7.1 General

1. Consider the provision of personal protective equipment only after all measures for removing or controlling safety or health hazards have been proved reasonably impracticable.

2. Ensure that sufficient personal protective equipment are provided and that they are readily available for every person who may need to use them.

3. The personal protective equipment shall provide adequate protection and comfort for continuous use and shall conform to the British Standard Specifications or other appropriate standards or their equivalent.

4. Consult the Safety Advisory Unit of your department if there is any doubt about the requirements and selection of any personal protective equipment.

5. The management shall ensure that all persons make full and proper use of the personal protective equipment provided.

6. Provide instruction and training in the proper use and care of any specific protective equipment where necessary.

7. The management shall provide proper storage for all personal protective equipment issued to ensure their conditions are properly maintained and are hygienic.

8. Where personal protective equipment is provided, do not wilfully and without reasonable cause remove personal protective equipment to endanger yourself or others.

9. Do not wilfully misuse, interfere with or ill-treat any protective clothing and equipment provided.

10. All persons who have been issued personal protective equipment shall ensure their good condition and report immediately any damage to the management for replacement.
11. Always keep the personal protective equipment as clean as possible since dirty ones can lead to dermatitis or fire.
7.2 Eye Protection

(Figure 7.2 - 1 refers)

1. The smallest particle in the eye can lead to disaster. Do not remove eye protection while in a dangerous area.

2. Get a trained person, not your colleague, to remove any foreign body from your eye.

3. Issue eye protection equipment to all where there is foreseeable risk of eye injury.

4. Ensure an adequate supply of goggles/shields is available.

5. Keep the goggles clean and make sure they are good fit.

6. All safety spectacles, goggles and face shields shall conform to B.S. 2092 or its equivalent.

7. Welding shield and goggles shall conform to B.S. 679 (for filters) and B.S. 1542-2 (for filter housings), or their equivalent.

8. Take care in selecting suitable eye protection. The following table shows what the markings on the lenses represent.

<table>
<thead>
<tr>
<th>Marking</th>
<th>Suitable for protection against</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.S. 2092</td>
<td>light impact</td>
</tr>
<tr>
<td>B.S. 2092-2</td>
<td>moderate impact</td>
</tr>
<tr>
<td>B.S. 2092-1</td>
<td>heavy impact</td>
</tr>
<tr>
<td>C</td>
<td>chemicals</td>
</tr>
<tr>
<td>D</td>
<td>dust</td>
</tr>
<tr>
<td>G</td>
<td>gas and fumes</td>
</tr>
<tr>
<td>M</td>
<td>molten metal</td>
</tr>
</tbody>
</table>

9. Wear suitable eye or face protection when engaged in:
   (a) grinding and cutting with an abrasive wheel, which is driven by mechanical power,
   (b) dressing abrasive wheels,
   (c) internal and external turning, other than precision turning, of non-ferrous metal and cast iron,
   (d) welding and cutting,
(e) loading and unloading a live cartridge into a cartridge-operated tool, operating and doing repairs or examinations to a cartridge operating tool when it is loaded,

(f) handling sewage, molten metal, acids, alkalis, and other dangerous or corrosive materials, whether liquid or solid, which are injurious to the eyes,

(g) cleaning sward, dust, etc. with steam,

(h) any process involving the use of Laser beams,

(i) cutting or breaking, chipping or scaling of rock, metal, clayware, cast iron, concrete or glass product,

(j) cutting out or cutting off rivets or bolts from boilers, vessels or plants,

(k) chipping, scaling or scurfing of boilers or vessels,

(l) grit-blasting, and

(m) any operation where there is a risk of injury to the eyes from flying particles.

10. Do not watch welding operations unless your eyes are protected from the damaging effect of flash.
BS 679 OR EQUIVALENT

STEAM

ABRASIVE WHEEL
Max. rpm: XXXX

ABRASIVE WHEEL
COMPETENT PERSON
TEL: .........

