

TRADE OF  
**Industrial Insulation**

PHASE 2

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**Module 1**

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Sheet Metal and Insulation Fundamentals

UNIT: 1

**Introduction to the  
Workshop Environment**

*Produced by*

**SOLAS**

**An tSeirbhís Oideachais Leanúnaigh agus Scileanna  
Further Education and Training Authority**

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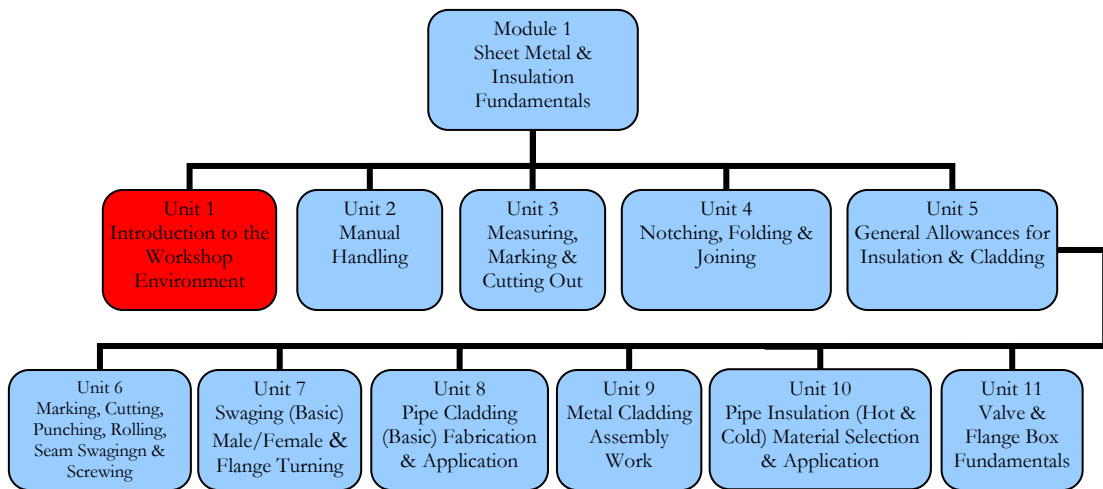
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# Introduction

You are about to embark on a learning experience that we hope will be enjoyable and an influencing time of your life. Your focus should be to develop the knowledge, skills and competencies that will enable you to enter the labour market or to bring added value to employers that will facilitate growth and competitiveness.

Our intention is to provide the best possible environment through attention to both the physical space in which learning takes place, and to the supporting environment.



## Unit Objective

By the end of this unit each apprentice will be able to:

- State the attendance, safety and fire drill procedures.
- Identify hazards in the workshop.
- Identify different fire extinguisher types and their uses.
- State the basic principles of first aid.
- Understand the importance of good housekeeping.

# 1.0 Safety Procedures

Health and Safety aims to prevent accidents and ill health at the place of work, and will always play an essential part in our delivery of training. It is necessary that you play an active role by observing and adhering to safety procedures so as to ensure we maintain health and safety standards within the training centre.

## Key Learning Points

- Attendance and time keeping procedures.
- Training centre layout, location of evacuation assembly points.
- Canteen and training centres operational practice.
- Safety procedures applicable to training location.

## 1.1 Attendance and Timekeeping

The Training Centre is open five days a week Monday to Friday. The start / finish time for all apprentices in full time training is as follows:

|                          |              |   |                   |
|--------------------------|--------------|---|-------------------|
| <b>Monday</b>            | <b>08.30</b> | - | <b>15:45</b>      |
| <b>Tuesday</b>           | <b>08.30</b> | - | <b>15:45</b>      |
| <b>Wednesday</b>         | <b>08.30</b> | - | <b>15:45</b>      |
| <b>Thursday</b>          | <b>08.30</b> | - | <b>15:45</b>      |
| <b>Friday</b>            | <b>08.30</b> | - | <b>12:45</b>      |
| <b>Morning Tea Break</b> |              |   | <b>10 Minutes</b> |
| <b>Lunch Break</b>       |              |   | <b>30 Minutes</b> |

1. Timekeeping is important; you **MUST** be on time.
2. Clocking out early is considered a breach of time keeping regulations.
3. Queue in an orderly manner while clocking IN or OUT.
4. Do not clock in or out for another apprentice or trainee.
5. Do not leave the training centre without notifying your instructor and always clock out and back in on your return.

