

WEYMOUTH COLLEGE

ELECTRICAL INSTALLATION



**WEYMOUTH
COLLEGE**



EMTA Awards Limited
*Part of the **SEMTA** Group*

Diploma in Electrical Installation

Industrial Environmental Awareness

Learner Name:

Learner Number:

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Looking after yourself and others in the workplace

Your health and safety responsibilities

When working in an industrial environment you need be aware that you have a legal responsibility to make sure of your own safety and that of others working around you.

Which legislation applies to the workplace?

Current legislation requires employers to display health and safety information relevant to the work being carried out. Using the HSE website identify the following legislation, giving a brief description or what each covers:

HASAWA

EAWR

CDM

WHSW

ESQCAR

MOHSAW

PUWER

COSHH

NAWR

HASFAR

MHOR

DSEAR

RIDDOR

What are the workplace responsibilities?

Your responsibilities at work are covered in Health and Safety at Work etc Act 1974. This should be displayed in your workplace.

As an employee your legal responsibility is to:

1.

2.

3.

4.

**Electrical Installation
Level 2 Diploma in Electrical Installations**



Your employer has a responsibility to:

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

What to do if there is a problem?

If you feel there is a problem with health and safety in your workplace what options do you have?

1.

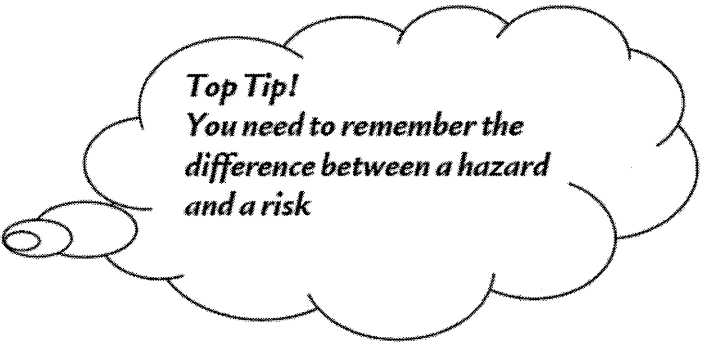
2.

3.

Hazards and risks

You need to be aware that in an industrial environment there are many hazards. Many of them may not immediately be apparent to you as a hazard.

Identifying hazards is the first step to understanding what could happen and the consequences if it did happen. Even if we cannot remove the hazard then it allows us to think up ways of seeing how we can reduce the **risk** of it happening.



Top Tip!
You need to remember the difference between a hazard and a risk

What is meant by the term 'Hazard'?

What is meant by the term 'Risk'?

The general workplace - Machinery

What 'hazards' are associated with machinery?

How are risks managed when using machinery?

What machinery might you encounter in the Electrical Installation Workshop?

The general workplace - Computers

What problems are associated with using a computer and display screen equipment (visual display units)?

-
-
-
-

What are the contributing factors for the above?

-
-
-
-

What legislation covers the use of VDU screens?

The general workplace – Lifting equipment

What types of lifting equipment/aids are available?

What does SWL mean?

What legislation covers lifting equipment?

The general workplace – Hand tools

Risks can be controlled by ensuring hand tools are used correctly and maintained. Each has their own set of hazards and ways to reduce the risk of injury. What hand tools are available for use in the Electrical Installation workshop, what risks are involved in their use and how can these be overcome?

| Tool | Risk | Solution |
|-----------------------------------|---|---|
| e.g. Claw Hammer | <ul style="list-style-type: none"> • Loose head • Split handle • Crushing/striking | <ul style="list-style-type: none"> • Fix/repair/remove • Replace • Ensure body parts clear when using! |
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The general workplace – Ladders & stepladders

Many accidents involving ladders happen during short jobs. To prevent accidents it is recommended that, if possible, you use other equipment such as a mobile elevating work platform. If you do have to use a ladder what simple steps might reduce the risk of an accident?

-
-
-
-
-

What items might you check on a ladder or a step ladder before each use?

The general workplace – Working with materials

Materials used in many industrial process can be toxic and dangerous to handle, care must be taken when handling these materials and ensure that the correct personal protective equipment (PPE) is worn at all times.

List the materials that you might use in the Electrical Installation Workshop and any dangers associated with them:

Materials must be used and disposed of in accordance with instructions for use as stated on the supplied COSHH data sheets. Are there any COSHH data sheets available for substances used in the workshop?

The general workplace – Moving materials manually

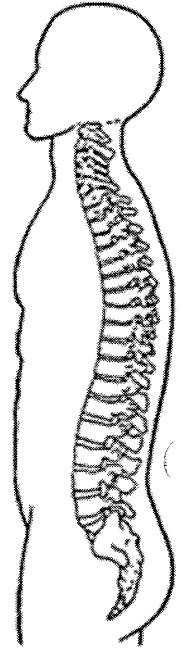
During industrial processes it is possible that the materials or even the pieces of equipment may need to be moved in order to undertake the task. Handling and transporting materials/equipment brings with it a host of potential hazards.

How can an item be moved manually?

-
-
-
-

What legislation covers the manual handling of materials and equipment?

**YOU SHOULD NEVER LIFT ANYTHING THAT YOU DO NOT
FEEL ABLE TO MANAGE**



What five simple rules can be followed to reduce the risk of manual handling?

- 1.
- 2.
- 3.
- 4.
- 5.

Here are some important points using basic lifting operations as an example

STOP AND THINK

Plan the lift. Where is the load to be placed? Use appropriate handling aids if possible. Do you need help with the load? Remove obstructions such as discarded wrapping materials. For a long lift such as floor to shoulder height consider lifting the load mid-way on a table or bench in order to change grip.



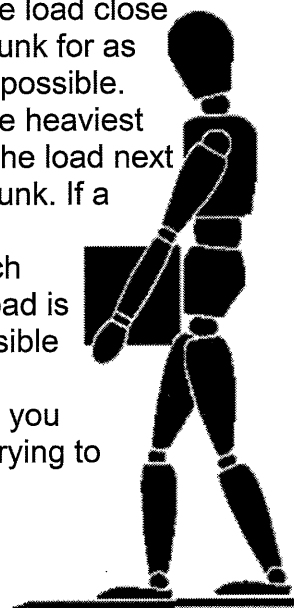
ADOPT A GOOD POSTURE

When lifting from a low level, bend the knees. But do not kneel or over-flex the knees. Keep the back straight, tucking in the chin helps. Lean forward a little over the load if necessary to get a good grip. Keep the shoulder level and facing in same direction as the hips.



KEEP CLOSE TO THE LOAD

Keep the load close to the trunk for as long as possible. Keep the heaviest side of the load next to the trunk. If a close approach to the load is not possible slide it towards you before trying to lift.



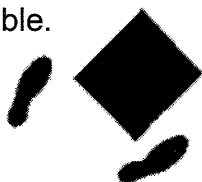
DON'T JERK

Lift smoothly keeping control of the load.

POSITION THE FEET

Feet apart giving balanced and stable base for lifting (tight skirts and unsuitable footwear make this difficult).

Leading leg as far forward as is comfortable.



GET A FIRM GRIP

Try to keep the arms within the boundary formed by the legs. The best position and type of grip depends on the circumstances and



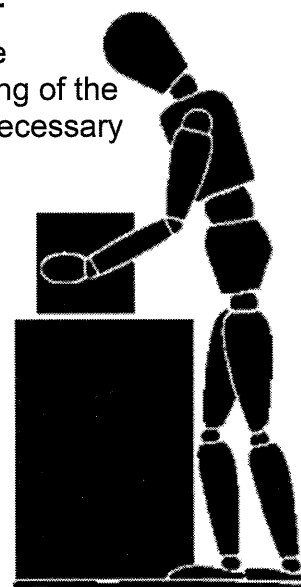
Individual preference but it must be secure. A hook grip is less tiring than keeping the fingers straight. If you need to vary the grip as the lift proceeds do it as smoothly as possible.

MOVE THE FEET

Don't twist the trunk when turning to the side.

PUT DOWN, THEN ADJUST

If precise positioning of the load is necessary put it down first then slide it into the desired position.



The general workplace – Your environment

Maintaining your immediate environment and the way you operate in it can help to reduce the risks for yourself and others.

What is 'good housekeeping'?

How can you reduce risks in your working environment?

Warning Signs and Symbols

Now that we have looked at some of the hazards that are in the workplace, let's look at what warning signs and symbols are used to tell us of potential hazards.

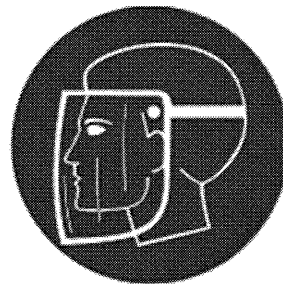
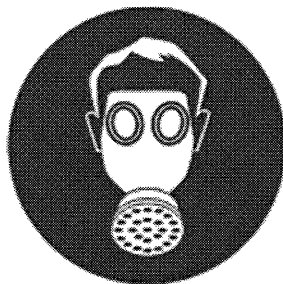
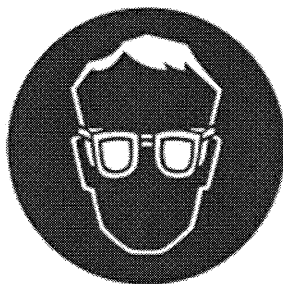
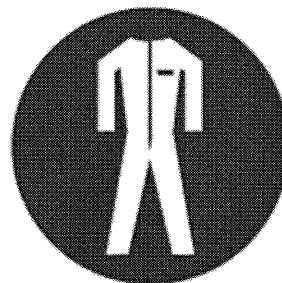
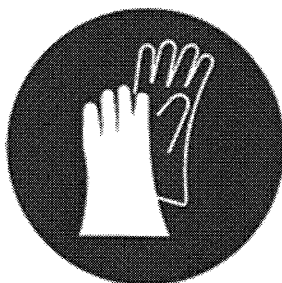
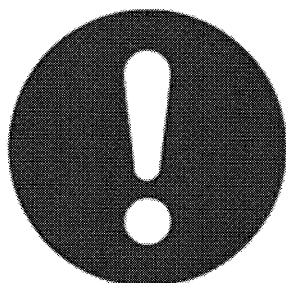
At work you may encounter warning signs. Some of these will be mandatory – so you must adhere to them. Others will be warning you of dangers such as the danger of electricity. There are also prohibition, safe condition/emergency and fire control signs.

Mandatory Signs (White pictogram on blue background)

Mandatory signs tell you what behaviour you must do e.g. wear protection for your eyes. They will have the following features:

- They are round in shape
- They have a white pictogram on a blue background (blue to take up 50% of the area)

Mandatory signs may be displayed at various locations which are clearly visible in the work area. Identify the following mandatory signs:

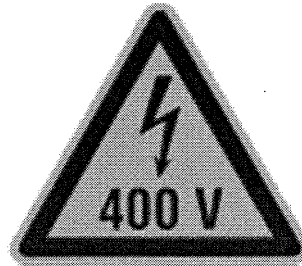
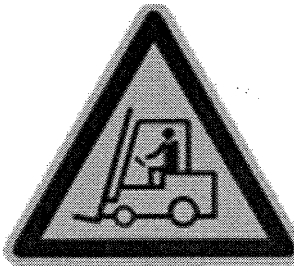
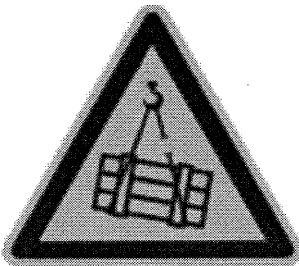
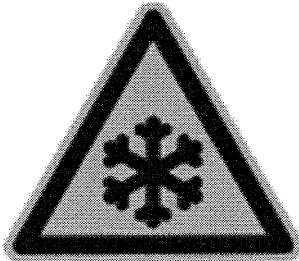
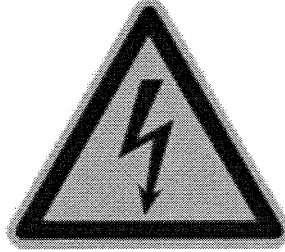


Advisory Warning Signs (Black pictogram on yellow triangle with black border)

Most advisory warning signs draw your attention to a possible hazard or risk. With the exception of dangerous substances which we will come on to later their features are:

- They are triangular in shape
- They have a black picture on a yellow background (yellow at least 50%)

Identify the following Warning signs:

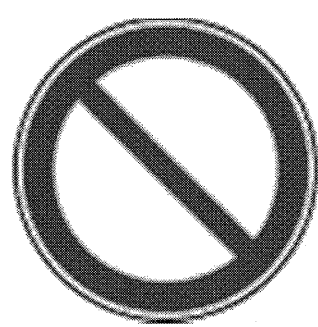


Prohibition Signs (Black pictogram on white background with a red circle and diagonal line)

Prohibition warning signs warn you not to do something, e.g. No entry

- They are round in shape
- They have a black picture on a white background surrounded by a red circle with a cross bar.