SPINDLE
Max. rpm: XXXX

EMERGENCY BUTTON

EYE PROTECTION
7.3 Head Protection
(Figure 7.3-1 refers)

1. No person shall enter a construction site unless he is wearing a suitable safety helmet as required by CS(S)R 48(2). Safety helmets are for protection against falling objects and heavy blows and shall conform to EN 397 or equivalent. Bump caps are for protection against light blows and shall conform to B.S. 4033.

2. Wear a safety helmet:
   (a) when there is the risk of being hit by falling objects;
   (b) while on or near a construction site;
   (c) during adverse weather conditions; and
   (d) when in any area designated as a “hard hat” area.

3. Wear bump caps or safety helmets when working in or passing any place where the headroom is limited and there is the risk of bumping against hard and protruding objects.

4. Correctly adjust the head harness so that head protection will stay on while you are bending over and yet will not be so tight that the harness makes a mark on your forehead.

5. Provide identification labels to all helmets in some way to prevent random exchange among wearers, with one helmet exclusive to each person.

6. Inspect helmets for cracks or sign of impact or rough treatment before each usage. Destroy, remove and replace all worn, defective or damaged helmets. Further, safety helmets of which the service life as recommended by the manufacturer, usually 3 years, have expired shall not be used and shall be replaced irrespective of the condition.

7. Destroy any helmet that has received a severe blow. The blow may have substantially reduced the protection offered by the helmet without apparent defects.

8. Prevent safety helmets from being dropped, thrown or used as supports.
9. Always make certain that there is at least 30 mm clearance between the crown straps and the inside shell.

10. Maintain shells and harness in excellent condition, and replace any defective part immediately.

11. Remove tars, paints, oils and other adherent dirt with non-flammable and non-toxic solvents. Consult the helmet manufacturer before choosing a solvent as some can be harmful to dielectric helmets.

12. Wipe dust or moisture from helmets before storing them.

13. Do not place helmets on the rear window shelf of a car as sunlight may adversely affect their strength. Also, a helmet may become a hazardous missile in case of emergency stops or accidents.

14. Provide suitable storage racks or lockers for helmets at work sites.

15. Service life of safety helmets is a function of several factors including materials used, quality control, usage conditions, care and maintenance. The normal service life of most helmets is about 2 to 3 years.

16. Supervising officers should carry out periodic inspection of helmets.
DO NOT

- Apply organic solvent
- Use damaged helmet
- Drill
- Hammer
- Paint
- Insert other headwear

WORLD STANDARDS

USA
- ANSI Z89.1

CHINA
- GB 2812

CANADA
- CSA Z94.1

INTERNATIONAL
- ISO 3873

GERMANY
- DIN EN 397

FRANCE
- NF-S72-202

AUSTRALIA
- AS 1801

EUROPE
- EN 397

UK
- BS EN 397

JAPAN
- JIS T8131

SAFETY HELMETS  

Fig 7.3 - 1
Chapter 7 Personal Protective Equipment

7.4 Hearing Protection

(Re. Figure 7.4 - 1 refers)

1. Refer to section 2.1.6 on “Noise Control”.

2. Ensure that the attenuation of all ear protectors conform to B.S. 5108.

3. Do not use ordinary dry cotton wool for hearing protection because it cannot provide any.

Ear Plugs

1. Use re-usable ear plugs or disposable ear plugs where the attenuation demanded is not excessive. The attenuation of some soft plastic re-usable ear plugs ranges from 18 to 25 dB(A) and that some disposable ear plugs made of glass down or wax cotton wool ranges from 8 to 12 dB(A).

2. Provide disposable ear plugs for infrequent visitors and ensure that they are never re-used.

3. Provide re-usable ear plugs for those who need to work continuously for a long-period in a high noise area.

4. Hygiene is important, particularly with re-usable ear plugs. Wash them clean every time after use and store them properly. Also, clean the box for holding the ear plugs at the same time.

5. Re-usable ear plugs are obtainable in different sizes to fit different sized ear canals. Universal fitting re-usable plugs are also available. Take care in selecting the correct size if the universal fitting type is not used. If they are too small for the ear canals, the attenuation effect will be reduced or even lost. If they are over sized, they may deform the ear canals and cause severe nerve problems in the worst case.

