.1.5 The statutory provisions summarised or referred to in the Code are the provisions in force on 15th October 1999.

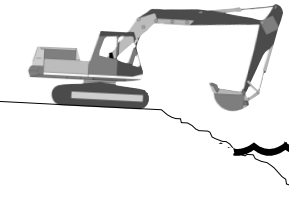
1.1.6 The Commissioner for Labour is grateful to the British Standards Institution for permission to make reference to the British standards in the preparation of this Code of Practice.

1.2 Scope

1.2.1 This Code of Practice recommends safe practices for the prevention of fall in land-based construction work carried out on, adjacent to or over water where drowning hazard to workmen exists.

1.2.2 This Code of Practice does not apply to work related to marine safety*, sea-based construction work, nor to work other than construction work.

* Guidelines on marine safety are available from the Marine Department.



2. INTERPRETATION

Unless otherwise defined in this Code of Practice, the terms used in this Code of Practice have the same meaning as those in the Factories and Industrial Undertakings Ordinance and the Construction Sites (Safety) Regulations, and -

2.1 "Buoyancy aid" (**助浮物**) means a garment or device which, when correctly worn and used in water, will provide a specific amount of buoyancy positioned in the garment to enable the wearer to float without appreciable effort in a face-up or vertical position with the mouth and nose clear of the water.

2.2 "Land-based construction work" (**陸上建築工作**) means any construction work other than sea-based construction work.

2.3 "Lanyard" (**懸掛繩**) means a connecting element or component of a fall arrest system. A lanyard may be of synthetic fibre rope, wire rope, webbing or chain.

2.4 "Lifejacket" (**救生衣**) means a garment or device which, when correctly worn and used in water, will provide a specific amount of buoyancy positioned in the garment to position and maintain an incapacitated wearer with his airways clear of the water, and increase the likelihood of his rescue.

2.5 "Qualified first aider" (**合格急救員**) means a person trained in first aid as specified in Regulation 60 of CS(S)R.

2.6 "Safety net" (**安全網**) means a net which is designed and used to catch persons falling from a height.

2.7 "Sea-based construction work" (**海上建築工作**) means any civil engineering work carried out within waters of the Hong Kong Special Administrative Region, involving dredging, reclamation of land from sea, piling, boring, drilling, pipe and buoy laying, caisson

construction and other similar construction work carried out from vessel.

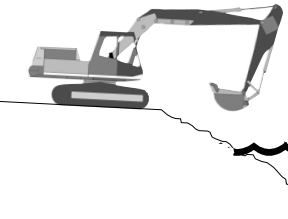
2.8 "Vessel" (**船隻**) includes -

a) any ship, junk, boat, dynamically supported craft, seaplane, or any other description of vessel used in navigation; and

b) any other description of vessel in the Hong Kong Special Administrative Region or in the waters of the Hong Kong Special Administrative Region not used in navigation or not constructed or adapted for use in navigation.

2.9 "CS(S)R" is the abbreviation for the Construction Sites (Safety) Regulations, subsidiary legislation of the Factories and Industrial Undertakings Ordinance.

2.10 "FIUO" is the abbreviation for the Factories and Industrial Undertakings Ordinance, Cap 59.



3. RESPONSIBILITY

3.1 Securing safety and health at work on a construction site requires full commitment and co-operation of every body concerned. A proprietor (or a contractor) should ensure the safety and health of all his workmen so far as is reasonably practicable.

The proprietor (or the contractor) often employs management personnel to discharge his duties and responsibilities for management or control of the construction site. Under the FIUO, the management personnel who have management or control of the construction site are regarded as the proprietor. The management personnel, who may include managers, agents, engineers or foremen, therefore, should take care of the safety and health of the workmen so far as is reasonably practicable. In this connection, the authority and responsibility for each member of the management personnel should be precisely set down.

3.2 Every person employed in an undertaking, including management personnel and the workmen, is himself an employee. He is required to co-operate with the proprietor (or the contractor) and other employees to take reasonable care for the safety and health of not only himself, but also of other persons who may be affected by his acts or omissions at work.

3.3 It is important to note that under the CS(S)R, the contractor responsible for a construction site is required to ensure the safety of every workplace on the site.

3.4 The responsibilities of the proprietor (or the contractor) and of the employees involved in construction work have been defined in the FIUO and its subsidiary legislation, in particular Sections 6A and 6B of the FIUO and Regulation 52A and the Third Schedule to the CS(S)R. The relevant provisions are listed in Appendix I for easy reference.

4. MANAGING SAFETY AND HEALTH

It is the responsibility of the proprietor (or the contractor) to provide a safe system of work for the safety and health at work of his workmen. To achieve this, it calls for a good safety management system. Among other things, the following actions should be taken :-

4.1 Project planning and design

4.1.1 A construction project should be designed with safety in mind. This approach makes it possible to eliminate or minimize work hazards by proper planning and design of the methods of construction, sequences of activities, coordination, etc.

4.1.2 Potentially hazardous or unfavourable site conditions which will likely affect the safety of the workplace should be considered in the planning and design of the construction project. These may include the following :-

a) sites with strong tides, winds or waves;

b) sites which are too remote from the city centre or hospitals;

c) sites which have restricted space for manoeuvring, such as those for temporary storage;

d) the activities of other contractors including sub-contractors within the sites;

e) adjacent maritime activities; and

f) emission of noise, toxic gases, harmful chemicals or dust from processes on or around the sites.

4.2 Selection of contractor or sub-contractor

4.2.1 In order to ensure that the contractor or sub-contractor will make adequate provision for safety and health, their ability to provide a good action plan on safety should be taken into consideration in deciding the award of contracts.

4.2.2 During the process of selection, tenderers or prospective contractors should be encouraged to submit an outline action plan on safety, giving preliminary information to demonstrate the intended safe system of work. Depending on the complexity of the project, the outline action plan on safety should briefly describe items such as safety organisation, communication, monitoring, equipment, facilities, emergency procedures, accident reporting and accident investigation procedures.

4.2.3 After the contractor or sub-contractor has been appointed, he should be required to submit a detailed action plan on safety on the basis of the outline action plan, if any, for agreement in writing. The action plan on safety should spell out the ways and means to carry out work safely and effectively in order to achieve the objective of ensuring the safety and health of workmen at work.

4.3 Risk assessment

4.3.1 Risk assessment is the overall process of estimating the magnitude of risk and deciding whether or not the risk is tolerable or acceptable. Its main purpose is to determine whether the as-planned or existing controls are adequate so that risks are controlled and harm can be avoided. Risk assessment should be conducted before any new work starts, and it should be reviewed periodically.

4.3.2 Risk assessment can be divided into 5 basic steps as follows :

Step 1 - Identify the hazards in the workplace.

Step 2 - Identify who or what may be harmed, and how such harm may occur.

Step 3 - Assess the risks arising from the hazards based on the probability and the possible consequences of the hazardous event, and assess whether the existing safety precautions are adequate and what more should be done.

Step 4 - Record the findings of the assessment.

Step 5 - Review the assessment from time to time and revise it if necessary.

4.4 Method statement

4.4.1 A method statement should be prepared by a competent person. The person should have adequate training and practical experience and be capable of making recommendations on safe methods as required in 4.4.2 and 4.4.3 below. In preparing a method statement on temporary works, the person should also be capable of making decisions on whether the loads on the works in progress can be resisted safely without undue movements.