Identify the following prohibition signs:



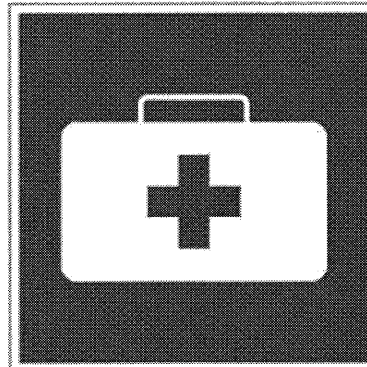
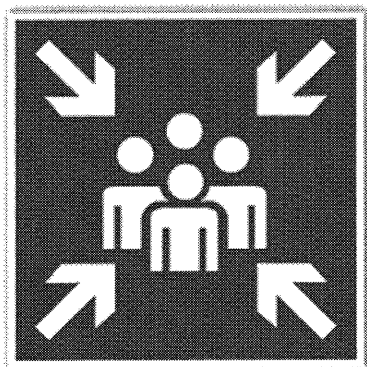
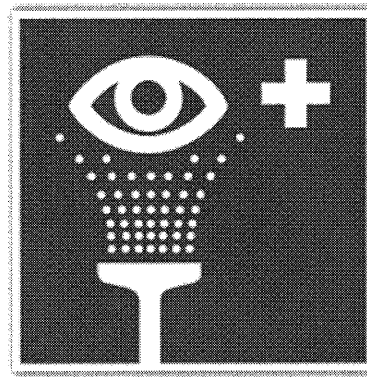
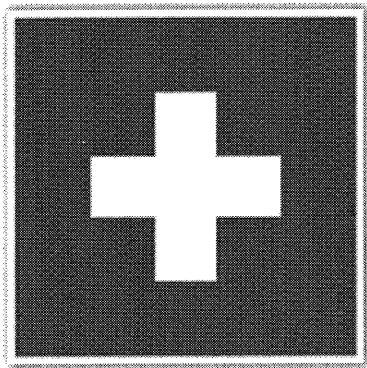
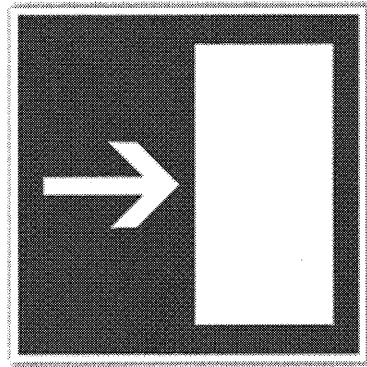
Safe condition/Emergency Signs (White pictogram on green background)

Safe condition signs/emergency signs show the locations of safe areas or equipment, e.g.

First aid kits

- They are rectangular or square in shape
- They have a white picture on a green background.

Identify the following safe condition/emergency signs:

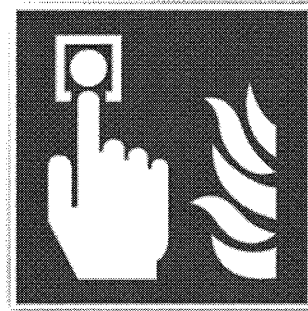
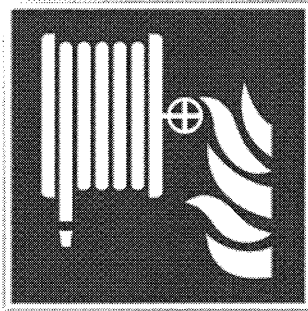


Fire Control Signs (White pictogram on red background)

Fire control signs show the locations of fire fighting/alarm equipment, e.g. fire extinguishers

- They are rectangular or square in shape
- They have a white picture on a red background.

Identify the following fire control signs:



Dangerous Goods

Dangerous Goods have their own symbols. There are 9 main groups or classes of hazardous substances. Some of the classes are split into sub categories called Divisions. These Classes and Divisions are internationally recognised so that the dangers can be understood worldwide.

You can recognise these classes by the following symbols and they are used on signs and labels. They may be in the workplace or on vehicles carrying dangerous substances.

Class 1 - Explosive substances and articles

There are a number of Divisions in the class for different types of explosive. You may see this orange label with numbers in the diamond instead of the explosion symbol. (e.g. 1.4) this only refers to the type of explosive.

What colour is this sign supposed to be?



Class 2 - Is all about gases. There are separate warning signs and labels for whether the substance is flammable, inflammable or non-flammable, non-toxic or toxic.

Can you identify which is which and what the colours are?



Class 3 - Warns about flammable liquids.

Note this warning symbol is very similar to the one above, in that it is advising that the substance is flammable. The number at the bottom of the diamond tells you whether it is a flammable gas by the inclusion of the Class i.e. 2 (above) or a flammable liquid i.e. Class 3 as in this case.



Class 4 - Has three divisions. Identify and describe the divisions:

Division 4.1 -

Division 4.2 -

Division 4.3 -

The Warning signs for these are: What are the colours?



Class 5 - Also has Divisions. Identify and describe the divisions:

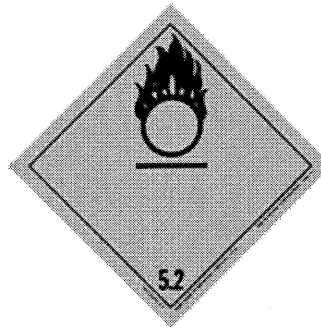
Division 5.1 -

.....

Division 5.2 -

.....

The Warning Symbols for these substances are: What are the colours?



Class 6 - also has two Divisions. Identify and describe the divisions:

Division 6.1 -

.....

Division 6.2 -

.....



Class 7 - Radioactive material

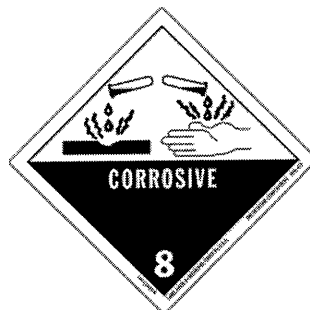
There are different categories of radioactive substances. The one above is for Category I.
All radioactive warning signs show the trefoil symbol.

What are the colours?



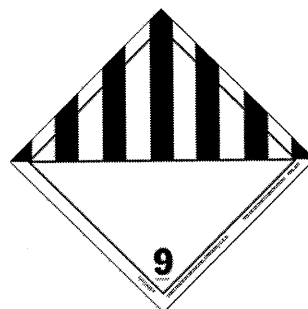
Class 8 - Corrosive substances

Corrosive substances can cause severe damage to living tissue or if they leak they can damage or destroy other goods.



Class 9 - Miscellaneous dangerous substances and articles

There are other articles or substances that are dangerous but do not fit in to any of the above categories. All of these articles/substances are allocated to Class 9. Examples of substances in this class include environmentally hazardous substances, magnetized material etc.



A number of regulations incorporate these classes of substances. The Regulations are specific to modes of transport. For example there are regulations for road and rail such as the 'Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2007' (SI 2007/1573), known in short as "CDG 2007".

CHIP

CHIP refers to the Chemicals (Hazard Information and Packaging for Supply) Regulations 2009, which came into force on 6 April 2009. These regulations are also known as CHIP 4.

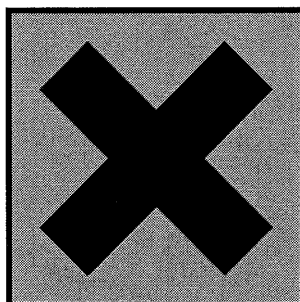
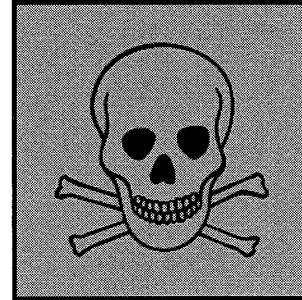
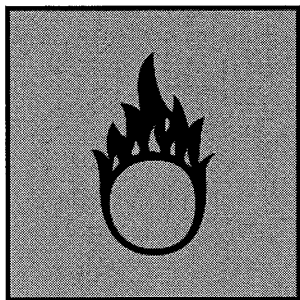
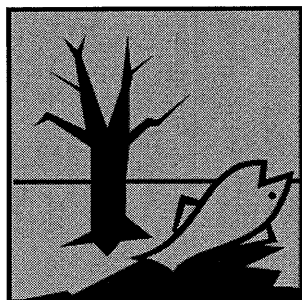
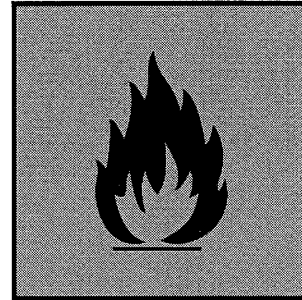
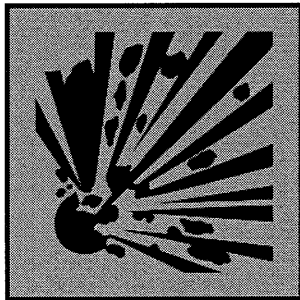
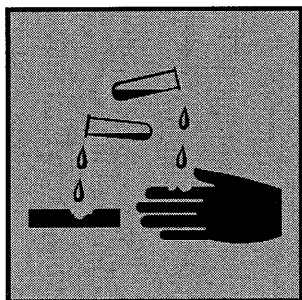
CHIP is the law that applies to suppliers of dangerous chemicals. Its purpose is to protect people and the environment from the effects of those chemicals by requiring suppliers to provide information about the dangers and to package them safely.

CHIP requires the supplier of a dangerous chemical to:

- identify the hazards (dangers) of the chemical. This is known as 'classification';
- give information about the hazards to their customers. Suppliers usually provide this information on the package itself (eg a label); and
- package the chemical safely.

(information taken from HSE website: <http://www.hse.gov.uk/chip/>)

Identify the following CHIP signs:



Signs and symbols – Which law?

- The use of dangerous chemicals (including cleaning fluids) is covered by the Control of Substances Hazardous to Health Regulations 2002 (COSHH) (as amended)
- The classification and transport of dangerous goods is covered in Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2007

Locating safety information There are for example, safe working practices and procedures the are concerned with working at heights, safe use of ladders and stepladders, using lifting equipment, using abrasive wheels, using metal cutting guillotines and shears, safe use of power presses and safe use of woodworking machinery.

It is therefore your responsibility to find out what specific regulations and safe working practices and procedures apply to your own work activities.

Find out what specific safety practices and procedures apply to your own work area.

If you want to find out about health and safety in your area or you think there is a health and safety problem in your workplace you should first discuss it with your employer, supervisor or manager. You may also wish to discuss it with your safety representative, if there is one. You, your employer or your safety representative can get information on health and safety in confidence by calling the Health and Safety Executive (HSE) helpline telephone service on 0845 345 0055.

Protection and Fire

Protection

An employer is required by law to assess what risks there are in the workplace. Once a risk has been identified, they are responsible for trying to reduce that risk. This could well result in providing you with protective clothing and equipment.

Personal Protective Equipment (PPE)

If an employer has provided you with PPE you are required to use it. It is a disciplinary offence if you do not wear PPE after being instructed to wear it. Examples of PPE are safety goggles, safety helmets, safety shoes, safety gloves etc.

The type of PPE provided will vary depending upon the risk and where you work. For example the wearing of a hard hat will be required in situations where there is the danger of falling materials. Your employer will already have carried out a risk assessment of the work area to identify the hazards and will provide you with the appropriate equipment. If there is excess noise in your work area due to heavy machinery operations, then these need to be monitored and actions taken, (Control of Noise at Work Regulations 2005.)

What PPE you are required to use for your area of work.

For your own safety and that of others it is also important to check that the PPE isn't damaged in any way and is safe to use. Otherwise it may not do the job of protecting you adequately. You must never use damaged or unsafe equipment and you should ALWAYS report the damage to your supervisor or manager.

How do you check the PPE you want to use is safe to use?

Which law?

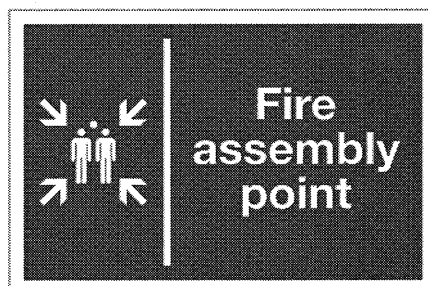
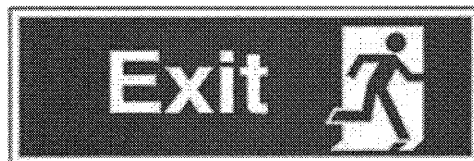
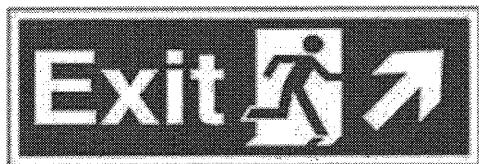
- The provision, use, training and maintenance of personal protective clothing and equipment is covered in the Personal Protection at Work Regulations 1992
- The assessment of harmful noise at work is covered in the Control of Noise at Work Regulations 2005.

Fire

Your employer has a responsibility to produce an emergency procedure in case something goes wrong. You, however, need to know what these procedures are so that you can adhere to them. You need to know what the procedures are for sounding an emergency alarm, when its tested, what it sounds like and the evacuation procedures and escape routes to be used, where and who to report your presence to at the appropriate assembly point. This is so that they will know who is missing and who could still be caught in the building, (a roll call is carried out by a designated person).

The safe route is marked by signs on the walls showing which direction the nearest exit is.

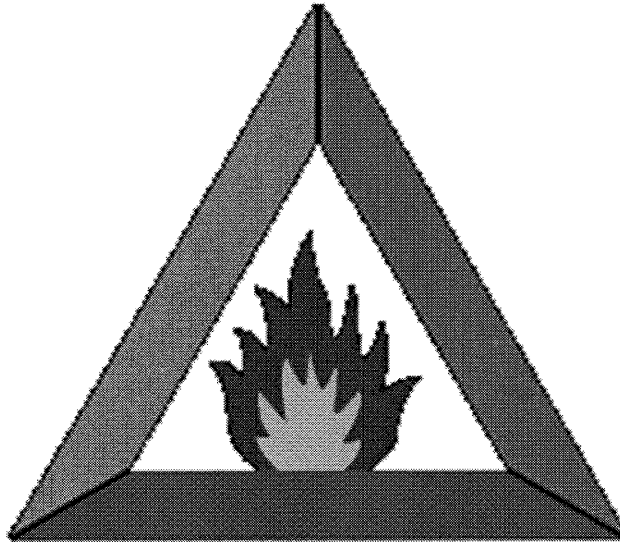
Identify the meaning of the following signs:



Fire & what causes it

There needs to be three things for a fire to exist. All three elements need to be present for the fire to exist.