6. Note that disposable ear plugs of compressible foam rubber, glass down or wax cotton wool are all made for universal fitting.
Chapter 7  Personal Protective Equipment

7. When a person is given ear plugs for the first time, tell him how to put them in and look after them after use. Before inserting an ear plug, put one hand behind the head and pull the back of the ear to open the ear canal. Compress the ear plug to a smaller size and slide it into the ear canal gently. Release the hand pulling the ear. The ear plug should sit tightly and comfortably.

Ear Muffs

1. Use ear muffs where a large attenuation of up to 40 dB(A) is demanded. Ensure that the cushion can wrap around the whole ear and provide a good seal.

2. Prefer ear muffs with replaceable ear cushions because they deteriorate with age or may be damaged in use.

3. Avoid wearing spectacles in order to get a good seal from the ear cushions.

4. Ear muffs should be stored and maintained properly. Use only soap and water or the solvent recommended by the manufacturer of the ear muffs for cleaning.

5. Provide ear muffs for those who may need to get in and out of a high noise area frequently.
7.5 Fall Protection

(Re. Figure 7.5 - 1&2)

1. Take **adequate steps** (as stipulated in the Construction Site (Safety) Regulations (CSSR) Reg. 38B) to prevent any person on a construction site from falling from a height of 2 metres or more.

2. **Adequate steps** include the provision, use and maintenance of one or more of the following safety measures:
   - working platforms,
   - guard-rails, barriers, toe-boards and fences;
   - coverings for openings;
   - gangways and runs.

3. In all circumstances, safe working platforms shall be provided as far as is practicable. Where the special circumstances of the work make it impractical to provide working platforms, scaffolds and other means of fall prevention, suitable and adequate safety nets and safety harnesses/belts shall be provided. If it is impracticable to provide safety nets, suitable and adequate safety harnesses/belts shall be provided. Safety harnesses and belts should only be used as the last resort to prevent falls, and they shall not be considered as suitable and adequate unless they are attached continuously to a suitable and secure anchorage.

4. Any person on a construction site liable to fall less than 2 m but the injuries so caused may be serious, similar measures to prevent falls as described in paras. 2 and 3 above shall be taken.

5. A safety harness shall be used for fall protection because it could reduce injuries to the waist caused by the shock from a fall. In addition, use shock absorbing device as far as practicable. Safety belt shall only be used for positioning and travel restraint.

6. Wear safety harnesses or belts and attach them to suitable anchor points for:
   - rigger works;
   - works performed from suspended working platforms or work cages; and
(c) climbing permanent ladders that are provided with a fall arrest system.

7. Properly maintain all safety nets, safety harnesses/belts and other equipment provided for prevention of falls of person.

8. Wear a safety harness/belt and keep it attached to a secure anchorage whenever the use of a harness/belt is necessary for your own or other person’s safety.

9. The safety harness or belt anchor point should be directly above and the lanyard shall be left with the minimum free length. All anchor points shall conform to B.S. 5845. or equivalent.

10. Use safety belts and harnesses of the smaller drop. They are made to two drop limits (i.e. lanyard lengths), one is 0.6 m for close work and the other is 2 m for providing greater freedom of movement.

11. All safety harnesses and belts shall conform to B.S. 1397 or equivalent.

12. Register all safety harnesses and belts. Maintain a record of maintenance.
FULL BODY HARNESS
(RECOMMENDED FOR FALL PROTECTION)
SAFETY HARNESS / BELT ATTACHED TO HORIZONTAL LIFE LINE

SAFETY BELT (RECOMMENDED FOR TRAVEL RESTRAINT ONLY)
7.6 Respiratory Protective Equipment (Figure 7.6 - 1 refers)

1. Wear suitable respirators for protection when:
   (a) sanding and rubbing down wood, filling materials and old paint;
   (b) spray painting;
   (c) steam cleaning;
   (d) cleaning cooling coils and filters with high pressure jets;
   (e) all processes involving asbestos or asbestos based products, lead, and harmful or toxic chemicals in open vessels;
   (f) all processes that may give out silica dust or mercury vapour;
   (g) all works in a confined space;
   (h) the atmosphere contains a nuisance, harmful or toxic dusts or gases; and
   (i) for rescue purposes.