## 1.2 Standards of Behaviour in the Canteen

1. Safety clothing and footwear must not be worn.
2. Queue in an orderly manner.
3. Sit at allocated areas only.
4. Smoking is not allowed.
5. Adhere to canteen timetables.
6. Respect and show courtesy to canteen staff and other users.

7. Do not remove cutlery or food from the canteen.
8. Return tray and utensils to the trolley provided.
9. Purchased food cannot be exchanged.
10. Shoplifting from the canteen warrants dismissal.
11. Close circuit television is in operation at all times.
12. Soft drink cans to be placed in the bins provided.

### 1.3 Entering Another Workshop Area

From time to time you may need to visit other workshop areas within the training centre. It is important to note that different hazards may exist in different areas of the training centre that the apprentice may not be aware of. When entering another workshop area the following procedures should be followed:

1. Notify the instructor on your arrival and state the reason for your visit.
2. Wear the appropriate personal protective equipment (PPE).
3. Be aware of hazards which may exist in the workshop area.
4. Do not operate any tools or machinery without prior permission of the instructor.
5. Do not attempt to distract other apprentices.
6. Failure to comply with the above rules may lead to disciplinary action.

### 1.4 Emergency Evacuation Procedure

#### Action by Safety Committee

Co-ordination of the evacuation procedure and subsequent action will be the responsibility of a number of people such as the Safety Officer, the Safety Committee Chairman and/ or the Training Centre Manager, who will assemble at the reception area on the alarm sounding, and he or she will identify what the threat is.

Responsibility for evacuation of the training Centre / location is allocated to members of the Safety Committee, each with a distinct area of responsibility. The individual member will nominate a deputy to carry out the evacuation in the event of his / her absence from the area.

#### Action by Instructing Staff

*When the fire alarm sounds the following action is to be taken:*

Make sure that all trainees / apprentices in the general area leave the building by their designated exit or nearest safe exit and go to their assembly point. Instructors will escort their class to the assembly point, do a head count of their class and report back to the fire warden who is manning the assembly point.

## Action by Apprentice

*When the fire alarm sounds the following action is to be taken:*

Leave the Training Centre by your designated exit, or the nearest safe exit and go to your assembly Point. Do not stop to collect personal belongings (you will be shown this exit and assembly point during your induction period ).

Remain at the assembly point until the all clear is given

If you are aware that someone is still in the building, please report this to the responsible person at the assembly point.

### Please Note:

**When the alarm sounds and you are in an area that is away from your designated exit, leave by the nearest safe exit and assemble at your designated assembly point.**

## 1.5 Accident Prevention and Reporting

Injuries are caused by accident. Accidents are unplanned happenings

Unplanned happenings are initiated by unsafe actions

Unsafe actions are often contributed to by a person's attitude

In some cases the cause is mechanical or structural failure.

All persons must be aware of the need for a responsible attitude towards accident prevention, which will avoid unsafe actions taking place. Skylarking and horseplay are strictly forbidden and will lead to dismissal.

In order to be aware of specific hazards in any section, you must read the document on Hazard Identification before you start work. This document is located in your section.

You must leave a work area in such a way that no one else can get hurt.

Trying to do someone else's job without authority is wrong and dangerous. There may be risks **you** cannot foresee.

If someone distracts you, and you get hurt in consequence, you won't be pleased. Think, before you distract anyone else.

Practical jokes and larking about are often good fun, but not under Training Centre or work conditions. They are liable to have a tragic ending.

### Causes of Accidents

- Boredom
- Carelessness
- Familiarity with the job
- Frustration and irritability
- Haste
- Horseplay
- Lack of concentration
- Lack of knowledge



- Thoughtlessness

All accidents must be notified to your instructor who will deal with the situation depending on the extent of the injury involved.

**In the event of any accident:**

Report the accident to your instructor who will decide the course of action to be taken.

Category 1      First aid will be administered on site.

Category 2      First aid will be administered on site and the patient  
will then be transported to the nearest A&E department

Category 3      An ambulance will be called and emergency first aid will  
be administered on site.

**You will be asked to give details of the accident and how it occurred, all of which will be recorded in the accident register.**

**Depending on the extent of your injuries, your next-of-kin will be notified.**

## 2.0 Hazards

### Key Learning Points:

- Identification of basic workshop equipment and hazards.
- Introduction to basic bench fitting tools, e.g. hand tools, marking out equipment, efficient tool layout.
- Individual and group workshop cleaning routines, cleaning roster.