What are these three elements?



Without sufficient _____, a fire cannot begin or continue

Without sufficient _____, or more specifically _____, a fire cannot begin or continue. If you smother a fire with a fire-proof blanket you remove the oxygen.

Fuel can be dealt with naturally by allowing the fire to burn out in a controlled manner, or by mechanically or chemically removing the fuel from the fire.

Fires can be caused by many reasons and can have devastating consequences leading to loss of property and life. Fires can start in various ways e.g. faulty electrics, bad housekeeping and human error.

Electrical equipment is regularly checked at work to try to reduce the risks of electrical faults; similarly it is important to maintain your work area in a neat and tidy way ensuring good 'housekeeping' by storing materials and consumables in a safe manner and in the designated locations and discarding waste materials correctly so that these possible sources of fuel are eliminated.

Fire & how to deal with it


Smoke detectors may be installed in the workplace along with sprinkler systems and heat sensors. Fire extinguishers are also located near fire exits for fighting small fires.

What are the fire procedures within the Electrical Installation Workshop?

There are different types of fire and they need to be dealt with accordingly. A fire in a photocopier for example is an electrical fire. It is therefore very important that you are aware of the type of extinguisher that can be used.

What are the different classes of fire?

Complete the following chart to show which extinguishers can be used on which class of fire:

| Classification of Fire Risk | Water | Dry powder | Foam | CO ₂ Carbon Dioxide |
|---|-------|---------------|------|-----------------------------------|
| A Paper, Wood Textile and Fabric | | | | |
| B Flammable Liquids | | | | |
| C Flammable Gases | | | | |
| F Oil & Fats | | | | |
|  Electrical Hazard | | | | |

Class A fires are common, as these can be found in most work areas. There are reasons for example you should not put water on a flammable liquid fire (class B) because the additional liquid (water) would spread the flaming liquid further.

Fire Extinguishers remove an element of the fire triangle.

Water fire extinguishers remove heat and cool the fire down

What happens is that the water turns to steam and the steam is further heated, taking the heat with it. Introducing particles of the correct powder or the correct gas in the flame remove heat in the same manner.



Here are examples of water fire extinguishers.

Notice that the body of it is red and has a coloured panel (in this case also red). Most fire extinguishers are in red; the difference between them is that they have a coloured printed area around them indicating the type of fire extinguisher. In this case the background colour where it says 'WATER' is red and matches the rest of the container and the writing is in white.

Chrome extinguishers are available and these have a coloured panel relative to the content.

Here are some examples of foam fire extinguishers.

A foam extinguisher smothers the fire and deprives it of oxygen. The foam sits on top of the fire and needs to be of sufficient depth so that the fire is starved of oxygen therefore breaking down the fire triangle.

Notice the cream colour of the background where it says 'FOAM'. This matches our chart and can be used on Class A (paper, fabric etc.) Class B (flammable liquids) and for Transport (such as cars).



Here are some examples of powder fire extinguishers.

A powder extinguisher does two things it reduces heat and it deprives the fire of oxygen.

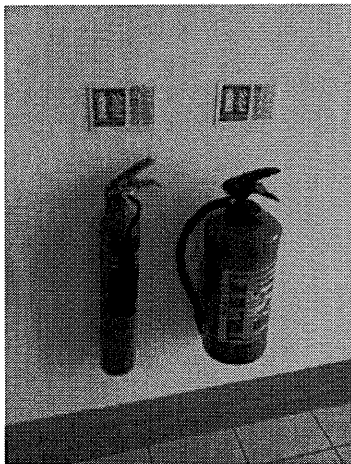
A powder extinguisher has a blue background on the red container with the words 'POWDER' on it.

As shown on the chart this type of extinguisher can be used on classes A, B and C fires.



A CO₂ fire extinguisher (with the black printing around the white words CO₂), indicate that it is a carbon dioxide extinguisher. Carbon dioxide is a gas found in air. The CO₂ displaces the oxygen and so removes one of the elements for the fire to exist. It is also identified by the fact that it has a funnel to disperse the CO₂ gas.

You may also see at work fire blankets that are contained in red boxes. They are used to smother the fire in order to remove oxygen from the fire.



Fire extinguishers are often mounted on a wall and signs alert you to their presence.

What fire extinguishers are available in the main Electrical Workshop?

Accidents, Incidents and First Aid

Even with the most meticulous planning, risk assessment and hazard reduction programme, there are bound to be near misses and accidents which could result in people getting hurt. Accidents are costly, not only in terms of finance, but in terms of the individuals suffering. Figures from the Health and Safety Executive advise that over 200 people a year lose their lives at work in Britain. In addition, around 150 000 non-fatal injuries are reported each year, and an estimated 2 million suffer from ill health caused or made worse by work. Your employer has a legal requirement to report deaths, major injuries, over three day injuries, injuries to the public and dangerous occurrences to the Health and Safety Executive. This is then used to highlight all accidents and injuries that have occurred and preventative measures taken. Even if no one was injured it is still important to report an accident or incident to you safety representative. An incident can be a dangerous occurrence or a hazardous malfunction that has the potential to harm people or property – e.g. a hydraulic failure on a forklift truck where the entire load being carried spills, however no one was injured.

Find out where the accident reporting book is.

An accident, if it occurs, may result in someone being hurt. Your employer will have procedures that need to be followed in the case of accidents involving injury. You also need to familiarise yourself with these procedures for your work area and for the company as a whole.

An employer needs to ensure that there are sufficiently trained first aiders on site on any given occasion, and that staff are aware of who they are. Notice boards are very useful for this. The employer needs to ensure that the first aid boxes are available and sufficiently maintained and up to date.

Where are the first aid boxes? Who are the appointed person(s)/first aider(s)?

Which law?

- The Health and Safety (First Aid) Regulations 1981
- Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995 (RIDDOR)

Using work equipment safely

Using the webpage below answer the following questions:

<http://www.hse.gov.uk/pubns/indg229.pdf>

What is work equipment?

What do you need to do?

What risks are there from using work equipment?

How do you identify the risks?

What can you do to reduce the risks?

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How do you reduce accidents occurring with the following?

Ladders

Drilling machines

Working at height

Using the webpage below answer the following questions:

<http://www.hse.gov.uk/pubns/indg401.pdf>

Why are these rules important?

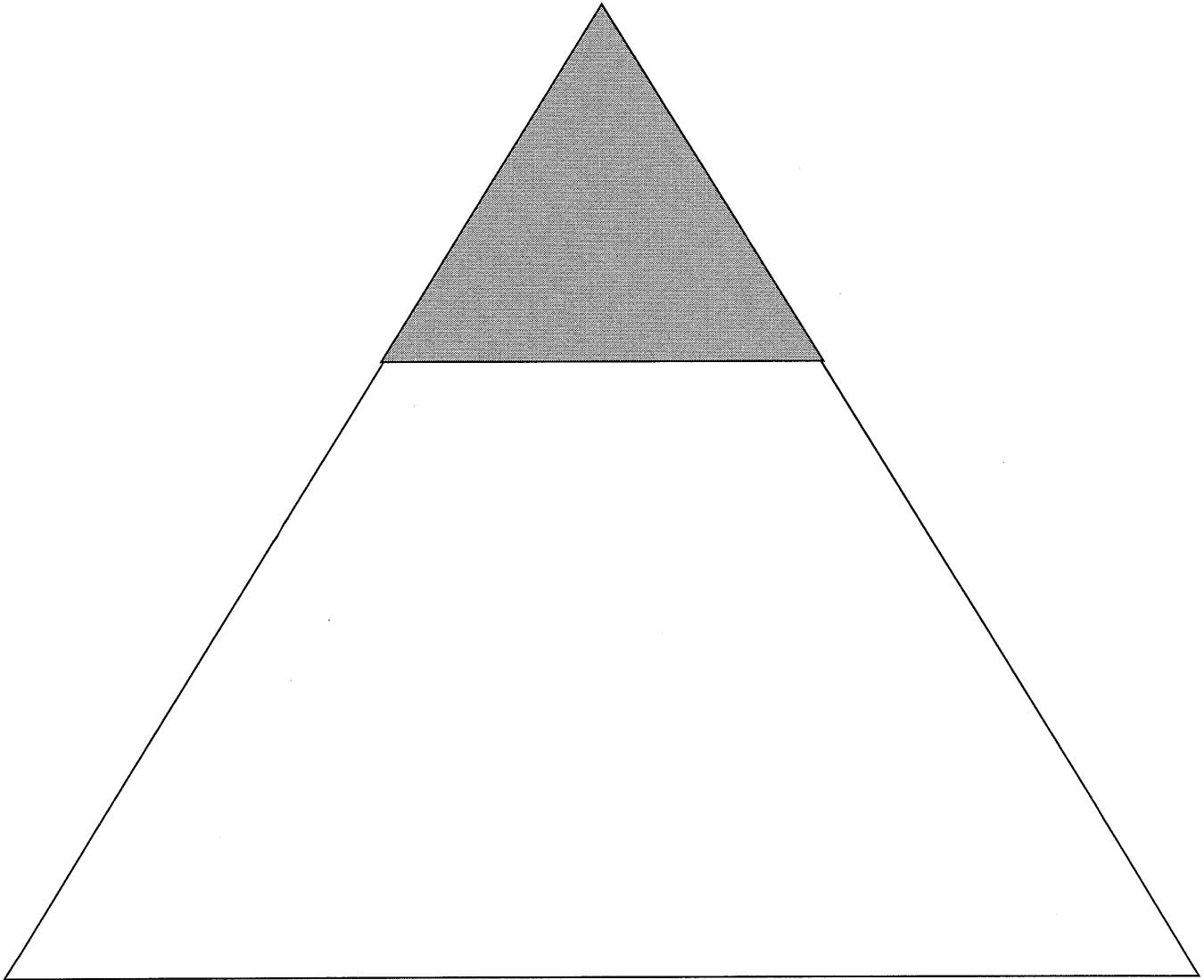
What is 'work at height'?

What do the Schedules to the Regulations cover?

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Complete the following diagram:

The Regulations hierarchy



What are the Dutyholders' responsibilities?

Communicating with others

Methods of communication

In all of our communications we should strive to promote, understanding, goodwill and trust. When we communicate with others we need to ensure we are clear and concise to ensure everybody understands the task or problem.

Many people think that if they have said something then they have communicated to another. However, this can be only half of the story. The receiving person needs to have understood what you have said for the communication to be complete. The dictionary says the meaning of communicate is to 'bestow' or 'impart' - but the definition that is important for us at work is to "succeed in conveying one's meaning to others".

What are the main ways in which we communicate?

Oral communications

Oral communications happen every day. However, to be effective your oral communications need to be geared to the needs of the recipient. Each of the following need to be considered before you even open your mouth!

Why is each of these important when using oral communication?

- Language –

- Pace –

- Tone –

- Timing –

Oral communication can be informal or formal. Informal communications can be discussions on a one-to-one basis with a work colleague. However, you may be required to participate and share data, information, thoughts and feelings in a more formal discussion such as a team briefing, question and answer session, group discussion etc. The above bullet points need to be considered whether you are communicating informally or formally.

Written communications

Whether writing on paper or using an electronic means, communicating in writing is usually more formal. You need to consider that the information or data needs to be read by other people. This means that your writing needs to be legible. Punctuation is used when writing to help the reader understand the text. In order to make sure that the reader gets the message that you intended to communicate you need to use the correct punctuation.

List different forms of written communication:

Internal & External Communications

Any communication (either written or oral) that you make tells the recipient something about you – by the way that you said it i.e. by the language, tone, pace, timing, you have to broadcast what you think. It is probable that you will communicate with different departments within the company and the way that you say things will be picked up by the recipient in that other department.

We have just looked at internal communications within the workplace; however external communications are even more important. You may need to communicate with customers and/or suppliers. If they get the wrong or discourteous message from you it could result in a loss of business for the company. The impression you give reflects on the impression that the customer gets of the whole organisation. You are in effect its ambassador.

Technical information

In an industrial environment it is highly likely that you will need to use and interpret engineering drawings and or technical documents.

List different types of technical information:

If you have difficulty in understanding any technical data you should seek help as guessing what is meant can lead to wastage or could have health and safety implications. IF IN DOUBT ASK!

Other technical data could be in the form of data sheets and national/international standards which you will need to interpret.

During your work you may be required to communicate technical information yourself by the production of test reports, sketch etc. You need to ensure that any sketches that you produce are of a suitable size and use appropriate drawing conventions so that your sketches are not misunderstood.

Communicating with others – Summary

After reading this section you now know that communication is getting your message understood by the recipient. We looked at oral and written methods of communication and saw the importance of language, pace, tone and timing when trying to communicate with others.

Finally we looked at the technical information that you are likely to encounter at work i.e. engineering drawings and technical data. We also looked at the importance of producing drawings and technical data in accordance with drawing conventions in order for the information to be more easily understood.

Understanding how to work effectively

Planning & Preparation

The key to effective working is to plan and prepare for the task to be done. This is to ensure that you do not get half way through a task and then discover that you need other equipment or tools that might not now be available. This could disrupt your work flow and lead to jobs not being completed properly or not within the time frame.