2. Ensure that suitable respirators can provide adequate protection. This is measured by the degree of inward leakage that occurs when used. The maximum allowable inward leakage for the various type of respirators are given in the appropriate British Standards.

3. The degree of inward leakage depends on:
   (a) the quality of face seal (facial hair, wearing spectacles, etc. can seriously affect the face seal);
   (b) the degree of efficacy of the filter or canister if used;
   (c) the degree of efficacy of the exhalation valve if used; and
   (d) the maintenance of the respirator and its accessories.

4. Provide training to all persons using the respirators for their correct fitting, use, limitations and symptoms of exposure.

5. Make reference to Table 7.6a and 7.6b for selection suitable respirators and the correct type for protection against specific hazards.
Table 7.6a - Specifications for Respirators

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>The selection, use and maintenance of respiratory equipment</td>
<td>BS4275:1974</td>
</tr>
<tr>
<td>Respirators for protection against harmful dusts and gases</td>
<td>BS2091:1969</td>
</tr>
<tr>
<td>High efficiency dust respirators and Positive pressure powered dust respirators</td>
<td>BS4558:1970</td>
</tr>
<tr>
<td>Specification for filtering facepiece dust respirators</td>
<td>BS6016:1980</td>
</tr>
<tr>
<td>Positive pressure powered dust respirators</td>
<td>BS4558:1970</td>
</tr>
</tbody>
</table>

Table 7.6b
Types of Respirators to Use Against Specific Hazards

<table>
<thead>
<tr>
<th>Type</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facemask</td>
<td>Nuisance dusts and non-toxic sprays</td>
</tr>
<tr>
<td>Cartridge Respirator</td>
<td>Low concentration of certain relatively non-toxic gases</td>
</tr>
<tr>
<td>Canister Respirator</td>
<td>Low concentration of certain toxic gases</td>
</tr>
<tr>
<td>Positive Pressure</td>
<td>Against disease producing non-toxic dusts</td>
</tr>
</tbody>
</table>

NOTE: Cartridge respirator and canister respirator shall only be used where the concentration of toxic gases is low and where there is no risk of oxygen deficiency.

6. Respirators for the use of asbestos works shall be those approved by the Commissioner for Labour (Regulation 12 of the Factories and Industrial Undertaking (Asbestos) Special Regulations). Some of them are listed in Table 7.6c.
Table 7.6c

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Model/Type Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>3M</td>
<td>a. 9920 disposable respirator</td>
</tr>
<tr>
<td></td>
<td>b. 7200 half-mask with 7255 filter</td>
</tr>
<tr>
<td></td>
<td>c. 7300 half-mask with 7255 filter</td>
</tr>
<tr>
<td>Sekur-Pirelli spa.</td>
<td>a. Polimask 200 half-mask with type 200 filter cartridge</td>
</tr>
<tr>
<td></td>
<td>b. Polimask 200/2 half-mask with 2 type 200 filter cartridges</td>
</tr>
<tr>
<td></td>
<td>c. C607 full facemask with 975P3 filter</td>
</tr>
<tr>
<td>Rascal Safety Ltd.</td>
<td>a. Dustmaster DM1 ventilated visor 045-00-01P5 with 045-00-01 headpiece, 021-02-06 main filter and 500-02-05 motor</td>
</tr>
<tr>
<td></td>
<td>b. Airstream AH4GB2 Respiratory Protective Helmet 060-00-16 with AS23-4 main filter 06-23-04 and visor assembly 060-10-17</td>
</tr>
<tr>
<td></td>
<td>c. Breathe Easy &amp; Positive Pressure Powered Respirator 055-00-01P1 with 2 P3 canisters 009-01-00, full facemask and 007-00-05 battery part</td>
</tr>
<tr>
<td></td>
<td>d. Powerflow Positive Pressure Powered Respirator 055-00-01P6 with 1 PM3 canister 009-00-13P, full facemask 055-00-01P and 007-00-03 battery part</td>
</tr>
</tbody>
</table>

7. Note that all respirators, with the exception of disposable types, require cleaning and inspection after use and before wearing by another person. Cartridges and filters have a limited life which can vary depending upon the environment in which they are used and manufacturer’s recommendations should be closely followed.