4.4.2 The method statement should contain written instructions regarding the technical aspects of the construction processes and how works can be carried out safely as designed. It should be well documented to ensure that everybody involved in the construction processes is aware of what to do. It should be distributed to all parties concerned in the language(s) understood by them before works commence.

4.4.3 Safety measures required to be taken in performing the activities safely should be incorporated into the method statement. Depending on the nature, size and complexity of the work, a method statement

should where appropriate include :-

a) arrangement for coordination, responsibilities and authority of management personnel during the progress of the work;

b) layout, support details and construction details of all temporary works including falseworks (the strength and stability of the temporary works should be justified in accordance with recognised engineering principles);

c) standards of materials and workmanship for the temporary works;

d) use of suitable plant and equipment;

e) sequence of work;

f) detailed method of construction;

g) provisions for prevention of fall into water, including safe means of access and egress, and safe working environment;

h) prevention of fall of materials, tools and debris;

i) use of suitable personal protective equipment, such as safety helmets, safety belts/safety harnesses and lifejackets;

j) arrangements for delivering, stacking, storing and movement of materials and plant; and

k) contingency plan in case of emergency including rescue arrangement.

4.4.4 The method statement should be reviewed and updated to suit any changes to the site conditions.

4.5 Coordination, communication and supervision

4.5.1 There should be effective liaison among all parties concerned including but not limited to designers, contractors and sub-

contractors, at the planning, design and construction stages. Only competent personnel for coordination and supervision should be selected to ensure effective communication at each stage of work.

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

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

a) the site conditions, including conditions of the ground affected and the varying water levels at the site;

b) the proprietor's (or the contractor's) requirements, including the programme of the activities;

c) the plans for the works, including detailed drawings;

d) the specification for materials, workmanship and plant;

e) the method of working, including sequence of construction;

f) the safe working loads on scaffolds, including working platforms; and

g) the list of contact persons for coordination in various trades.

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

a) the construction work is carried out as laid down in the action plan on safety and in the method statement; and

b) the workmen follow the proprietor's (or the contractor's) safety rules and instructions.

4.6 Monitoring safety performance

4.6.1 Requirements on safety and health, particularly those relating to compliance with safety legislation, are advisable to be incorporated in the conditions of contract for engagement of contractors or sub-contractors.

4.6.2 The contractors or sub-contractors should keep regular reports on the safety conditions of the site. Such reports should consist of detailed information on work hazards, precautions taken, accident analysis and recommendations.

4.6.3 Workmen's feedback on the safety conditions of the site should be encouraged.

4.6.4 A monitoring system should be developed, implemented and maintained on site for checking the safety performance of the contractors or sub-contractors against the agreed action plan on safety and the as-agreed standards.

4.7 Contingency plan for adverse weather conditions

4.7.1 The proprietor (or the contractor), through his management personnel or otherwise should monitor the weather conditions. Weather conditions that could have an adverse effect on the work over water include rain, high wind or typhoon, and those causing poor visibility, such as fog, mist or glare.

4.7.2 If a decision is made to stop work, then measures should be taken to maintain the stability of the plant, equipment and works erected on site. All site personnel should be safely and efficiently evacuated from the work sites. When the adverse weather is gone, all the plant, equipment and works erected should be found to be in order before works start again.

4.8 Training

4.8.1 The proprietor (or the contractor) should ensure that training with adequate content on safety and health at work is provided to all workmen and management personnel before undertaking the work. The training should meet the operational needs of the activities over water to ensure that workmen assigned to the work are competent to undertake such activities.

4.8.2 Training workmen on safety and health will strengthen the workmen's safety knowledge; engender their sense of participation; evoke loyalty from the workmen to the management; and foster their sense of self-discipline and responsibility.

4.8.3 All personnel who conduct training should possess appropriate qualification or experience.

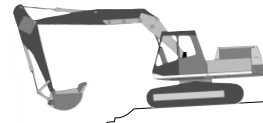
4.8.4 Training may include general induction and more specific training, and may be met by a mixture of on-the-job and off-the-job training. It should embrace safety practices, constituents of a safe workplace and information on the particular site conditions. Topics should therefore include site safety concepts, risks and hazards, safe access and egress, safe use of plant and use of safety equipment.

Additional training should be provided to the workmen on such matters as the safety policy, safety rules, safety organisation, accident reporting procedures.

Training at foremen, supervisors and management levels should extend to include the implications of method statements, legal requirements, project planning, establishment and running of the site organisation, and training of workmen.

Designers and engineers should also receive appropriate training to promote awareness of safe methods of working over water, and the physical and practical problems on site. Prior site inspections may assist them to formulate a safety design and to ensure a safe working environment.

4.8.5 All personnel should be trained to be familiar with the emergency procedures of the site. They should be provided with the necessary information to enable them to act effectively and efficiently in an emergency situation. They should also know where to get the emergency equipment and how to use the equipment.



5. PREVENTION OF FALL

5.1 Mobile plant

5.1.1 If mobile plant is used on a site near water, kerbs should be installed at the edges over water whenever practicable. Such kerbs should be constructed in compliance with 5.2.

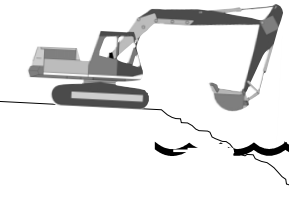
5.1.2 During progress of earth filling work (e.g. reclamation work) in which installation of kerbs is impracticable, lorries should not get near the edge of a temporary earth slope. The distance between any wheel of the lorry and the edge of the slope should not be less than 3 metres. The fill materials deposited by the lorries should be spread and compacted by crawler track-mounted plant, such as a bulldozer (see Figure 1).

5.1.3 For crawler track-mounted plant, the minimum distance from any part of the crawler track to the edge of a temporary earth slope should comply with Figure 2.

5.1.4 When mobile plant works at the edge of a permanent slope, overhanging of any part of the crawler track should not be permitted (see Figure 3).

5.2 Kerb

When a kerb is required, it should be substantially constructed to a height at least 250mm above the working surface, at a distance at least 500mm from the edge near water.



5.3 Guard-rail

Guard-rails and toe-boards should be installed at edges where persons are liable to fall from height or into water. The guard-rails should have adequate strength and should be securely fixed to a height between 900mm and 1 150mm above the ground or floor [Regulation 38B(2)(b) and Third Schedule to CS(S)R]. The height of an intermediate guard-rail above the ground or floor should be not less than 450mm and not more than 600mm.

5.4 Protection against drowning

5.4.1 When work is being carried out overside or in an exposed position where there is a foreseeable risk of falling into water and it is impracticable to provide guard-rails at the edges over water, every workman there should wear a lifejacket or use a buoyancy aid. Refer to 8.4 for details.

5.4.2 Rescue equipment should be provided to protect workmen against drowning [Regulation 52A(1)(a) of CS(S)R]. Refer to 9.4 for details.

5.5 Working platform

5.5.1 The contractor should have a method statement for construction of a working platform. Refer to 4.4 on method statement.

5.5.2 Design and construction of working platforms should comply with the Code of Practice for Scaffolding Safety issued by the Commissioner for Labour.

5.5.3 Every edge of a working platform from which a person might fall

into water should be provided with a guard-rail or guard-rails in compliance with 5.3.

5.6 Edge over water, gangway or run

5.6.1 Every edge over water such as an edge of a gangway or an edge of a run, where a person is liable to fall from height or into water, should be provided with guard-rails and toe-boards in compliance with 5.3 [Regulation 38B and Third Schedule to CS(S)R].