Hazards exist in all workplaces and new hazards can be created in a changing environment. Hazards can be identified as:

- Poor work design.
- Human behaviour.
- Materials or substances.
- Faulty equipment or machinery.
- Inappropriate management systems and procedures.

The use of a systematic approach is essential to identify all the possible hazards through anticipation or analysis.

Employees should be consulted to ensure all hazards and risks are identified and control measures are appropriate to reduce the associated risk.

It is generally accepted that there are five classes of hazard: -

|                      |  |
|----------------------|--|
| <b>Biological</b>    | Bacteria, Fungi, Parasites.  |
| <b>Chemical</b>      | Acids, Cleaning agents, Dust, fumes.   |
| <b>Environmental</b> | Electromagnetic fields, Dust, Noise, Radiation, Spillages, Vibration.  |
| <b>Behavioural</b>   | Accident, Bullying, Error, Discrimination, Harassment, Stress.   |
| <b>Physical</b>      | Cranes, Electricity, Floors, Hoists, Ladders, Lighting, Manual Handling, Pressure Vessels, Stairs, Work Platforms. |

Hazard identification and risk control documents must be produced for all of the above hazards.

## 2.1 Preventing Workshop Hazards

### Tidiness

Tidiness is the foundation of accident prevention. Keep your workplace tidy and, if you see anything in an obviously unsafe place, remove it or report it. There are proper places for rubbish and waste. Dumping things “any old where” may lead to a fire or an accident. Tidy up as you go along and remember that the job isn’t finished until you’ve cleared up. A cleaning roster should be in place to ensure that overall tidiness is maintained.

### Handling Materials

It’s not what is handled, so much as the way it’s handled, that leads to so many accidents. Look out for sharp edges, splinters and nails. Pull out or knock down projecting nails before you pass material on or throw it out for scrap. Don’t try to carry a load that you can’t see over. Containers should be treated with caution, as many liquids are **flammable, corrosive or poisonous**. Even if empty, assume that they are dangerous unless you are sure that the liquid they contained was harmless. **Get help** when lifting unduly awkward or heavy objects. Watch your step as you walk about. Watch for traffic and people working overhead. Spilt liquids such as oil cause slips and falls. Wipe them up. Pick up anything that is left lying around. Short cuts are dangerous. Go the safe way even if it means going the longer way. Use the gangways and walkways provided. When passing a place where chips or dust fly about, turn your head away. If possible keep clear of dangerous areas.

### Falls

Stack materials so that it is stable and safe. Put tools and other equipment where they cannot fall or be knocked onto someone below. Don’t climb about; use a suitable ladder. Examine ladders and planks before you use them. Do not stand under suspended loads.

### Machinery

Operate and clean machines according to the instructions. Never take short cuts. Check that guards are in place before operating a machine. Disconnect the power supply from the machine before dismantling for cleaning. Handle all cutting tools with extreme care. Ensure that the floor on which you stand is free from oil or grease and is dry. All spillages should be cleaned as they occur. Concentrate on the job and do not be distracted by other activities.

### Compressed Air

Compressed air can injure or kill without warning. It can easily damage sensitive organs such as eyes, ears or internal organs. Death can occur if air is forced through the skin into the blood stream.

## Electricity

Electricity can injure or kill without warning. Do not mess with it. If using a portable power tool, for example a drilling machine or an angle grinder, always check the following: -

- Is the plug undamaged, clean and dry?
- Is it 110 volt (look at the information plate on the tool).
- Is the lead sound and undamaged with no cuts or “makeshift” repairs?

## Fires

Fire-fighting equipment is for use in emergencies. Keep it clear of obstructions so that it can be accessed quickly when required. This also applies to fire doors and exits. Do not wait until there is a fire to find out where these things are and how to use them. Find out now.

## Clothing

Loose clothing such as ties, open coats, flapping cuffs, bows and scarves are always dangerous when working near machinery. Smooth shafts, despite their innocent appearance, are dangerous. Avoid loose clothing because the material probably won't tear if it catches, but will take you into the machine or around the shaft. Wear a neat fitting set of overalls.