Planning

Before you start an activity you need to produce a work plan. You will need to:

- Refer to documents for example drawings, technical/reference documents (such as tapping drill sizes, imperial to metric conversion books, component specifications, quality documentation)
- Determine the materials that you will need (such as stock material, components, part machined components, cables/wire, welding consumables)
- Locate any equipment that is needed (such as machine tools, lifting and handling equipment)
- Determine and locate work holding methods and equipment (such as machine or bench vice, clamps, special work holding arrangements) where appropriate
- Determine what tools that you will need (such as hand tools, portable power tools, cutting tools, soldering irons)
- Determine what measuring equipment that you may need (such as mechanical, electrical, pressure, flow, level, speed, sound)
- Plan the sequence that you will use in order to undertake the activity so that it is done in a logical order.

Preparation

Having planned how you will undertake the activity you now need to prepare to do the job. You need to ensure that:

- The work area is free from hazards and is suitably prepared for the activities to be undertaken
- You have implemented any required safety procedures
- You are suitably prepared in the correct PPE which is in a good condition.
- You have obtained any necessary tools and equipment, have checked that they are in a safe and usable condition and that you have received training in the use of that equipment
- You have got all of the necessary drawings, specifications and associated documentation
- You have obtained and understand the instructions for the job
- You have the correct materials or components
- You have the appropriate authorisation to carry out the work has been given to (remember if in doubt ask!).

Housekeeping

Housekeeping is very important within the workplace as it helps promote health and safety and reduce downtime, here are some examples:

- Keep your work area clean, tidy and uncluttered
- Return tools and equipment to their designated areas (such as shadow boards)
- Return any drawings and work instructions to where you got them from
- Dispose of any waste materials in line with your company's procedures and any environmental requirements
- Fill out any documentation that you are required to do in a legible and accurate way
- Look out for any damaged or unusable tools or equipment so that it can be reported.

What are the house keeping procedures in the main Electrical Workshop?

What are the house keeping procedures in the main Electrical Classroom?

Skills & Knowledge

In order for you to be able to work effectively you need to have the right skills and knowledge for the job. That is why it is important for you to think about the skills and knowledge that you already have and also how you could develop those skills and Progress. Feedback from your trainer and mentor is a very useful way of judging your progression and highlighting any further training needs. These can then be transferred into a training plan for future use. This plan is more effective if you set objectives as to what you are going to achieve and by when, you are then able to measure your progression and highlight any shortfalls within the plan/training matrix.

All throughout our working lives we are always learning – whether it is a new software package or how to operate a new piece of equipment. The term Continuous Personal Development (CPD) has been used to indicate that we are learning all the time. When used with a structured plan it allows us to steer our development in the correct direction. This is advantageous to both employer and employee.

In the previous section we looked at working relationships. We saw that if disagreements/disputes are not settled quickly they can lead to disruptions at work. These disruptions could mean that you are not being effective at work. Having good working relationships with others is not only necessary for your effective working but for others too.

Understanding how to work effectively – Summary

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After reading this section you now know it is important to plan and prepare for the work activities that you are going to undertake so that you can effectively do the job with the minimum of disruption. We looked at what 'housekeeping' is and some of the activities that you can do for good housekeeping in your area of work.

Lastly we looked at why it is important to assess your skills and knowledge and how feedback on your performance can assist you in getting even more effective in your job. We looked at how setting objectives is useful for achieving targets and how, throughout your career, it is important to continuously strive for personal development.

Understanding and working with others

Personal conduct

In order to be able to work with others we first of all need to take a look at our own attitude. What is meant by a 'positive attitude'? An attitude is the state of mind with which you approach a situation and it affects what you say, what you do, how you look and it affects how you feel both mentally and physically. To enable us to work as part of a team we need to have a positive attitude and understand that others may have a different view on how to complete any given task.

You can take a **positive** attitude towards yourself and others by:

Positive attitude towards yourself:

- Being willing to learn (and to recognise that no one may have all the answers)
- Trying to do a better job (and suggest better ways to do jobs)
- Demonstrating enthusiasm in whatever you say and do
- Being willing to accept changes and try out new ideas
- Being punctual and take pride in what you do
- Believing in yourself – you are unique!
- Cultivating a sense of humour and not take yourself too seriously!

Positive attitude towards others:

- Being interested in others and what they do
- Trying to understand others' points of view
- Keeping each other informed
- Being polite (and use words such as 'please' and 'thank you', 'may I', 'do you mind?')
- Maintain a positive frame of mind at all times
- Trying to be helpful
- Being a good listener – and try to understand and learn from others
- Trying to be patient with others
- Treating others the way you want to be treated
- Working with others to achieve a common goal.

Always strive to complete any given task to best of your ability at all times.
In the previous section we looked at the health and safety of yourself and others.
Your personal health and safety depends upon your attitude.

Negative thinking gets translated into:

- Carelessness – "It doesn't matter"
- Ignorance – "I didn't know it would explode"
- Fatalism – "If it happens it happens"
- Recklessness – "Danger is the spice of life"
- Cynicism – "Safety is child's play"
- Laziness – "It's too much trouble"
- Over-confidence – "I never get hurt"

Whereas positive thinking gets translated into:

- Planning ahead –prepare the job properly”
- Willingness to Learn – “Thanks for giving me the benefit of your experience and for your suggestions”,
- Alertness – “I’ll be careful at all times”
- Willingness – “I’ll fix it or if I am unable to, I will report it to my supervisor.
- Knowing your goals – “I want to improve”
- Faith – “I’ll do my best”

Identify some times in the past two weeks when you have had a negative attitude towards something:

Identify some times in the past two weeks when you have had a positive attitude towards something:

Working Relationships

In the workplace you will work with people of different race, gender, religion and levels of ability. The Government has brought in legislation to make sure that working relationships are fair. The laws are worded by saying that “it is unlawful for an employer to” An employer has to take this employment legislation and translate it into the company policy and procedures. You should have a staff handbook or access to your own company’s policies and procedures. In these it will state what the company policy is.

For example under ‘harassment’ below, the company will have harassment and bullying policy. This means that it will be a **disciplinary offence** to threaten others in the workplace or make sexual remarks or gestures.

List the legislation associated with the following with a brief explanation of what it covers:

Disability

Race

Gender

Different types of discrimination

There are four types of discrimination:

For each type, write a definition of what the term means:

- **Direct –**

- **Indirect –**

- **Harassment –**

- **Victimisation –**

In order to develop and maintain good working relationships you have a responsibility to:

- Respect the views, rights, time and property of others and treat them fairly in order to establish and maintain good working relationships
- Offer help and information to others promptly and willingly
- Present yourself in the workplace on time and in a way that does not cause concern to others
- Ask for information advice and/or help politely, without causing disruption to your own or others work
- Don't let the fact that people are different from you affect good working relationships.

Dealing with relationship problems

It is important to resolve difficulties or misunderstandings quickly and not let them develop into more serious problems.

Problems normally fall into one of the following categories:

List some examples for each of these categories:

- **Work related issues –**
- **Personal issues –**
- **Communication problems –**
- **Behavioural problems –**

Disagreements or disputes are unsettling, not only to those involved in the dispute, but to others in the work area and can lead to disruption in the workplace. It is therefore in everyone's interest to get the matter resolved as soon as possible. In the first instance you should raise the matter with your immediate manager who will try to resolve the issue in question.

In some cases the nature of the dispute/disagreement may be very serious and employers, by law, need to have a grievance procedure in place. These grievance procedures will normally have a number of steps in them for people to hear about the grievance or problem. Most grievances are resolved at an informal stage, by discussions with their manager, however some progress to a full hearing. Grievance procedures also normally have an appeals process, where the decisions of the panel can be challenged.

You need to ensure that you are aware and familiar with these procedures.

Team Working

A team may be brought together for a specific purpose or it may be people within a department within a company. The common feature about all sorts of teams is that they share a common goal. You are all there to achieve the same thing. They can be short term (i.e. they disband once they have achieved the goal) or long term (they continue as long as the objective is there).

As individuals we all have strengths and weaknesses. The key to building a successful team is to create a team that uses the differing strengths, skills and experience of all those involved in the team e.g. a skills matrix. This means that individuals complement each other with each being able to help each other - and as they are all aiming for the same goal any help and assistance will probably be willingly given and available from other members of the team (when asked at an appropriate time).

Communication between team members is therefore a necessary ingredient for successful team work. It is also important to share your knowledge and your progress on the projects – so that all those involved in the team are kept advised and plans can then be changed accordingly.

What is essential for effective team working is:

- That the objective for the team should be clear
- Each team member should be given a clear role
- Regular team meetings should be held
- Reviews of progress need to highlight what actions for the team members need to be actioned next
- Disputes or disagreements will probably hinder the achievement of the goal and should therefore be resolved as soon as possible.

Section 4 – Understanding and working with others – Summary

After reading this section you now know that your attitude and the way you deal with situations is totally under your control and that a positive attitude can make your daily routines more rewarding and enjoyable. A positive attitude can influence your health and safety and will also help others around you.

In this section we saw that there is legislation concerning how you interact with others at work regarding discrimination and how these are translated into company policies and procedures. We looked at how to create and maintain good working relationships. We also identified some of the common relationship problems and how to deal with them.

Lastly we looked at team working – why teams are created, what makes a good team and your conduct within a team.

Access Equipment

LADDERS AND STEPLADDERS

Is it a suitable activity?

This refers to the type of work and its duration. As a guide, only use a ladder or stepladder:

- in one position for a maximum of _____ minutes;
- for '_____' - they are not suitable for strenuous or heavy work. If a task involves a worker carrying more than _____ kg (a bucket of something) up the ladder or steps it will need to be justified by a detailed manual handling assessment;
- where a handhold is available on the _____;
- where you can maintain _____ points of contact (hands and feet) at the working position. On a _____ where you cannot maintain a handhold, other than for a brief period of time, other _____ will be needed to prevent a fall or reduce the consequences of one. On stepladders where a handhold is not practicable a risk assessment will have to justify whether it is safe or not.

On a ladder or stepladder do not:

- _____ - the person and anything they are taking up should not exceed the highest load stated on the ladder;
- _____ - keep your belt buckle (navel) inside the stiles and both feet on the same rung throughout the task.

When working on _____ you should avoid work that _____, such as side-on drilling through solid materials (eg bricks or concrete), by having the steps facing the work activity. Where side-on loadings cannot be avoided you should prevent the steps from tipping over, for example by tying the steps to a suitable point. Otherwise a more suitable type of access equipment should be used.

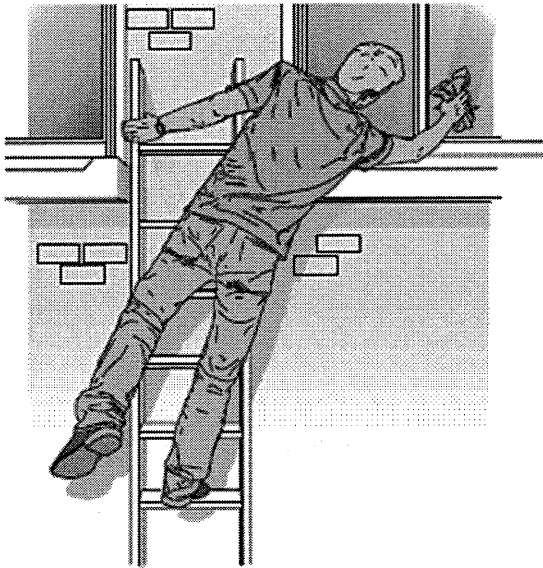
You should also _____ holding items when climbing (for example by using tool belts):

- on a ladder where you must carry something you must have _____ to grip the ladder;
- on a stepladder where you cannot maintain a handhold (eg putting a box on a shelf), the use of a stepladder will have to be justified by taking into account:
 - the _____ of the task;
 - a safe _____ still being available on the stepladder;
 - whether it is _____;
 - whether it avoids _____;
 - whether it avoids _____;
 - whether the users _____ are fully supported; and
 - whether you can _____ the stepladder.

(Information taken from HSE guidance leaflets indg402, indg403 and indg405)

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Take a look at the pictures below and decide whether they show good or bad practice. Then use the space adjacent to state what is being done correctly/incorrectly.



Good Practice or Bad Practice?

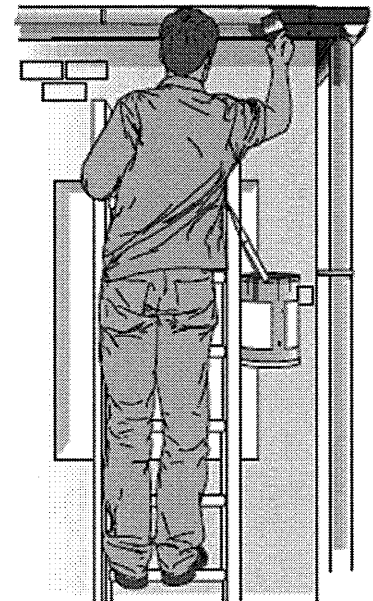
(delete as appropriate)

What is being done correctly/incorrectly?

Good Practice or Bad Practice?

(delete as appropriate)

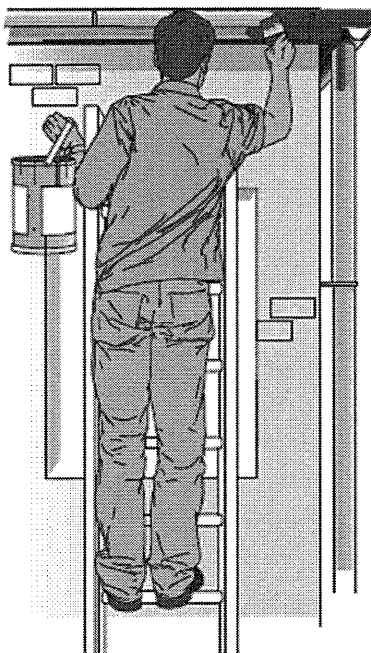
What is being done correctly/incorrectly?