5.6.2 A gangway or run for passage of persons only should be at least 400mm wide. For passage of materials, a gangway or run should be adequate in width and in no case less than 650mm wide [Third Schedule to CS(S)R].

5.6.3 The gangway or run should be closely boarded, planked or plated, or of open metal work without any interstice exceeding 4 000mm^2 in area [Third Schedule to CS(S)R].

5.6.4 The planks/boards should be straight-grained, sound and free from irregular knots, dry rot, worm holes, cracks and other defects affecting their strength [Third Schedule to CS(S)R].

5.6.5 The planks/boards should be either at least 200mm wide and at least 25mm thick, or at least 150mm wide when the planks/boards exceed 50mm thick [Third Schedule to CS(S)R].

5.6.6 The planks/boards should be secured evenly on at least 3 supports unless, taking into account the distance between the supports and the thickness of the planks/boards the conditions are such as to prevent undue or unequal sagging. In addition, the planks/boards should not project beyond their end supports by more than 150mm unless they are sufficiently secured to prevent tipping [Third Schedule to CS(S)R].

5.6.7 The gangway or run should incline at an angle less than 30° from the horizontal unless it is specifically designed for use at a greater angle.

5.7 Safety net

5.7.1 Provision of a workplace without risk of falling should always be the first consideration. However, if this is not practicable, use of suitable and adequate safety nets and safety belts (include safety harnesses) attached continuously to a suitable and secure anchorage should be considered.

5.7.2 The proprietor's (or the contractor's) designer should seek recommendations from manufacturers of safety nets, so that a suitable safety net for the particular type of work to be executed under the prevailing conditions will be used. The designer should issue a method statement for construction and for dismantling of the safety net. Refer to 4.4 on method statement.

5.7.3 The acceptable standards of safety nets are shown at Appendix II.

5.7.4 Siting of safety net :

a) A safety net should be installed as close as possible to the working level and in compliance with the level specified in the method statement.

b) Any gap between the safety net and an adjacent structure should be as close as practicable and should not exceed 200mm.

c) The safety net should not be stretched taut when constructed, and should have an initial sag to minimize rebounce of a falling person.

d) The safety net will deflect when arresting a falling person. An

adequate clearance between the safety net and the surface or structure below should therefore be maintained so as to prevent the falling person from collision.

e) The safety net should be properly secured and slung adequately far above the high water level so that the person caught in the net will remain clear of the water.

f) If a safety net is constructed at such a level that the free space underneath may infringe upon the space required for passage of vehicles or vessels below, safety measures in 7.3 should be taken.

g) Siting a safety net in the proximity of a high voltage cable, moving gantry or other dynamic structure should not be permitted unless the use of the safety net has been justified to be safe.

5.7.5 Framework supporting safety net :

a) Supporting framework should be capable of withstanding the dead weight of the safety net assembly, imposed loads and impact forces of the falling person without risk of collapse or partial collapse.

b) The supporting framework should be so arranged that the falling person does not have a risk of falling onto any part of it.

c) The safety net should be securely fastened to the supporting framework with tie cords, hooks, rings or thimbles spaced at 750mm maximum along each side of the net. Strength of the tie cord should be at least twice of that of the net mesh cord. All hooks should have positive locking.

5.7.6 Safety net outrigged from scaffolding :

a) The scaffolding should be securely anchored to a stable structure and designed to take the additional loads imposed.

b) Stability of the supporting structure and scaffolding should be justified in accordance with recognised engineering principles.

c) A typical arrangement of an outrigged safety net is shown in Figure 4.

5.7.7 Access and egress :

a) A safe access and egress should be provided for a safety net so as to facilitate rescue of any person who has fallen into the net.

b) The access and egress should be achieved by erecting the safety net adjacent to a working platform, floor or other access point.

c) A means for clearance of debris which avoids the need to stand on the safety net should be used. If the net is temporarily dismantled to facilitate clearing of rubbish then workmen should be restricted from entering the areas which have previously been protected by the net, unless they are using other suitable means of protection.

5.7.8 Safe use of safety net :

a) A safety net should be constructed and dismantled by competent workmen.

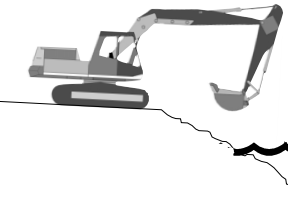
b) Before handing over the safety net to the proprietor (or the contractor), the person who constructs the safety net should check the as-constructed safety net against the method statement. The proprietor (or the contractor), assisted by a competent person, should inspect the as-constructed safety net against the method statement before his acceptance, and should continuously monitor the conditions of the safety net through inspections at least at weekly intervals. All inspection records should be kept.

c) Accumulation of debris in the safety net should not be allowed. Dropping of materials into a safety net should be forbidden.

d) For a safety net having deterioration or used for more than 1 year, advice on suitability for further use should be sought from the manufacturer.

5.8 Safety belt/safety harness

For safe use of safety belt/safety harness, refer to Section 8.



6. ACCESS AND EGRESS

6.1 Safe means of access and egress

6.1.1 Every means of access and egress should be kept safe [Regulation 38A(2) of CS(S)R]. Every edge from which a person might fall from height or into water should be provided with guard-rails and toe-boards in compliance with 5.3. The means of access and egress should also be clear of any cargo lifting area and so located that no suspended load passes over it.

Every opening affecting safe use of the means of access and egress should either be fenced in compliance with 5.3 or be securely covered. If a means of access has been rendered unsafe for any reason, physical barriers should be erected and warning notices prohibiting its use should be posted at every approach.

6.1.2 The means of access and egress and its immediate approaches should have non-slippery surfaces and should so far as is reasonably practicable be gritted. It should be kept free from any slippery material, obstruction or hazard caused by projecting fixtures or fittings. If such fixtures or fittings cannot be removed immediately, it should be suitably fenced off, painted or marked to alert users of the access and egress.

6.1.3 The means of access and egress should be kept in position as long as it is required. It should be well lit and properly maintained. At least two satisfactory means of escape should be available for use in an emergency.

6.1.4 For safe use of ladder, please refer to 6.3.

6.2 Access to and from vessel

6.2.1 Safe means of access between a vessel and the shore should be provided so far as is reasonably practicable at all states of the tide. At the point of access to a vessel, a lifebuoy with a buoyant lifeline should be kept ready for use. For details of lifebuoys and buoyant lifelines, please refer to 9.4.3.

6.2.2 To achieve safe means of access between a vessel and the shore, an access equipment such as a wooden or metallic gangway may be used. When such an access equipment is provided, any person boarding or leaving the vessel should use that equipment.

6.2.3 The access equipment should comply with the following :-

a) It should be installed as soon as possible and be properly secured.

b) It should not be painted or treated in such a way as to conceal any cracks or defects.

c) It should be properly maintained and suitably protected against corrosion.

d) It should be inspected by a competent person at appropriate intervals. Any defect affecting its safety should be reported immediately to the proprietor (or the contractor) or his management personnel, and should be made good before further use.

e) The equipment itself and its immediate approaches should be adequately illuminated.

6.2.4 If access to a workplace on water is to be gained via a vessel, such a vessel should comply with the relevant regulations, e.g. those made under the Shipping and Port Control Ordinance, Cap. 313.