Understandably, hands are more prone to injury than any other parts of the body. They are used to handle an endless variety of materials, some quite safe, others dangerous. Protection for the hands is available in many forms and for many purposes. What is suitable for handling sheet metal will probably be quite unsuitable for working with chemicals. So make sure you use the right type of protection for the job. One important point you should remember is that it is highly dangerous to wear gloves when working with machinery, particularly where there is a risk of the gloves being caught up in moving parts. Gloves should not be used when working with drilling machines or circular saws and caution should be exercised when using power operated bending rolls.

Wear good safety boots or shoes at work and keep them in good repair. It pays in the long run because you will get less tired, as well as being less liable to foot injuries and falls.

Loose hair can easily get caught up in moving machinery – apart from the injury and pain, if the hair roots are damaged your hair will never grow again. Ensure that your hair is tied up and out of danger.

The head contains the nerve centre, which controls the body. Damage to that centre can wreck your whole life. That is why it is important to wear a safety helmet whenever there is a risk of your head being injured. A helmet is absolutely essential on construction sites and its use in many other industries is highly desirable.

## Eye Protection

If some foreign body gets into your eye, you should have it attended to immediately. Your mate may be willing and able to get it out, but your eyes are too valuable to trust to any unskilled person. You know how uncomfortable and painful it can be to get a bit of windblown dust in your eye. A bit of metal or stone, a splash of chemical, sparks from a grinding wheel or slag from a weld may result in anything from seriously impaired vision to total blindness. The use of a pair of safety glasses or similar protection will prevent this happening. Get into the habit of using eye protection always.

**Remember** – you can get a new pair of safety glasses but – you are on your **only pair of eyes**

## Hearing Protection

Loud noise can damage your hearing. When noise levels are high you must wear ear protectors. If you do not, you will suffer hearing loss and may have to wear a hearing aid later in life. Machines with high noise levels include woodworking machinery, heavy metal guillotines, angle grinders and percussion drills – you must wear hearing protection while working with these machines or while in an area where they are in operation. If in doubt about noise levels ask your instructor.

## Breathing Apparatus

Some processes produce dust or fumes. These may be harmful or may only be a nuisance. If you work where dust or fumes are produced, dangerous or otherwise, you must wear suitable masks or breathing apparatus to protect your lungs. The type of equipment required will depend on the type of dust or fumes present.

## Hand Tools

Keep hand tools in good order. Spanners with splayed jaws, chisels with burred or mushroomed heads, files, screwdrivers and so on with handles that are damaged, may lead to injury. Misuse of tools also leads to injury. Carrying tools in a safe manner will protect yourself and others. Cutting tools should be carried with edges protected.

## 3.0 Fire Extinguishers

### Key Learning Points

- Identification and selection of fire extinguishers suitable for carbonaceous, liquid fuel and electrical fires.
- Location and recommended use of fire fighting equipment.

There are a number of Fire Stations located around the training centre. They have already been pointed out to you during the tour of the training centre at the start of your course. There are also individual fire extinguishers positioned in all workshops and they will be pointed out to those trainees and apprentices operating in the areas covered.

### 3.1 Types of Fire Extinguishers

There are four types of fire extinguisher in common use. Each one extinguishes specific classes of fire. Newer fire extinguishers use a picture / labeling system to designate which class of fire they are to be used on. Older fire extinguishers are labeled with coloured geometrical shapes with letter designations. The letter designations may be included in the new picture / labeling system as shown below.

The main types of extinguisher that you will come across are;

- Water ( Red )
- CO<sub>2</sub> ( Black )
- Dry Powder ( Blue )
- Foam ( Cream )

These have been colour coded so that you can identify them quickly. It is very important that you do not use the wrong extinguisher and put yourself in danger. The main body colour of the extinguisher is red. The identifying colour is either in the form of a coloured band or the writing may be in the specific colour.

### 3.2 Classes of Fires

There are five classes of fire. Here we will look at the three most common ones.

#### Class A



Fires involving solid materials, mainly of organic origin, which normally burn under production of embers, e.g. wood, paper, straw, textiles, coal, car tyres.

Use: Water, Foam or Powder.

### Class B



Fires caused by combustion of liquids or materials that liquefy, e.g. petrol, benzene, oils, paints, tar, ether, alcohol, paraffin.

Use: Foam, Powder or CO2

### Class C



Fires caused by combustion of gases e.g. methane, propane, hydrogen, acetylene, natural gas, and city gas

Use: Powder, **only** if the fire has just started and the gas supply can definitely be shut off. Otherwise let it burn out. **Get out** in case of explosion.