Good Practice or Bad Practice?

(delete as appropriate)

What is being done correctly/incorrectly?



(Information taken from HSE guidance leaflets indg402, indg403 and indg405)



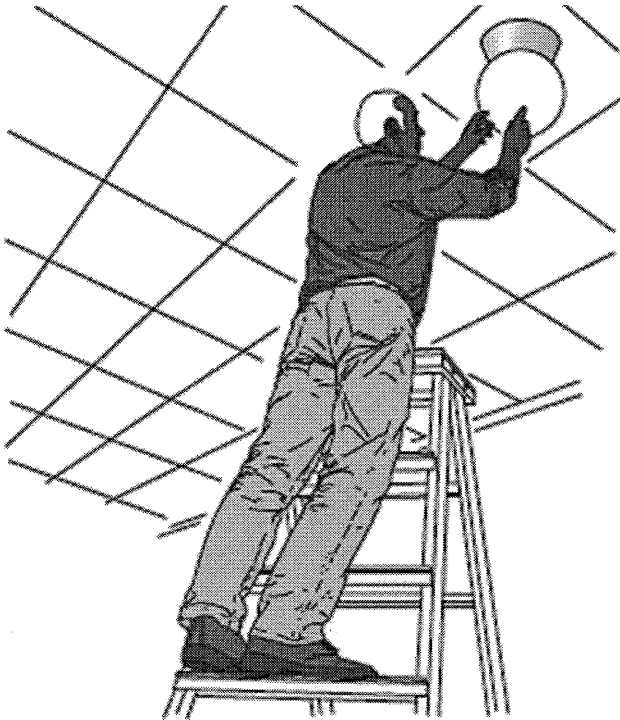
Good Practice or Bad Practice?
(delete as appropriate)

What is being done correctly/incorrectly?

Good Practice or Bad Practice?
(delete as appropriate)

What is being done correctly/incorrectly?



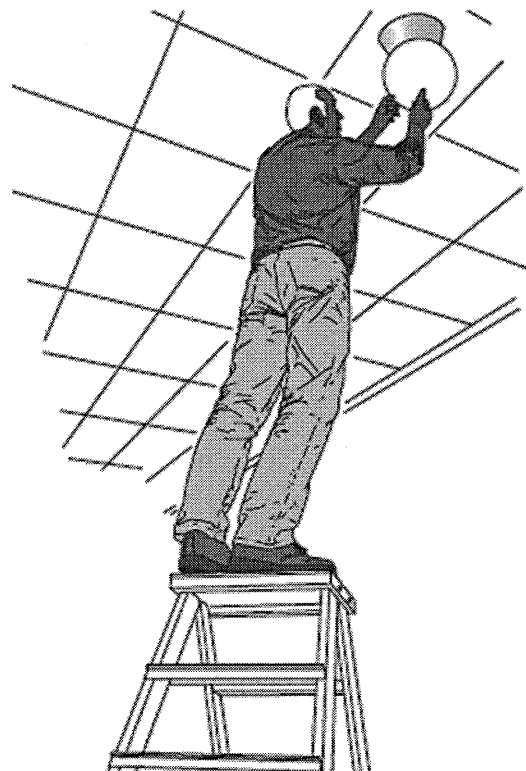


Good Practice or Bad Practice?
(delete as appropriate)

What is being done
correctly/incorrectly?

Good Practice or Bad Practice?
(delete as appropriate)

What is being done correctly/incorrectly?



Selecting/buying safe ladders

(Information taken from HSE guidance leaflets indg402, indg403 and indg405)

HSE and BERR recommend _____ 'Industrial' or EN 1314 ladders or stepladders for use at work. Make sure the ladder is a suitable size for the work.

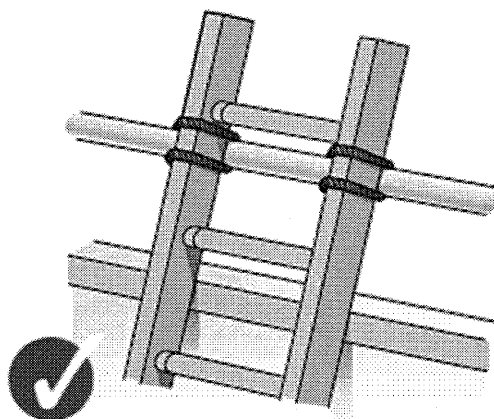
Is it a safe place to use a ladder or stepladder?

This covers the specific place where you are going to set up and use it. As a guide, only use a ladder or stepladder:

- on _____ or spread the load (e.g. use a board);
- on _____ - for stepladders refer to the _____, for ladders the maximum safe ground slopes on a suitable surface (unless the manufacturer states otherwise) are as follows:
 - side slope _____° – but the rungs still need to be levelled
 - back slope _____°;
- on _____, solid surfaces (paving slabs, floors etc.). These need to be clean (no oil, moss or leaf litter) and free of loose material (sand, packaging materials etc.) so the feet can grip. Shiny floor surfaces can be slippery even without contamination;
- where it has been _____.

The options for securing a ladder are as follows:

- _____ the ladder to a suitable point, making sure both _____ are tied;



- where this is not practical, use a safe, _____ ladder or a ladder supplemented with an effective ladder _____ device;
- if this is not possible, then securely _____ the ladder, eg against a wall;
- if none of the above can be achieved, _____. Footing is the last resort and should be avoided, where reasonably practicable, by the use of other access equipment. The ladder should be correctly footed by standing with both feet on the bottom rung of the ladder.

Stepladders should not be used for access to another level unless they have been designed for this. Ladders used for access to another level should be tied (see picture overleaf).

Identify the items on the picture:

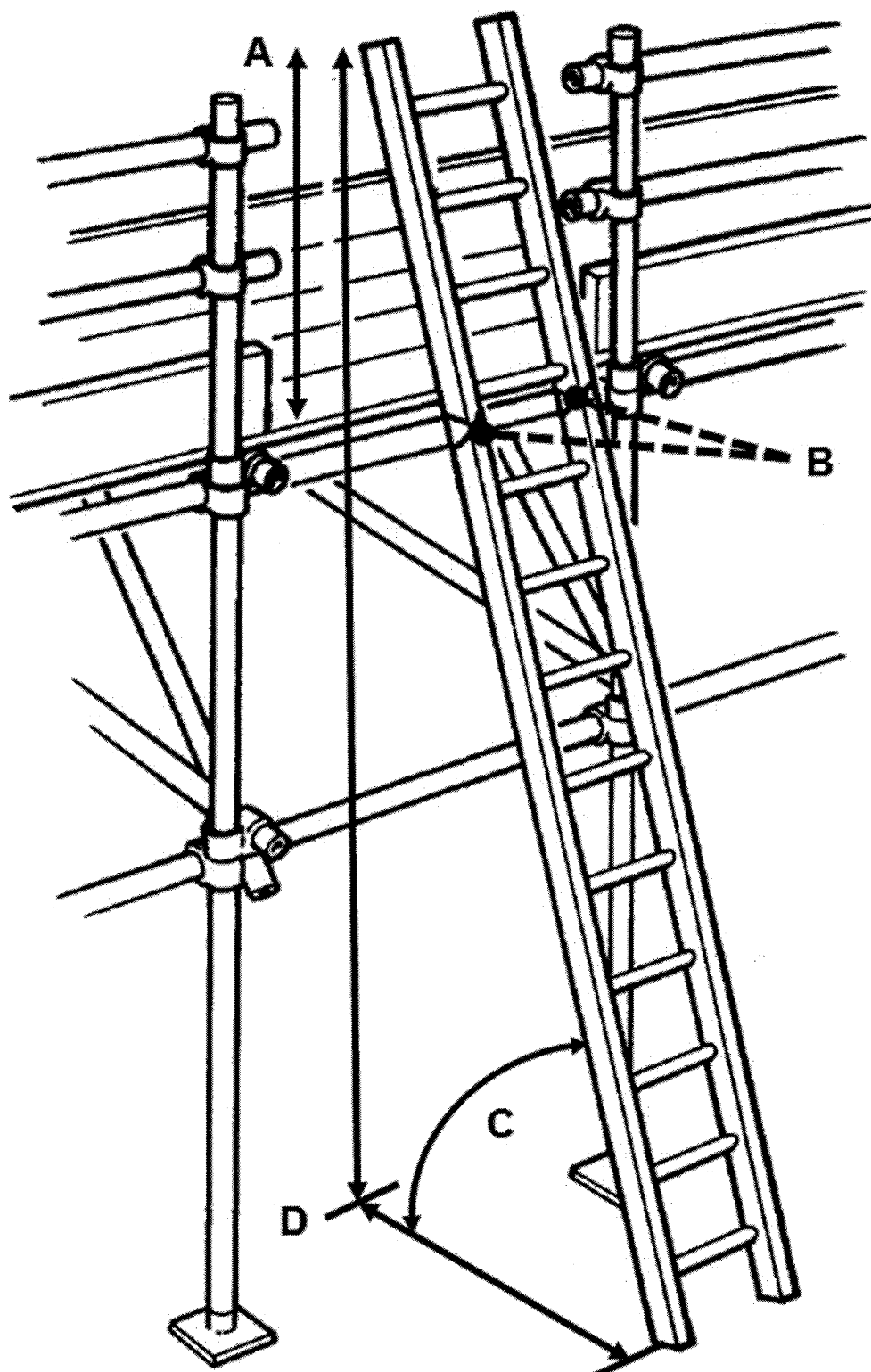
A _____

B _____

(Information taken from HSE guidance leaflets indg402, indg403 and indg405)

C _____

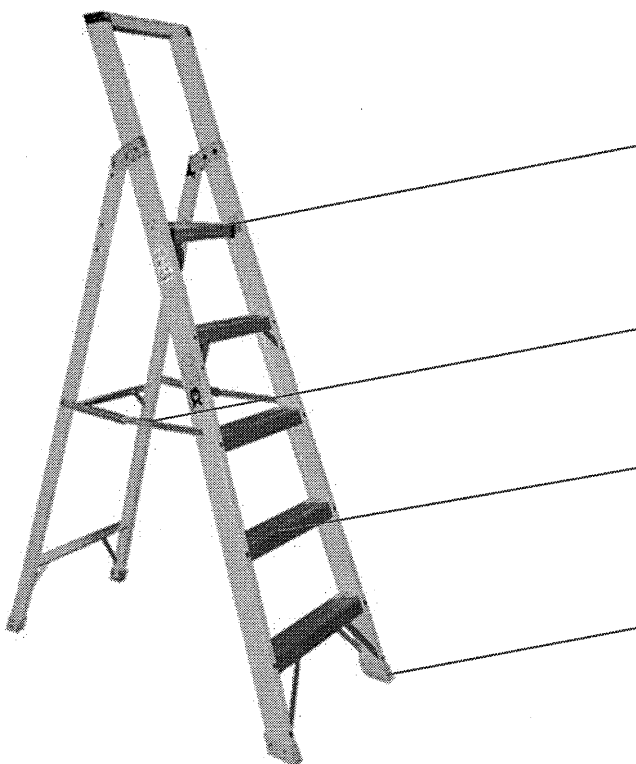
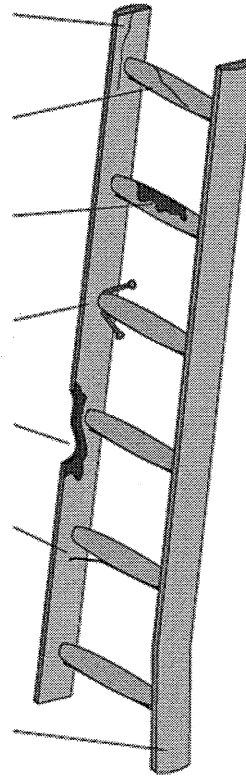
D _____



(Information taken from HSE guidance leaflets indg402, indg403 and indg405)

Is the ladder or stepladder safe to be used?