6.3 Ladder

6.3.1 A ladder should be sound, of suitable length and sufficient strength [Regulation 38D of CS(S)R]. It should be regularly inspected and a record should be kept for such purpose.

6.3.2 The ladder should have a level and firm footing. It should be equally and properly supported on each stile and should not stand on loose packing such as loose bricks.

6.3.3 The ladder should be secured where necessary to prevent undue swaying or sagging. It should be securely fixed to its upper resting place. If such fixing is impracticable, it should be fixed at its lower resting place. If the latter fixing is still impracticable, a person should station at the foot of the ladder to prevent it from slipping.

6.3.4 The ladder should extend at least five rungs above the stepping off point. The stiles should extend upwards to a height of not less than 1.05m above the upper landing place. For a fixed ladder rising 3m or more from the lower landing place, it should be fitted with safety hoops at intervals not exceeding 1m. For a long ladder, intermediate landings should be provided at intervals not greater than 9m.

7. GENERAL WORKPLACE ENVIRONMENT

7.1 Housekeeping

7.1.1 To reduce tripping hazards, tools, ropes and other materials not in use should be stored away. Wires and ropes should be coiled and secured so as to prevent any obstruction. Rubbish should be removed as quickly as possible. Materials pending use should be stacked properly and securely.

7.1.2 The surfaces of floors should be non-slippery. Slippery wastes should be removed immediately.

7.1.3 For machinery which has a risk of oil leakage, a sand-filled drip tray should be placed underneath the machinery to retain the oil. This can reduce fire hazard and prevent oily and slippery surfaces.

7.2 Illumination and lighting

7.2.1 Permanent illumination should be provided for night work and in dark areas including immediate water surfaces. The light should be evenly spread so as to avoid deceptive shadows and glare.

7.2.2 Spotlights mounted on swivels should be installed at strategic locations close to the shore so that any person fallen into water can be spotted easily.

7.2.3 Appropriate navigation light signals should be provided close to the shore in compliance with the relevant regulations and directions, e.g. those made under the Shipping and Port Control Ordinance, Cap. 313.

7.2.4 All the illumination lights provided should not create any hazard to safe navigation of vessels.

7.3 Headroom restriction

7.3.1 Temporary works over water or land, including safety nets, should not infringe upon the headroom required for passage of vehicles or vessels below. A retro-reflective warning sign with character size not less than 250mm showing the clear headroom for each way of passage should be displayed at the temporary works posing headroom constraints.

7.3.2 The proprietor (or the contractor) should seek agreement on the restricted headroom from the relevant authorities such as the Marine Department, so that traffic safety underneath the temporary works will be ensured.

7.4 Health and hygiene

7.4.1 When a workman is required to work in a difficult environment such as an exceptionally hot or humid environment, the workman should be allowed to have breaks to rest in fresh air under the shade.

7.4.2 Alcohol may affect a person's fitness for work and no alcohol should therefore be allowed while at work.

7.4.3 Suitable and adequate toilets and washing facilities should be provided for use of every workman [Regulation 55 of CS(S)R]. The toilets and washing facilities should be so constructed that no person will fall into water therefrom.

8. PERSONAL PROTECTIVE EQUIPMENT

Use personal protective equipment (PPE) only as a last resort. Whenever possible safe systems of work and engineering controls should be used instead. If PPE is still needed, the proprietor (or the contractor) should provide every workman with suitable and well-maintained personal protective equipment for his use. The workman provided with the equipment should be given adequate instructions on the functions and limitations of each piece of equipment, and be trained on how to use it properly.

8.1 Footwear

Footwear with non-slippery soles should be worn while at work. The footwear should preferably be fitted with sole and toe reinforcement.

8.2 Safety helmet

Safety helmet should be worn at all times while at work. The acceptable standards of safety helmets are shown at Appendix II.

8.3 Safety belt/safety harness

8.3.1 Providing a workplace without risk of falling should always be the first choice. However, if such environment is not practicable, use of suitable and adequate safety nets and safety belts (include safety

harnesses) attached continuously to a suitable and secure anchorage as mentioned in 5.7 should be the second option to prevent persons from falling. If this is still impracticable, wearing of safety belt (includes a safety harness) with continuous and effective anchorage system should be the last resort for fall prevention.

8.3.2 The acceptable standards of safety belts/safety harnesses are shown at Appendix II. The equipment should be used in compliance with the manufacturer's instructions.

8.3.3 The safety belt/safety harness should be used together with its lanyard fastened directly or indirectly to an effective anchorage to arrest the fall of the wearer from his work level. The acceptable standards of anchor devices for safety belts/safety harnesses are shown at Appendix II. The anchor device generally includes a fixed anchor, an independent lifeline and a fall arresting device. Any works, permanent or temporary, which has not been justified in accordance with recognised engineering principles to withstand the loads created by the fall should not be used as an anchorage. The anchorage should be positioned to minimize the height of fall.

8.3.4 The safety belt/safety harness should fit the wearer correctly. If it is to be worn in addition to a buoyancy aid or lifejacket, the proprietor (or the contractor) should ensure that these items function together effectively and will not interfere with other pieces of equipment.

8.3.5 Every set of safety belt/safety harness equipment including its associated equipment such as lanyard, fall arresting device, etc., should be properly maintained in good serviceable conditions. The whole set of equipment and its anchor device should be inspected regularly and prior to its use by a competent person appointed by the proprietor (or the contractor). Records of such inspections should be signed by the competent person and kept on site.

8.4 Lifejacket and buoyancy aid

8.4.1 Every workman at work having a foreseeable risk of falling into water should wear a lifejacket. Buoyancy aids are considerably inferior in performance to lifejackets. Use of a buoyancy aid will only be appropriate if the wearer is a proficient swimmer working close to the shore and he will unlikely be incapacitated by the environment.

8.4.2 The acceptable standards of lifejackets and buoyancy aids are shown at Appendix II. Instructions on the suitability of the equipment for specific situations should be sought from the manufacturers.

8.4.3 A lifejacket or buoyancy aid should fit the wearer, and should allow the wearer freedom in action and movement. It should not unduly restrict his vision, hearing or breathing, nor contain any component causing injury to the wearer in normal use.

8.4.4 The lifejacket or buoyancy aid should have distinctive and easily visible colour. Retro-reflective material should also be affixed on its surface which is normally above the water when it is in use. Its protective cover should be made of robust material which is resistant to abrasion, puncture and molten metal splash.

8.4.5 The lifejacket or buoyancy aid should preferably be provided with a whistle (for day work) and/or an self-activating light (for night work) which can aid in locating the wearer to facilitate rescuing.

8.4.6 The lifejacket or buoyancy aid should be properly maintained in a good serviceable condition. Prior to and after each use, it should be checked by the user for defect which might alter its strength or buoyancy. Any defect observed should be reported to the proprietor (or the contractor) or his managerial personnel. Defective unit should not be used.

9. RESCUE AND EMERGENCY PROCEDURE

9.1 Rescue team

9.1.1 A rescue team should be organised to deal with emergency situations, such as accidents. Every member of the team should be trained in rescue and emergency procedures, and should have completed a course in first aid. At least one of the members should be a qualified first aider when there are 30 or more workmen on site [Regulation 63 of CS(S)R].

9.2 First aid facility

9.2.1 First aid facilities including a stretcher and a portable resuscitation equipment should be provided and kept readily accessible for emergency use. The facilities should be placed in the charge of a team of responsible persons designated by the proprietor (or the contractor), such as the rescue team.