### Electrical Fires



Fires in electrical equipment are considered to be Class B. Use a Carbon Dioxide Extinguisher for electrical fires. CO2 is ideal as it is nonconductive and harmless to electrical equipment. It smothers flames by denying air to the fire.

## 3.3 How to Use a Fire Extinguisher

Even though extinguishers come in a number of shapes and sizes, they all operate in a similar manner.

Here's an easy acronym for fire extinguisher use.

**P A S S** Pull, Aim, Squeeze, and Sweep

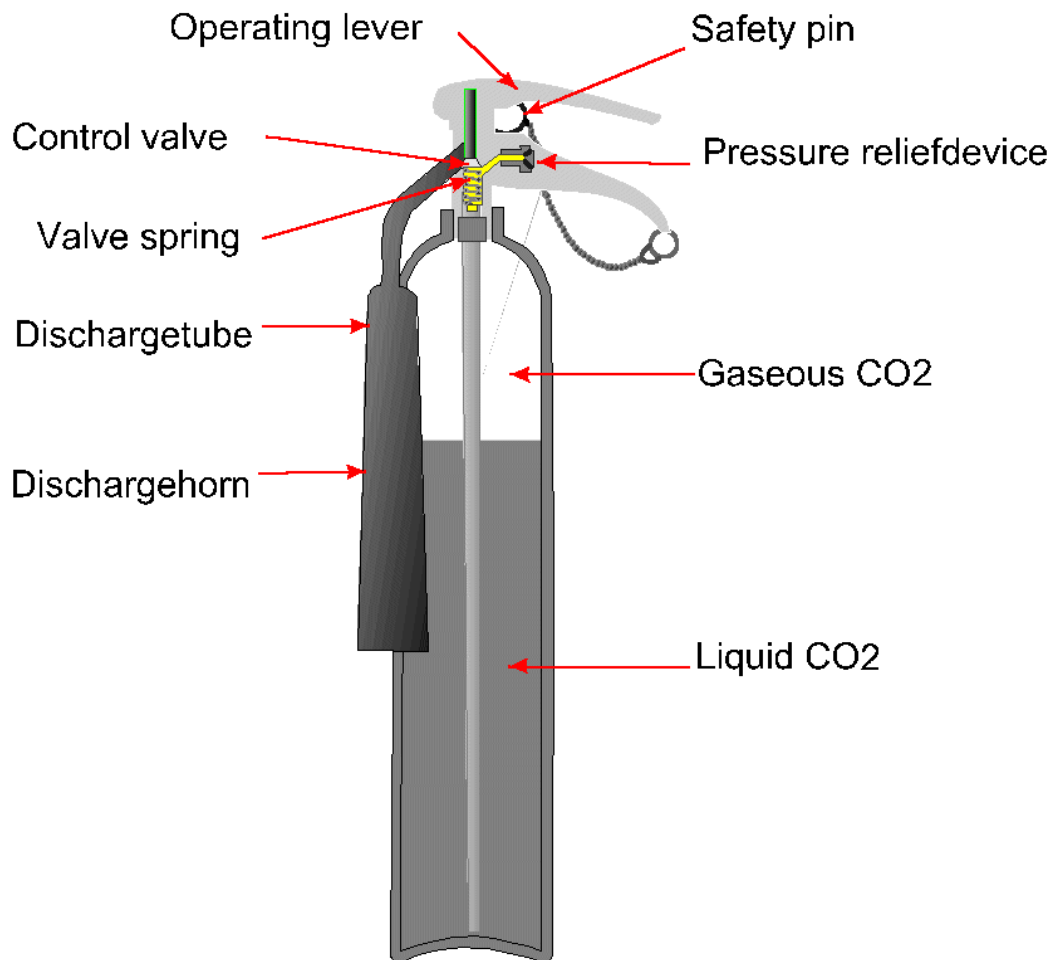
**Pull** the pin at the top of the extinguisher that keeps the handle from being accidentally pressed

**Aim** the nozzle toward the **base** of the fire.

**Squeeze** the handle to discharge the extinguisher, while standing approximately 8 feet away from the fire. If you release the handle, the discharge will stop.

**Sweep** the nozzle back and forth at the base of the fire. After the fire **appears** to be out, watch it carefully since it may **re-ignite!**

### Carbon dioxide extinguisher (small size)





## 4.0 First Aid

### Key Learning Points

- First aid principals and accident reporting procedures.
- Accident reporting, procedures and records.