Use the pictures below to identify things that should be checked prior to use:



(Information taken from HSE guidance leaflets indg402, indg403 and indg405)

TOWER SCAFFOLD

To assemble the tower scaffolding we will be using the 3T system this stands for:

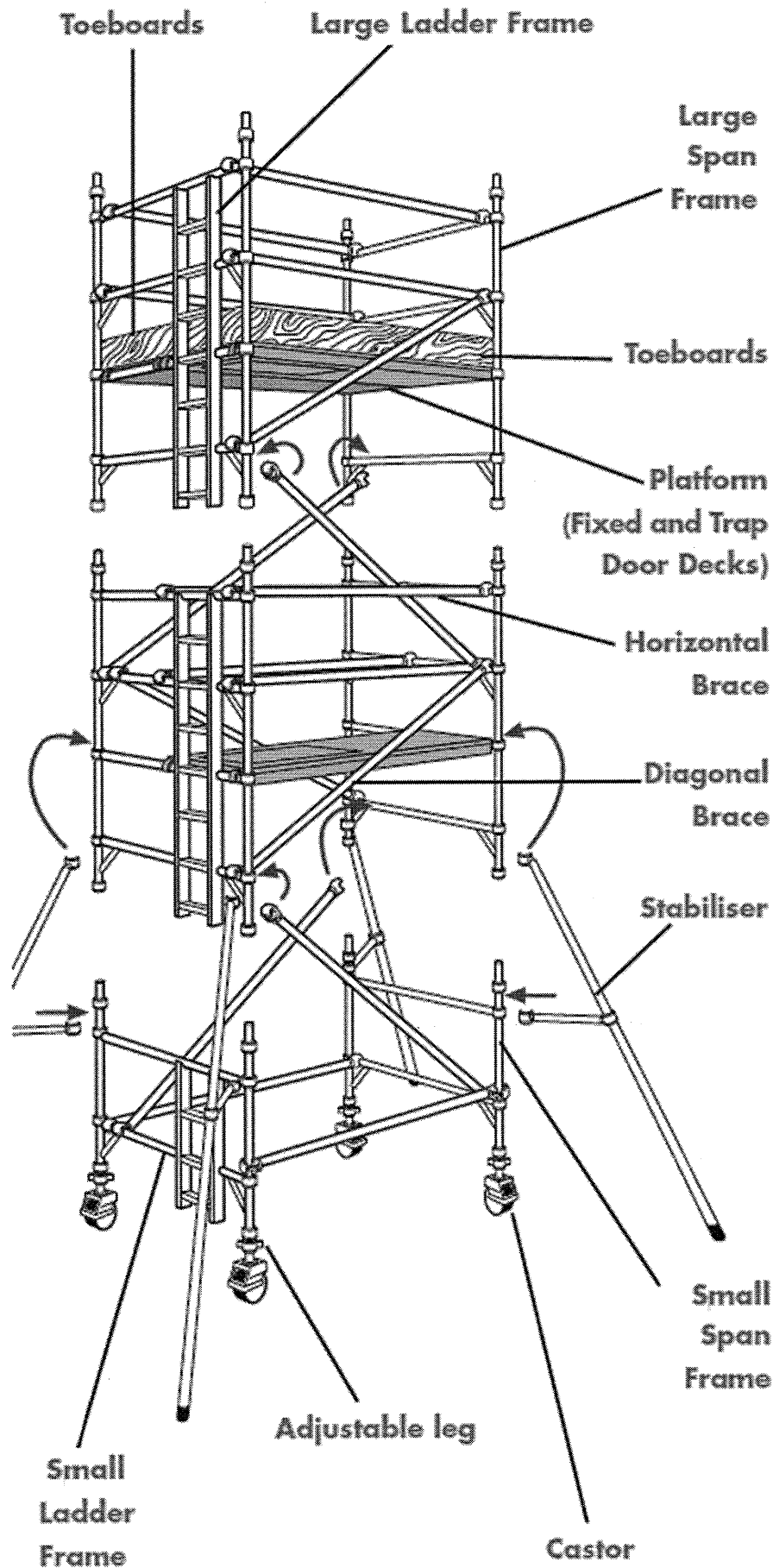
Before work commences it is necessary to check all the components are fit for use.

What things might you check for?

Using the picture, overleaf, create a checklist of items that must be checked and then carry out the inspection.

| Item | No. Required | Safe to use ✓ / X |
|------|-----------------|----------------------|
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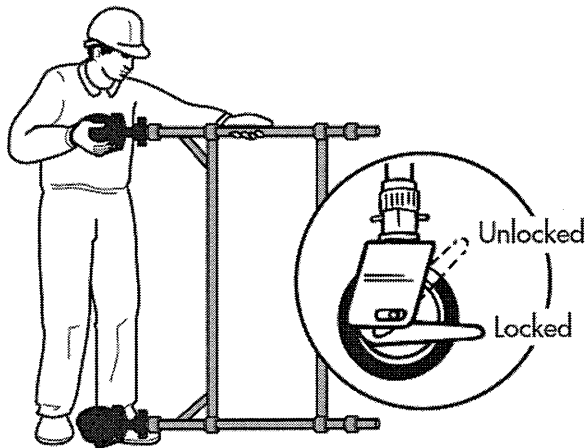
(Information taken from HSE guidance leaflets indg402, indg403 and indg405)



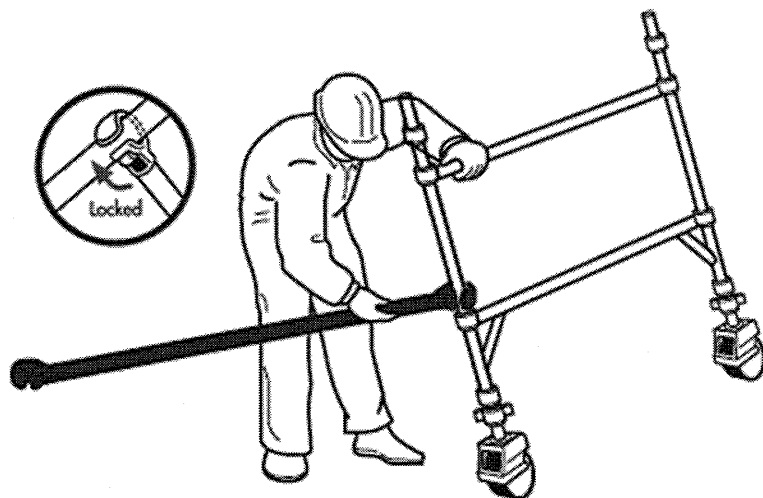
(Information taken from HSE guidance leaflets indg402, indg403 and indg405)

Using the pictures below write a description of each stage of assembly.

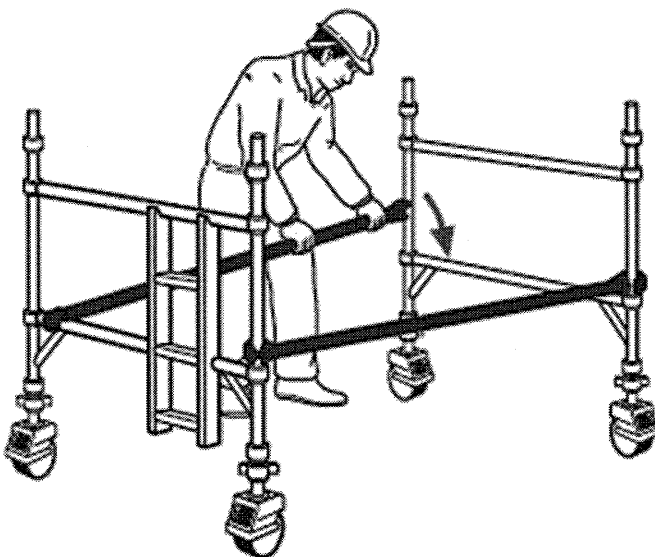
Stage 1 –



Stage 2 –

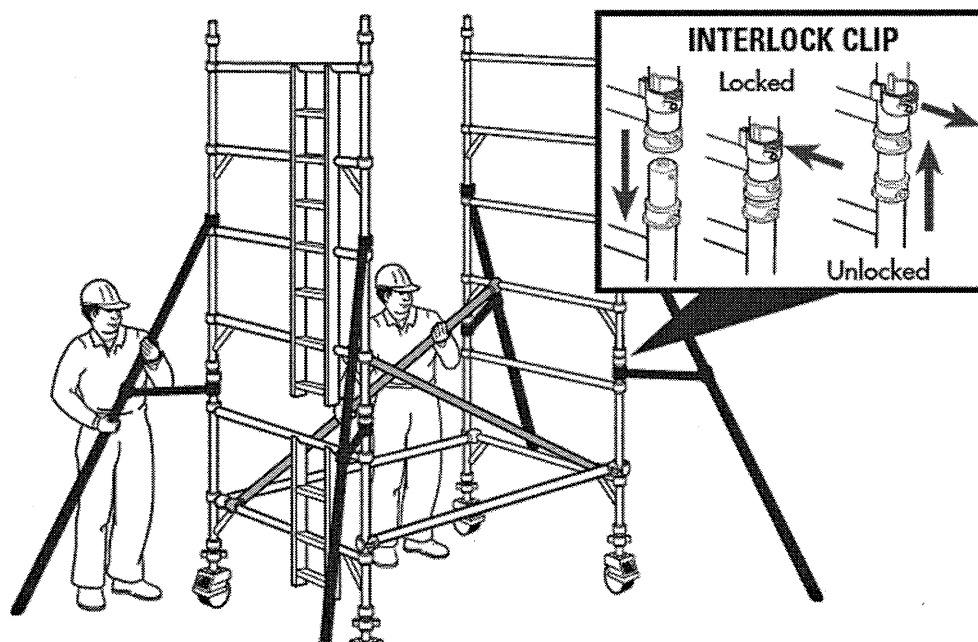


Stage 3 –

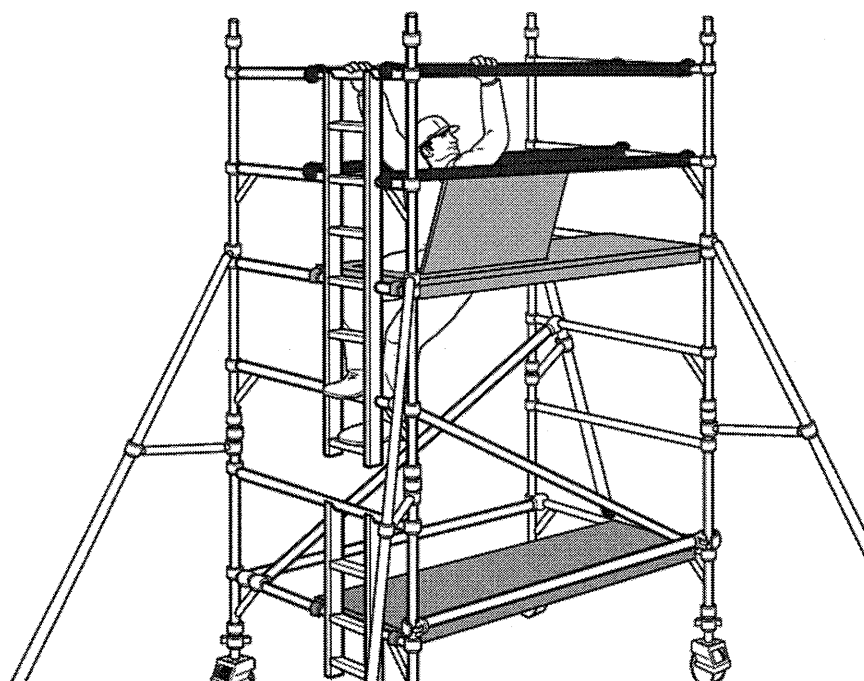


(Information taken from HSE guidance leaflets indg402, indg403 and indg405)

Stage 4 –

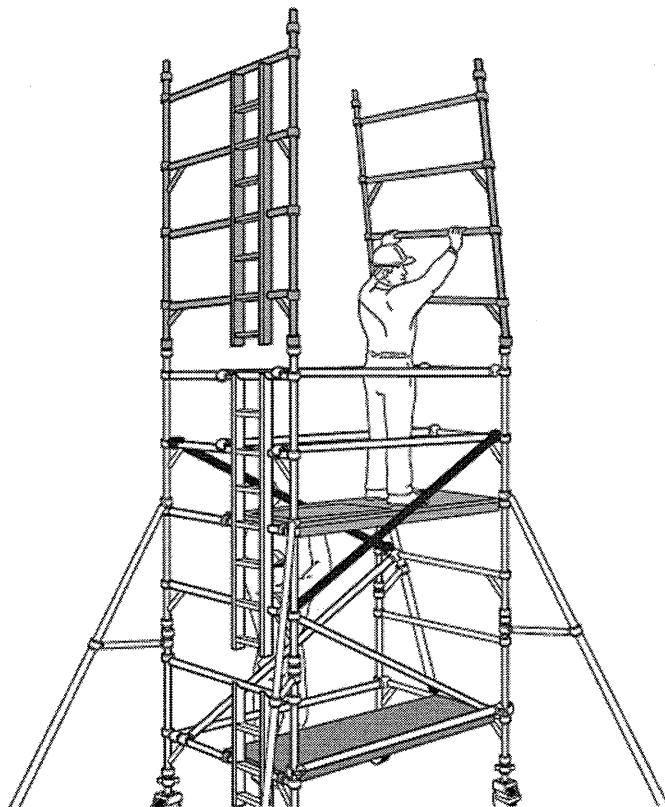


Stage 5 –

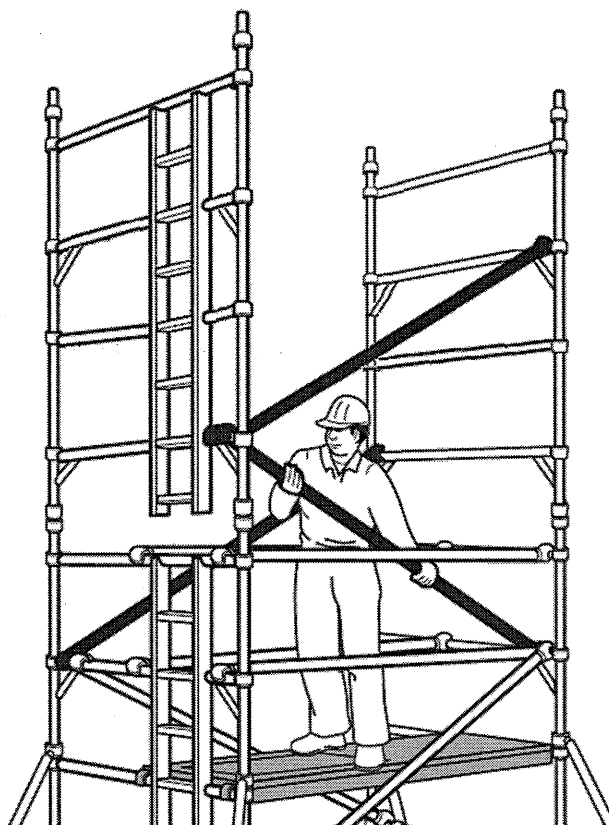


Stage 6 –

(Information taken from HSE guidance leaflets indg402, indg403 and indg405)