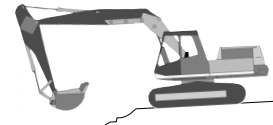
9.2.2 Notices in Chinese and English should be posted in prominent positions, especially at edges near water, stating the following :-

a) the locations and types of the rescue and life-saving appliances;

b) the location of the room, if any, for treatment of injuries;

c) the names of members of the rescue team; and

d) the means of communication.



9.3 Emergency procedure

9.3.1 Emergency procedures should be formulated in the action plan on safety to deal with emergency situations. The procedures should be expressed clearly in writing and should at least include the following :-

a) raising the alarm for emergency including calling the police by dialing '999';

b) activating the rescue team;

c) dealing with emergency situations;

d) providing and using emergency and first aid facilities;

e) stating routes for rescue operation if necessary; and

f) sending rescued persons to hospital for medical treatment due to immersion in water (possibly polluted) or injury.

9.3.2 The responsibility for co-ordinating and supervising emergency operations should be assigned to identified persons who are trained and competent to discharge it.

9.3.3 The emergency procedures should be posted in prominent positions using words that will surely be understood by the workmen.

9.3.4 All workmen should be trained on the emergency procedures. Drills and practices should be held regularly so as to ensure that all workmen are familiar with the emergency procedures.

9.3.5 The emergency procedures should be updated regularly so as to suit the progress of construction work. Drills and practices held can also help to identify the areas of weakness for improvement.

9.4 Rescue equipment

The proprietor (or the contractor) should provide suitable and sufficient rescue equipment for use in emergency rescue operations. All items of rescue equipment provided should be checked daily so as to ensure that they are in their proper positions and in good serviceable states. All workmen should be informed of the functions and limitations of each item of equipment, and be trained on how to use it properly.

9.4.1 Buoyant lifeline

Buoyant lifelines should be fibre ropes made of polypropylene with nominal diameter not less than 8mm. The acceptable standards of the fibre ropes are shown at Appendix II.

9.4.2 Grab line

Grab lines should be provided where practicable, for the purpose of giving a person in water something to grab onto in emergency. The grab line so provided should be of buoyant type and be sufficiently long to cater for the high and low tides. A marker float at the free end of the grab line should be provided and trailing ends of undue length should be avoided so as to prevent the boats nearby from being fouled up.

9.4.3 Lifebuoy

Lifebuoys, each fitted with a buoyant lifeline should be set at suitable locations but not exceeding 50m intervals along the edges over water where work is being carried out. Each buoyant lifeline should be knotted at every 3m to assist handhold, and have a length of about 30m. The buoyant lifeline should be constructed in compliance with 9.4.1.

The lifebuoys should be constructed of either cork with canvas covering, or of polyurethane foam with a rigid PVC cover. It is normally of 760mm outside diameter and 455mm inside diameter. For night work, a self-activating light should be fitted to it.

9.4.4 Rescue line

Rescue lines should be provided where practicable. Each rescue line should at least consist of a buoyant lifeline and a floatation chamber. The buoyant lifeline should be constructed in compliance with 9.4.1. Throwing the chamber out to a person in water can allow the person to grab the lifeline and he can be hauled to safety.

9.4.5 To achieve the best result, a lifebuoy or rescue line should be thrown as near as possible to a person in the water. If a tide is running, it should be thrown on the upstream side.

9.5 Rescue boat

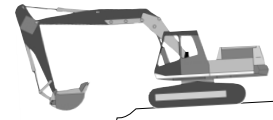
9.5.1 At least one rescue boat should be provided and kept ready for immediate use whenever workmen are employed to work over or adjacent to turbulent or tidal water where rescue of them would have to be carried out by boat. The rescue boat may be a rigid or an inflatable vessel. It should comply with the requirements stipulated in the Merchant Shipping (Safety) (Life-Saving Appliances) (Ships built on or after 1 July 1986) Regulations and should be properly maintained so that it is operational at any time in good condition.

9.5.2 The rescue boat should be power-driven with a fixed self-starting engine. Effective two-way radio communication should be set up between the rescue boat and the management on the shore. If night work is to be carried out, a powerful swivel-mounted spotlight should be installed on the rescue boat so that any person fallen into water can be spotted easily.

9.5.3 The rescue boat should be fitted with grab lines and provided with at least one lifebuoy fitted with a minimum 15m long buoyant lifeline. The buoyant lifeline should be constructed in compliance with 9.4.1. For a large rescue boat, it should also be provided with an overside boarding ladder or equivalent means to help rescue any unconscious person from the water.

9.5.4 The rescue boat should be marked clearly to show its intended use and it should not be permitted to use as a working vessel or an ordinary means of transport. First aid facilities including a sucker for clearing a person's airway and blankets for covering the rescued person should be provided. The first aid facilities should be suitably protected from getting wet by waterproof materials.

9.5.5 The rescue boat should be manned by competent boatmen who should be trained in rescue and emergency procedures, and should have completed a course in first aid. The boatmen should be competent in swimming, and they should at least equip with buoyancy aids while they are patrolling on board. So far as is reasonably practicable, there should be at least two boatmen on a rescue boat so that one is always free to rescue the person in water.



Appendix I

Relevant provisions of the Factories and Industrial Undertakings Ordinance, Chapter 59.

A1.1 Section 6A of the Factories and Industrial Undertakings Ordinance - General duties of a proprietor

(1) It shall be the duty of every proprietor of an industrial undertaking to ensure, so far as is reasonably practicable, the health and safety at work of all persons employed by him at the industrial undertaking.

(2) Without prejudice to the generality of a proprietor's duty under subsection (1), the matters to which that duty extends include in particular -

(a) the provision and maintenance of plant and systems of work that are, so far as is reasonably practicable, safe and without risks to health;

(b) arrangements for ensuring, so far as is reasonably practicable, safety and absence of risks to health in connection with the use, handling, storage and transport of articles and substances;

(c) the provision of such information, instruction, training and supervision as is necessary to ensure, so far as is reasonably practicable, the health and safety at work of all persons employed by him at the industrial undertaking;

(d) so far as is reasonably practicable as regards any part of the industrial undertaking under the proprietor's control, the maintenance of it in a condition that is safe and without risks to health and the provision and maintenance of means of access to and egress from it that are safe and without such risks; and

(e) the provision and maintenance of a working environment for all persons employed by him at the industrial undertaking that is, so far as is reasonably practicable, safe, and without risks to health.

A1.2 Section 6B of the Factories and Industrial Undertakings Ordinance - General duties of persons employed

(1) It shall be the duty of every person employed at an industrial undertaking while at work -

(a) to take reasonable care for the health and safety of himself and of other persons who may be affected by his acts or omissions at work; and

(b) as regards any duty or requirement imposed on a proprietor of the industrial undertaking or on any other person by this Ordinance for securing the health and safety of persons employed at the industrial undertaking, to co-operate with him so far as is necessary to enable that duty or requirement to be performed or complied with.

A1.3 Regulation 52A of the Construction Sites (Safety) Regulations - Prevention of drowning

(1) Where a construction site is situated on, or adjacent to, water into which a workman is liable to fall with risk of drowning, the contractor responsible for the site shall -

(a) provide suitable rescue equipment and keep it in an efficient state; and

(b) take measures to arrange for the prompt rescue of any such person in danger of drowning.