If you are not quite up to the mark, your attention is relaxed and that's just when an accident happens. Your attention is needed at all times in the training centre or while at work. If you feel unwell, you should report to your instructor.

The smallest pinprick can lead to blood poisoning. Get first-aid treatment for all injuries, however slight. Leave any dressing alone after it has been put on. Tampering with it may infect the wound with germs.

If anyone is badly hurt, send for a member of the First-Aid team before moving him/her. Moving an injured person without the necessary knowledge may cause further injury.

### 4.1 Principles of First Aid

First aid is the initial assistance or care of a suddenly sick or injured person.

First aid is an important part of everyday life, both at home or at work. It is the care a person applies as soon as possible after an accident or sudden illness. This prompt care and attention prior to the arrival of an ambulance can sometimes mean the difference between life and death, or between a full or partial recovery.

The main aims of first aid are:

- (1) Protect the casualty from further harm – ensure the scene is safe.
- (2) Provide pain relief – this could include ice packs or making the patient more comfortable.
- (3) Prevent the injury or illness from getting worse .
- (4) Provide reassurance.

### 4.2 Calling for Help

In Ireland dial '999' for emergency assistance . '112' is the GSM international standard emergency number which can be dialled from digital mobile phones or fixed landline phones.

**There are three things to remember when calling for help:**

1. State which emergency service you want: Ambulance, Fire, Police.
2. Stay on the line until connected with the emergency service operator who will need to talk to you before sending assistance.
3. Give as much information as possible about the location and the nature of the emergency

## 5.0 Housekeeping in the Workshop

### Key Learning Points

- Professional care of tools and equipment.
- Location and identification of special tools, equipment and consumables.
- Identification and marking/engraving toolkit.
- Safe disposal of scrap and swarf in an environmentally sound

It is important to keep the work area clean and tidy. All tools and equipment must be returned to their respective toolbox or storage area when not in use. When using power tools always wear safety glasses. Do not wear loose clothing, and always tie back long hair when operating machinery. Ensure that the floor is kept free of debris, oil and coolant spills. Clean up any spills immediately.

### Guidelines for the Care and Use of Hand Tools

- Select the correct size tool for the job.
- Do not use worn or damaged tools.
- Maintain tools in good condition.
- Cutting tools need to be sharp and safe.
- Store and carry tools safely.

### 5.1 Safe Disposal of Waste Materials

All waste materials such as metal cut-offs and scrapped parts should be placed in special metal scrap bins and sent for recycling.

All other waste material such as oily paper, cloths, filings etc., should be removed from the workbench or floor using a brush and pan. This waste can be placed in general disposal bins.

### 5.2 Storing Tools and Equipment

When a task has been completed all tools and equipment should be returned to the stores. Some important points to be aware of when storing tools and equipment are:

1. ALL power tools should be stored on shelves with their electrical cords rolled in a neat manner.
2. Special measuring equipment such as vernier callipers and height gauges should be placed in their appropriate cases.
3. Hand tools should be placed in tool boxes and stored neatly.
4. Extension leads and cords should be rolled up neatly and either hung up or placed on shelves for safe storage.

5. Excess consumables such as welding rods etc, should be returned to the stores and placed in their relevant compartments for the next apprentice to use.
6. Engraving and marking tools should be properly stored in their own compartment boxes and returned to the stores when not in use.

## Summary

Health and Safety in the work place is everyone's responsibility. Developing your safety sense begins the first day you walk into a training centre or onto a building site. Read the Safety Code carefully and then re-read it. By following the safety code throughout your training you will develop your safety sense and at the same time complete your training without injuries. Developing your safety sense involves the following:

**Attitude of Mind:** Each apprentice should be determined not to get hurt or hurt others.

**Alertness:** Always being on the lookout for hazards.

**Knowledge:** Recognising by experience, including the experience of others, what is likely to lead to an accident.

## Suggested Exercises

- (1) Identify hazards within the workshop.
- (2) State the appropriate fire extinguisher for use with the following types of fire: paper, petrol and electrical fires.
- (3) State the attendance and canteen procedures.
- (4) State the procedure to be followed when entering another workshop area.

## Training Resources

- (1) Induction manual.
- (2) Safety videos.
- (3) Copy of the training centre safety manual.
- (4) Fire equipment.
- (5) Course manual.
- (6) Apprentice toolkit.
- (7) Sample accident report forms.

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