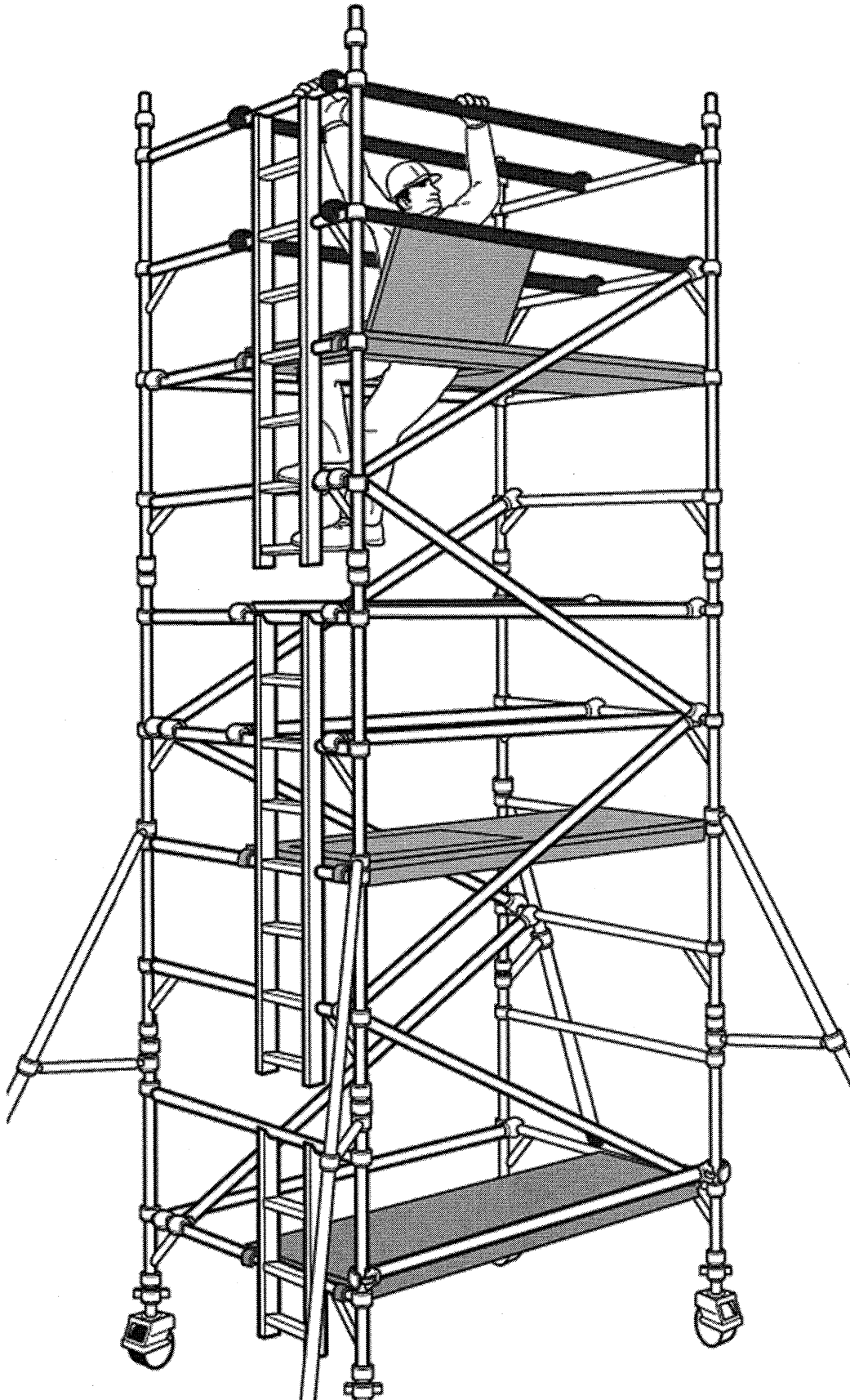


Stage 7 –



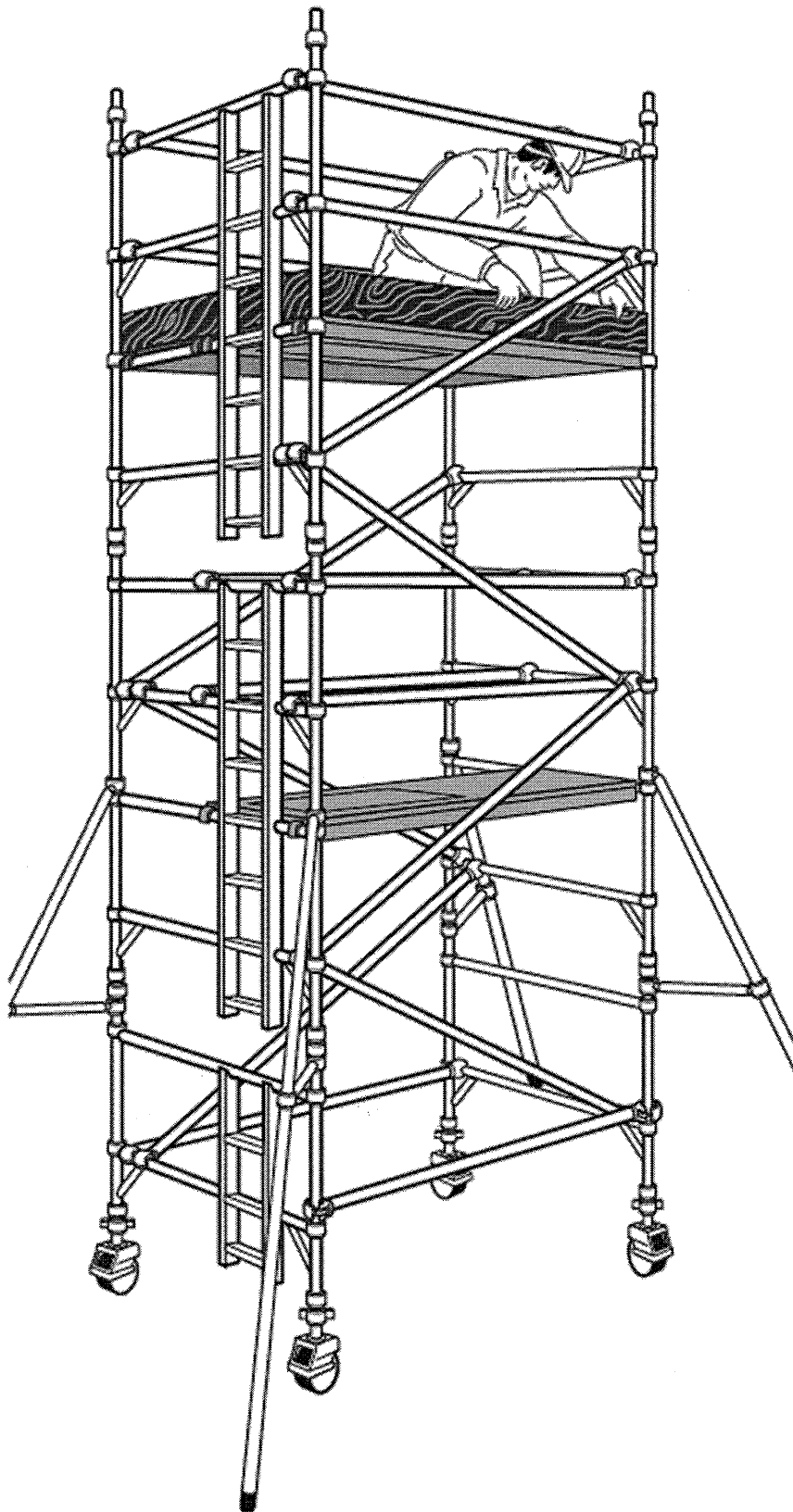
Stage 8 –

(Information taken from HSE guidance leaflets indg402, indg403 and indg405)



Stage 9 –

(Information taken from HSE guidance leaflets indg402, indg403 and indg405)



(Information taken from HSE guidance leaflets indg402, indg403 and indg405)

Safe Isolation

In the UK there is a legal requirement for employers to ensure any employees involved in work on electrical equipment are trained, competent and have appropriate equipment for the tasks. This will include the use of safe systems of work (SSOW) and access to appropriate safe isolation equipment including locking-off devices, voltage indicators, proving units and warning notices.

Annually, within the construction industry, there are significant numbers of accidents involving electric shock, burns and other injuries involving electricity. Some of these accidents prove to be fatal. HSE investigations have proved, on many occasions that these accidents are linked to poor safe isolation practice by electricians. Below are some examples of accidents caused by non-competent persons or poor practices:

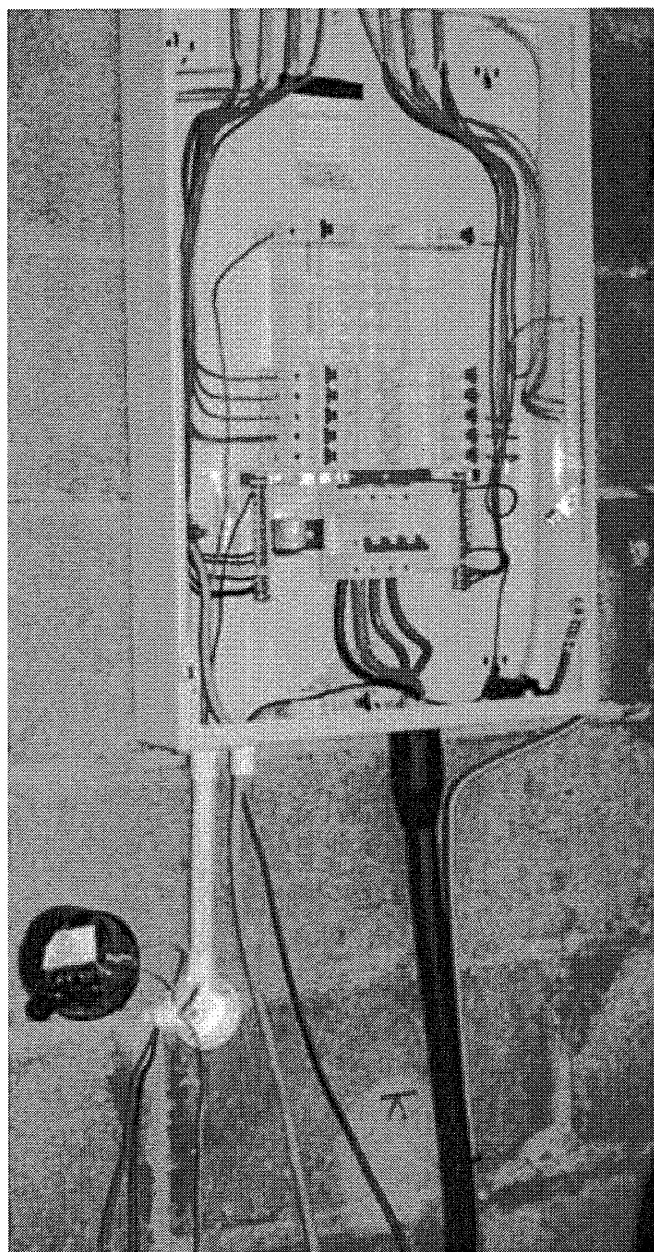
For each of the following links provide a brief summary of the accident and any fine that was issued:

<http://www.hse.gov.uk/electricity/maintenance/touch.htm>

<http://www.hse.gov.uk/electricity/maintenance/panel.htm>

<http://www.hse.gov.uk/electricity/maintenance/fence.htm>

<http://www.hse.gov.uk/electricity/maintenance/wiring.htm>



“An electrician working on a new-build construction project installed the 3-phase and neutral distribution board shown in the photograph. He energised the supply to the distribution board before the circuits connected to it were complete, to provide a supply to a socket outlet.

He was connecting the supply cables to a wall-mounted timer unit, with the phase conductor connected to the circuit breaker at the top left hand side of the busbar assembly. The circuit breaker had not been securely isolated and was ON as he stripped the insulation from the end of the cable. He touched the live copper conductor of the cable and was electrocuted.

The distribution board was manufactured to a high standard of safety. However, if he needed to energise the board before it was complete, he should first have replaced the cover and switched off and locked the circuit breakers supplying unfinished or incomplete circuits. He should also have ensured that circuits were not connected into circuit breakers until after they were complete and had been tested.”

http://www.esc.org.uk/fileadmin/user_upload/documents/industry/best_practice/BPG_2_09.pdf

Legislation

The Health and Safety at Work Act 1974 is an umbrella act that sets out general requirements, health and safety duties, for employers, employees and the self-employed. Under this statutory act are numerous sets of regulations used to enforce these duties. One of these, The Electricity at Work Regulations 1989, is used to ensure adequate precautions are taken to prevent death or injury from electricity in the workplace. These precautions consider safe work on or near electrical equipment and the requirements of appropriate technical knowledge, training or experience for persons carrying out such work. There is a requirement to ensure correct implementation of safe systems of work, provision of suitable tools, test equipment and personal protective equipment.

There are few reasons, linked to the Electricity at Work Regulations, that an appropriate safe isolation procedure must be used.

For each of the regulations below state the title of each and give a brief description of its requirements:

<http://www.hse.gov.uk/pubns/priced/hsr25.pdf>

- Regulation 12 –

- Regulation 13 –

- Regulation 14 –

- Regulation 16 –

Management of site safety

Safety on site is paramount. Risk assessments and safe systems of work will be regularly used. Where electrical work is carried out a suitably competent authorised person, the designated Duty Holder, should be appointed to take responsibility for the supervision of the installation. The authorized person, or his delegate, is responsible for:

- ensuring suitable doors with appropriate warning notices are fitted to all switchrooms and riser entrances
- that heavy duty locks or padlocks, and keys are provided ensure that access doors are locked when work is not being undertaken in these areas
- Plant and materials should not be stored in electrical switchrooms or electrical risers
- To avoid the energising of any outgoing electrical distribution services until the distribution switchgear and all connected circuits are complete and have been inspected and tested
- Once distribution circuits are energised, the safe isolation procedures must be implemented
- ensuring that earthing arrangements and protective conductors including equipotential bonding are in place, and that the final circuit is tested as far as practicable.