(2) Where there is a special risk of such a fall from land or from a structure adjacent to or above the water or from a floating stage, the contractor responsible for the construction site shall provide secure fencing to prevent such a fall.

(3) Any fencing provided under paragraph (2) may be removed or remain unerected for the time and to the extent necessary for the access of persons or the movement of materials.

A1.4 Third Schedule to the Construction Sites (Safety) Regulations - Requirements with which certain safety equipment must comply

1. Width of working platforms, gangways and runs

   (1) Subject to subsections (2) and (3), the width of any working platform, gangway or run shall be not less than 400 millimetres.

   (2) Subject to subsection (3), the width of any gangway or run used for the movement of materials shall be not less than 650 millimeters.

   (3) Where it is impracticable by reason of limitations of space to provide a working platform, gangway or run of the width required by subsection (1) or (2), then, in lieu of complying with that subsection, the working platform, gangway or run shall be as wide as is reasonably practicable.

2. Working platforms, etc. to be closely boarded, etc.

   (1) Subject to subsection (2), every working platform, gangway and run shall be closely boarded or planked.

   (2) Subsection (1) shall not apply to a working platform, gangway or run

      (a) consisting of open metal work having interstices none of which exceeds 4 000 square millimetres in area; or

      (b) the boards or planks of which are so secured as to prevent their moving and so placed that the space between adjacent boards or planks does not exceed 25 millimetres.

if there is no risk of persons below the platform, gangway or run being struck by materials or articles falling through the platform, gangway or run.

3. Boards and planks in working platforms, gangways and runs

Every board or plank forming part of a working platform, gangway or run shall

(a) be of sound construction, adequate strength and free from patent defect;

(b) be of a thickness capable of affording adequate security having regard to the distance between the supports and be not less than 200 millimetres in width and not less than 25 millimetres in thickness or not less than 150 millimetres in width when the board or plank exceeds 50 millimetres in thickness;

(c) not protrude beyond its end support to a distance exceeding 150 millimetres unless it is sufficiently secured to prevent tipping;

(d) rest securely and evenly on its supports; and

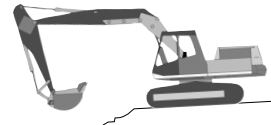
(e) rest on at least 3 supports unless, taking into account the distance between the supports and the thickness of the board or plank the conditions are such as to prevent undue or unequal sagging.

4. Coverings for opening

Every covering provided for an opening shall be

(a) so constructed as to prevent the fall of persons, materials and articles; and

(b) clearly and boldly marked as to show its purpose or be securely fixed in position.



5. Height of toe-boards, etc.

The height of a toe-board or other similar barrier shall be not less than 200 millimetres.

6. Height of guard-rails

Subject to section 7, the height of a guard-rail above any place of work on a working platform, gangway, run or stairway shall be

(a) in the case of a top guard-rail, not less than 900 millimetres and not more than 1 150 millimetres;

(b) in the case of an intermediate guard-rail, not less than 450 millimetres and not more than 600 millimetres.

7. Exception to section 6

Section 6 shall not apply to a working platform on a bamboo scaffold if the platform is protected by not less than 2 horizontal bamboo members of the scaffold spaced at intervals between 750 millimetres to 900 millimetres.

8. Temporary removal, etc. of guard-rails, etc.

(1) Guard-rails, toe-boards and barriers may be removed or remain unerected for the time and to the extent necessary for the access of persons or the movement of materials or other purposes of the work concerned, but shall be replaced or erected as soon as practicable after the expiration of that time.

(2) Toe-boards shall not be required for stairs.

Appendix II

Standard for equipment

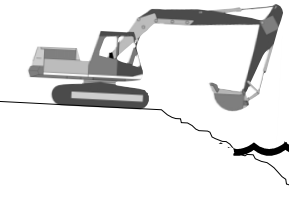
An equipment complying with the relevant standard(s) below is acceptable under this Code of Practice. However, if an equipment complying with a national or international standard which has been justified to be equivalent, it would also be acceptable.

Section	Equipment	Standard
A2.1	Ladder	a) British Standard BS 4211 : 1994 Specification for Ladders for permanent access to chimneys, other high structures, silos and bins.
		b) British Standard BS 5395 : Part 1 : 1977 Stairs, ladders and walkways Part 1. Code of practice for the design of straight stairs.
		c) British Standard BS 5395 : Part 2 : 1984 Stairs, ladders and walkways Part 2. Code of practice for the design of helical and spiral stairs.
		d) British Standard BS 5395 : Part 3 : 1985 Stairs, ladders and walkways Part 3. Code of practice for the design of industrial types stairs, permanent ladders and walkways.
		e) British Standard BS 1129 : 1990 British Standard Specification for Portable timber ladders, steps, trestles and lightweight stagings.

Section	Equipment	Standard
		f) British Standard BS 2037 : 1994 Specification for Portable aluminium ladders, steps, trestles and lightweight stagings.
A2.2	Safety net	a) British Standard BS EN 1263-1 : 1997 Safety nets Part 1. Safety requirements, test methods.
		b) British Standard BS 8093 : 1991 Code of Practice for The use of safety nets, containment nets and sheets on constructional works.
A2.3	Safety belt/ safety harness	a) British Standard BS EN 353-1 : 1993 Personal protective equipment against falls from a height : guided type fall arresters. Part 1. Specification for guided type fall arresters on a rigid anchorage line.
		b) British Standard BS EN 353-2 : 1993 Personal protective equipment against falls from a height : guided type fall arresters. Part 2. Specification for guided type fall arresters on a flexible anchorage line.
		c) British Standard BS EN 354 : 1993 Personal protective equipment against falls from a height --- Lanyards.
		d) British Standard BS EN 355 : 1993 Personal protective equipment against falls from a height --- Energy absorbers.
		e) British Standard BS EN 358 : 1993 Personal equipment for work positioning and prevention of falls from a height --- work positioning systems.

Section	Equipment	Standard
		f) British Standard BS EN 360 : 1993 Personal protective equipment against falls from a height --- Retractable type fall arresters.
		g) British Standard BS EN 361 : 1993 Personal protective equipment against falls from a height --- Full body harnesses.
		h) British Standard BS EN 362 : 1993 Personal protective equipment against falls from a height --- Connectors.
		i) British Standard BS EN 363 : 1993 Personal protective equipment against falls from a height --- Fall arrest systems.
		j) British Standard BS EN 364 : 1993 Personal protective equipment against falls from a height --- Test methods.
		k) British Standard BS EN 365 : 1993 Personal protective equipment against falls from a height --- General requirements for instructions for use and for marking.
		l) British Standard BS 6858 : 1987 British Standard Specification for Manually operated positioning devices and associated anchorage lines for use with industrial safety belts and harnesses.
A2.4	Anchor device for safety belt/ safety harness	a) British Standard BS EN 795 : 1997 Protection against falls from a height --- Anchor devices --- Requirements and testing.
		b) British Standard BS 7883 : 1997 Code of practice for Application and use of anchor devices conforming to BS EN 795.