V. Store respirators properly when not in use.
1) Disposable Masks

- Disposable single-use dust mask
- Disposable gas/vapour mask

2) Quarter-Face Masks
7.7 Breathing Apparatus  

(Figure 7.7 - 1 refers)

1. Breathing apparatus offers the most effective protection against toxic gases and in an oxygen deficient environment.

2. Ensure that every person designated to wear breathing apparatus shall be certified fit by a doctor.

3. Adequately train every person designated to wear breathing apparatus and give them adequate practice in its use.

4. Make reference to table 7.7a for selection of suitable breathing apparatus.

Table 7.7a - Specifications for Breathing Apparatus

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Reference (BS or equiv.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Closed circuit type</td>
<td>BS4667:1974</td>
</tr>
<tr>
<td>b. Open circuit type</td>
<td>Part 1</td>
</tr>
<tr>
<td>c. Fresh air hose and compressed air line</td>
<td>Part 2</td>
</tr>
<tr>
<td>d. Escape type</td>
<td>Part 3</td>
</tr>
<tr>
<td></td>
<td>Part 4 (1982)</td>
</tr>
</tbody>
</table>

5. Note the pressure gauge readings when using breathing apparatus and make sure that there is adequate gas in the cylinder before use.

6. Service and check the breathing apparatus regularly by the manufacturer. Check leakage of the gas hose and replace immediately if a defect is found.

7. Store the breathing apparatus properly when not in use, and maintain proper record.
TOXIC GAS

TO AIR COMPRESSOR

MAINTENANCE RECORD

RECORD OF USE
7.8 Safety Footwear

1. Wear suitable footwear for work and ensure that all safety footwear conforms to EN 344 and EN 345 or their equivalent.

2. Use safety footwear on site or in other dangerous areas. Foot injuries account for a lot of industrial accidents and safety footwear would prevent most of them.

3. Wear suitable safety shoes or ankle boots when working anywhere where there is high risk of foot injuries from slippery or uneven ground, sharp objects, falling objects, etc.

4. All safety footwear, including safety shoes, ankle boots and rubber boots shall be fitted with steel toecaps. Where there is a risk of treading on protruding nails or sharp objects, the footwear shall be fitted with penetration resistant soles, and be identified with a symbol "P" in accordance with EN 344. For electrical workers, or where electrical hazard exists, safety footwear with electrical resistant soles shall be fitted as appropriate.

5. Avoid wearing flip flops, high heeled shoes, slippers, light sport shoes etc. in situations where there is a risk of foot injury.

6. Keep shoe lace knots tight.
7.9 Protective Clothing

1. Wear impermeable overalls, gloves and dust caps when working or handling asbestos and asbestos based products, lead and lead based products including lead paint, and other harmful chemicals, which may be absorbed through intact skin.

2. Do not wear overalls that are worn or saturated with oil. They should be clean and close fitting clothing, changed before returning home and washed every day.

3. Avoid loose sleeves or belts and keep loose clothing buttoned up.

4. Wear impermeable protective overalls when entering a manhole where there is possible contact with sewage or unlined tunnels with unknown drippings.

5. Wear gaiters manufactured to B.S. 4676:1971 or equivalent when engaged in handling molten metal and knocking out hot materials.
7.10 Hand Protection

1. Wear suitable gloves and clean after use when:
   (a) working or handling sheet metal and other objects, which have sharp edges and corners;
   (b) cutting with a knife or other cutting edge;
   (c) operating a chainsaw;
   (d) rolling film;
   (e) welding and cutting;
   (f) avoiding electric shock;
   (g) providing better grip while handling oily components;
   (h) lifting manhole covers and engaged in manual handling of materials and equipment, to provide better a grip; and
   (i) avoiding heat burn and direct contact with dye or other chemicals.

2. Do not wear gloves where there is a risk of them becoming entangled in moving parts of machinery.

3. Avoid direct contact with ratten rods, water jetting hoses and other drainage equipment.

4. Wash hands properly with disinfectant soap and clean water before drinking, eating or smoking. Wash hands immediately after each operation on site when the situation warrants.