Section	Equipment	Standard
A2.5	Buoyancy aid and lifejacket	a) British Standard BS EN 393 : 1994 Lifejackets and personal buoyancy aids --- Buoyancy aid 50
		b) British Standard BS EN 394 : 1994 Lifejackets and personal buoyancy aids --- Additional items
		c) British Standard BS EN 395 : 1995 Lifejackets and personal buoyancy aids --- Lifejacket 100
		d) British Standard BS EN 396 : 1994 Lifejackets and personal buoyancy aids --- Lifejacket 150
		e) British Standard BS EN 399 : 1994 Lifejackets and personal buoyancy aids --- Lifejacket 275
A2.6	Fibre rope	a) British Standard BS EN 699 : 1995 Fibre ropes for general service --- Polypropylene
A2.7	Safety helmet	a) British Standard BS EN 397 : 1995 Specification for industrial safety helmets



Appendix III

Reference

A3.1 Construction Safety (including the 1991's amendment)
(The Building Employers Confederation, United Kingdom.)

A3.2 Construction Site Safety Notes (GE 700 - 1992 Edition)
(Construction Industry Training Board, United Kingdom.)

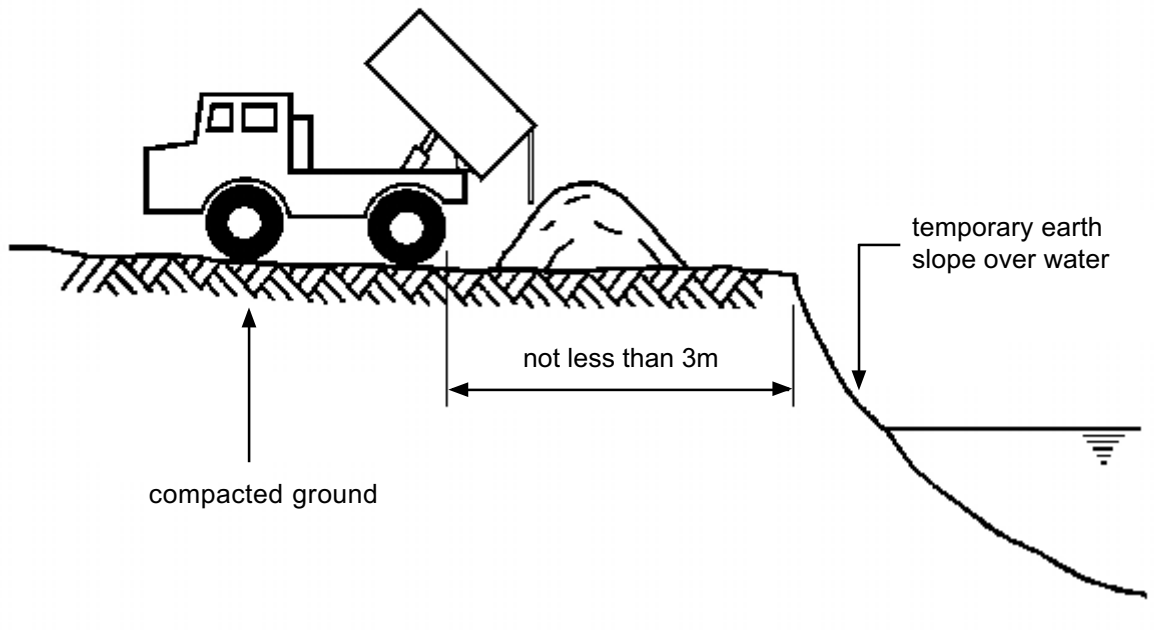
A3.3 Code of Safe Working Practices for Merchant Seamen (1991)
(Department of Transport, United Kingdom.)

A3.4 Shipbuilding and Ship-repairing Safety Guide (1973)
(Marine Department, Hong Kong)

A3.5 Code of practice for the construction, machinery, equipment, stability, operation and examination of motor vessels, of up to 24m loadline length, in commercial use and which do not carry cargo or more than 12 passengers (1993)
(Surveyor General's Organisation, United Kingdom)

A3.6 Safety and Health in Shipbuilding and Ship Repairing
(International Labour Office, Geneva)

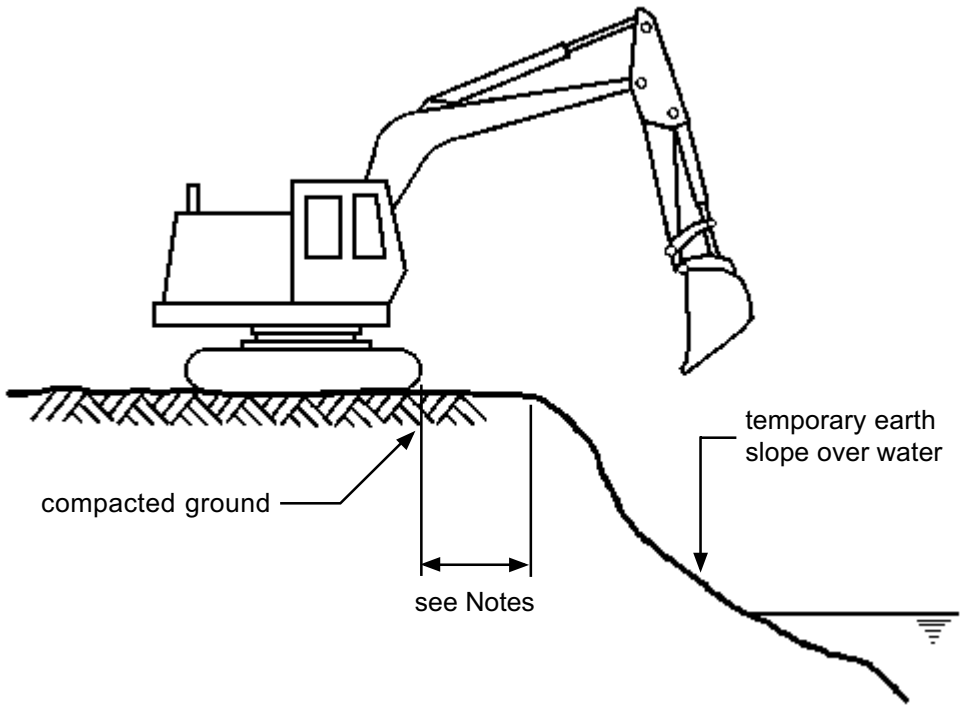
A3.7 Safety and Health in Dock Work
(International Labour Office, Geneva)



Notes: (1) Materials should be deposited on the surface of compacted ground.

(2) Materials deposited should be spread and compacted by a crawler track-mounted plant, such as a bulldozer.

Figure 1
Wheel-mounted plant at edge of temporary earth slope over water

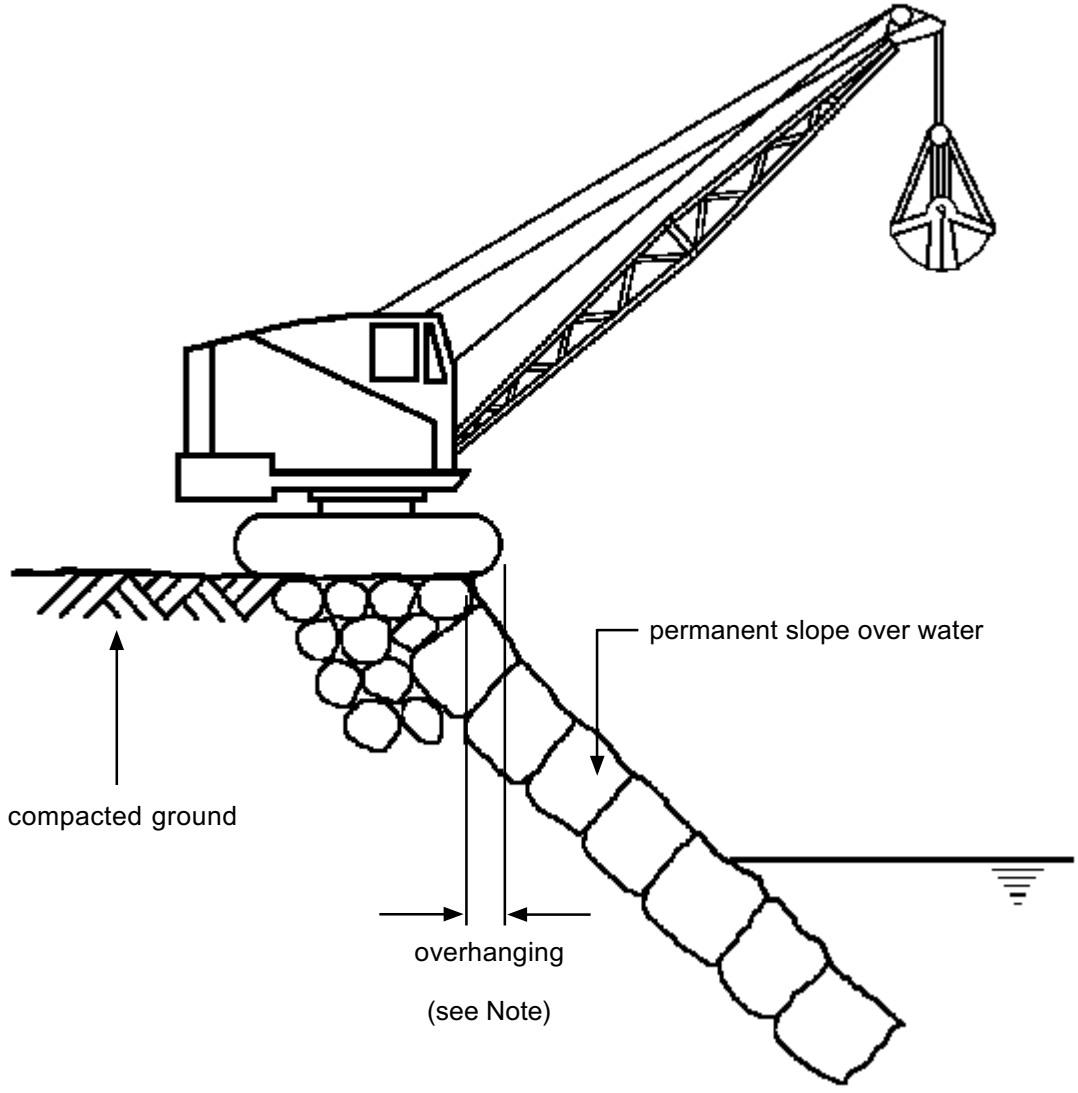


Notes: (1) The minimum distance from the crawler track to the edge of temporary earth slope should be determined by a registered professional engineer competent in geotechnics.

(2) Unless justified by the registered professional engineer in writing, this distance should not be less than 1m for plant on dry and well-drained ground.

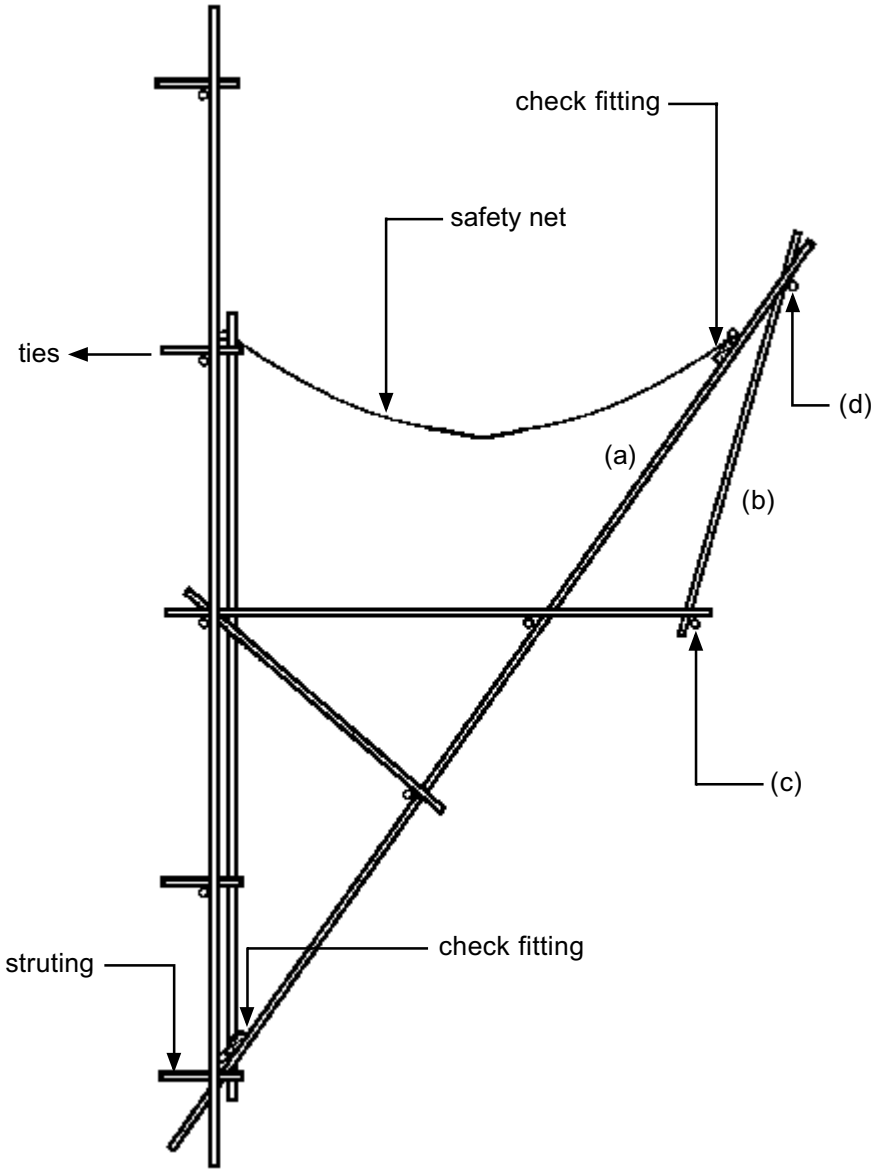
Figure 2

Crawler track-mounted plant at edge of temporary earth slope over water



Note: Overhanging of any part of the crawler tracks or wheels should not be permitted.

Figure 3
Mobile plant at edge of permanent slope over water



Notes: (1) The net and its supporting framework are attached to the scaffolding structure which should be securely tied back to the building.

This arrangement may also be suitable for attachment direct to the building.

(2) Members (b), (c) and (d) may be omitted if member (a) has been justified in accordance with recognised engineering principles by the proprietor's designer in writing to have adequate structural strength for safe performance.

Figure 4

A typical schematic arrangement of safety net outrigged from scaffolding

ENQUIRY

If you wish to enquire about this Code of Practice or require advice on occupational safety and health, you can contact the Occupational Safety and Health Branch through :

Telephone : 2559 2297(auto-recording after office hours)

Fax : 2915 1410

E-mail : laboureq@labour.gcn.gov.hk

Information on the services offered by the Labour Department and on major labour legislation can also be found by visiting our Home Page on the Internet. Address of our Home Page is http://www.info.gov.hk/labour.