Safe Isolation Practice

Regulation 12, of The Electricity at Work Regulations 1989, requires a means for cutting off the supply and for isolation. It is, therefore, important to ensure that the correct point of isolation is identified and an appropriate means of isolation is used to prevent circuits or equipment being unintentionally re-energised. Warning signs/caution notices should also be installed at the point(s) of isolation, and the circuit conductors must be proved to be dead at the point of work.

The point of isolation should be under the control of the person who is carrying out the work on the isolated conductors. This can either be through a local isolation device, such as a plug and socket, switch-disconnector, circuit breaker, fuse etc, which is under the direct control of the competent person carrying out the work. These devices can be used without further precautions provided there is no risk that the supply could be re-energised by others. Where there is no local means of isolation, or there is a risk of others re-energising the supply, the circuit or equipment to be worked on should be securely isolated.

Equipment for safe isolation

For each item of equipment below state what it is and what it is used for:

1.

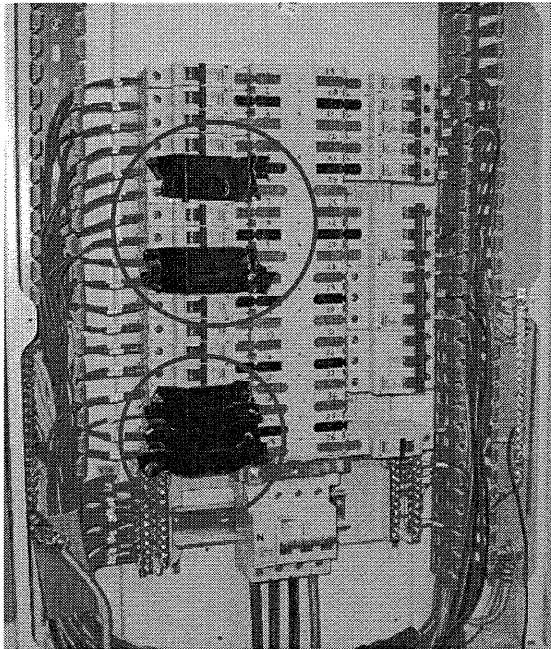
2.

3.

4.

5.

| | |
|---|--|
| <p>1.</p>  | <p>2.</p>  |
| <p>3.</p>  |  |
| <p>4.</p>  | <p>5.</p>  |



What poor practice can you see in this picture?

GS38

The following notes are on 'Guidance Note GS38 - Electrical test equipment for use by electricians'

This guidance note is intended to give guidance, to competent persons, on the selection of:

- Test probes
- Leads
- Lamps
- Voltage
- Indicating devices
- Measuring equipment

For circuits rated up too, but not exceeding, 650V.

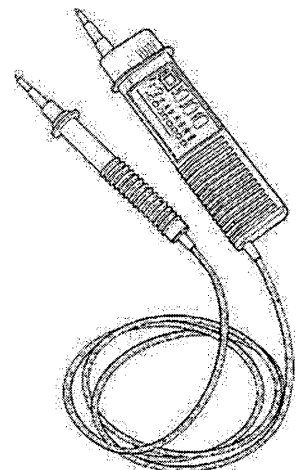
It highlights issues that should be considered when carrying out electrical testing with regards to the EAWR 1989. Some of these issues include:

- Equipment used should be appropriately constructed, maintained and used in non-dangerous way
- Work should not be carried out 'live'; subject to the requirements of the EAWR 1989
- Appropriate safe working practices are used.
- Those carrying out work should be competent to do so.

It specifies requirements for test probes and leads. These include:

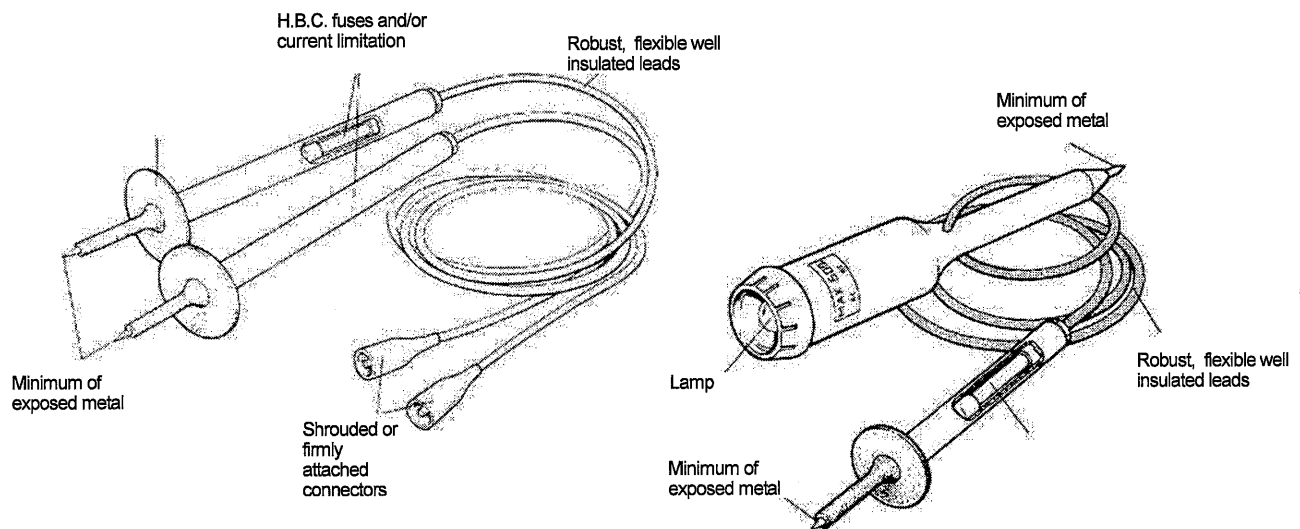
Probes –

- Finger barriers
- Adequate insulation of tips – minimum of 4mm, preferably 2mm or spring loaded sleeves
- Appropriate HBC fusing



Leads –

- Adequately insulated and sheathed
- Coloured where appropriate
- Flexible but sufficiently strong
- No accessible conductive parts



Electrical Permits-to-Work

Electrical permits to work must be used on High Voltage (HV) systems that have been isolated and made dead. In some situations or installation they may also be used for Low Voltage (LV) work. These permits are signed agreements that a piece of electrical equipment or a circuit has been safely isolated and can be safely worked. This process is likely to include the use of multiple lock off devices and caution notices placed at points of isolation.

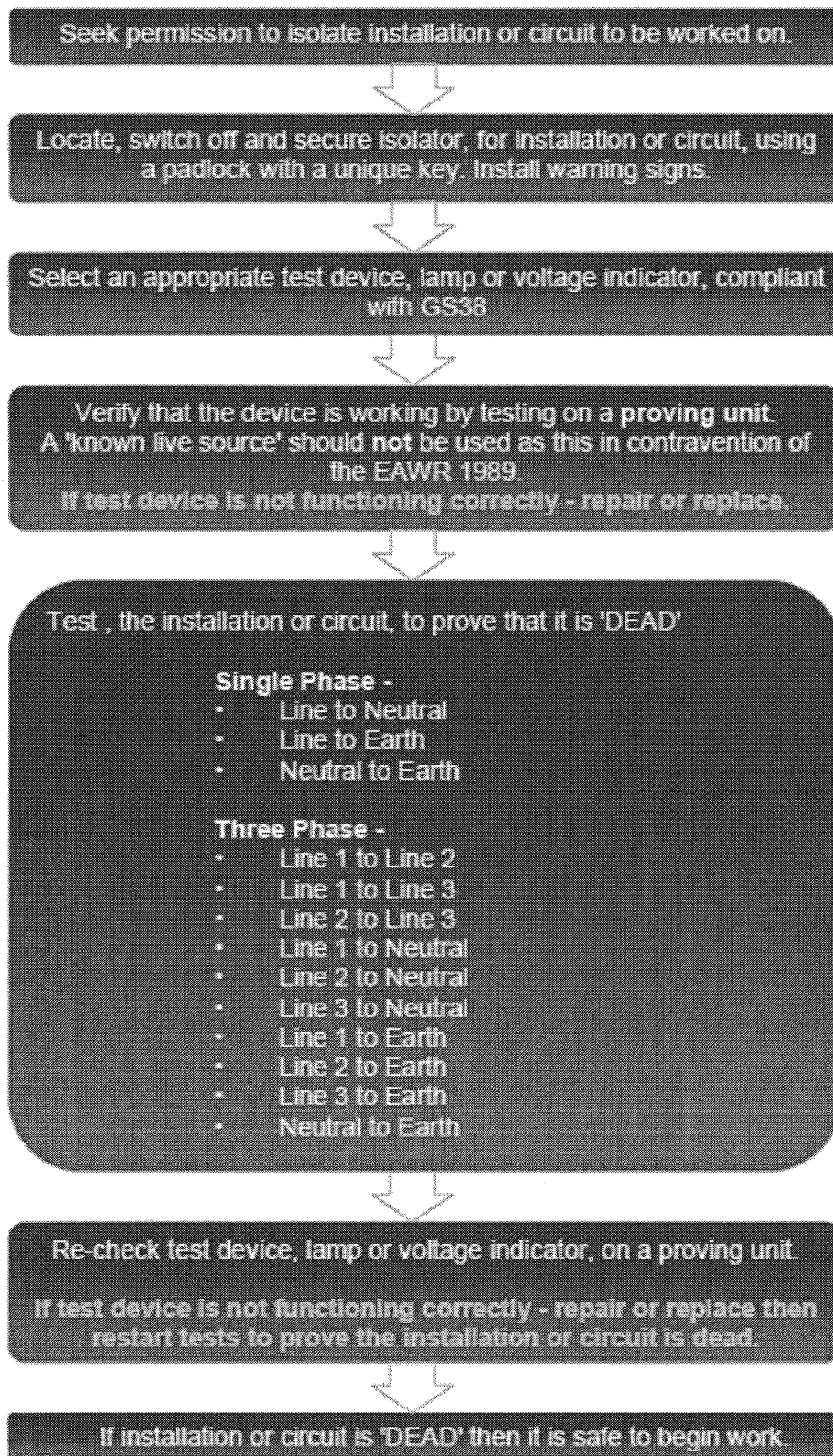
Safe Systems of Work

To ensure that electrical work is carried out safely a safe system of work (SSOW) process is often used. Employers must ensure that all employees are competent to carry out the work, are provided with appropriate tools, materials, PPE and are able to follow the SSOW. The SSOW will also include safe isolation and permit-to-work (if required on the premises). This type of system may also be instigated through a method statement. This will state, step by step, how a task is to be completed.

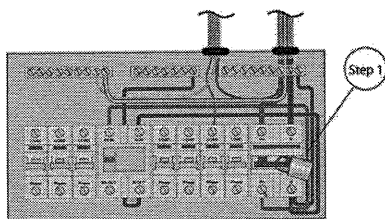
Proving Dead Isolated Equipment or Circuits

The process on the next page shows how to carry out safe isolation. There is also a pocket guide on this procedure provided by the National Inspection Council for Electrical Installation Contractors (NICEIC).

SAFE ISOLATION PROCEDURE



GUIDE TO ISOLATION PROCEDURE



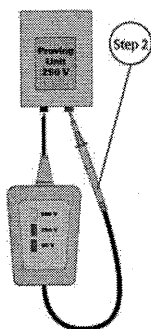
Step 1

Check it is safe and acceptable (with the occupier/user) to isolate. If the isolator is an off-load device, remove the load. Open the means of isolation for the circuit(s) to be isolated and secure the isolating device in the open position with a lock or other suitable means.

Step 2

Prove the correct operation of a suitable voltage detection instrument, see note (v), against a known voltage source, such as that illustrated.

Steps 3 and 4 are shown overleaf



Notes (also see notes overleaf)

- This guide gives information on safe working procedures for the isolation of the supply of electrical energy to electrical equipment.
- The example illustrated shows the minimum steps required to isolate the final circuits supplied by a single-phase consumer unit. The consumer unit includes an isolator and circuit-breakers.
- When circuits are protected by fuses enclosed in a distribution board, remote isolation of the supply to the distribution board may be required.
- HSG85 *Electricity at work safe working practices* gives detailed guidance on devising safe working practices for people who carry out work on or near electrical equipment.
- Guidance on voltage detection instruments is given in HSE *Guidance Note GS 38 - Electrical test equipment for use by electricians*.



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POCKET GUIDE 5

GUIDE TO ISOLATION PROCEDURE (continued)

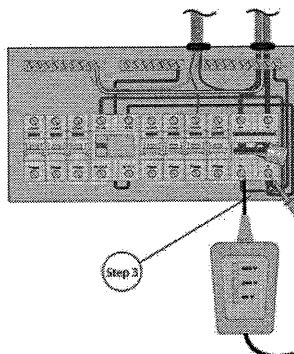
Step 3

(steps 1 and 2 are shown overleaf)

Using a voltage detection instrument, check that there is no dangerous voltage present on any circuit conductor to be worked on. It is important to confirm that conductors are **not** energized, for example, due to a wiring fault. Check terminal voltages between: (i) earth and phase, (ii) neutral and phase (as shown) and (iii) earth and neutral.

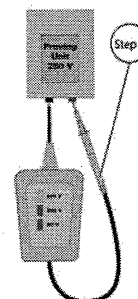
Notes:

- In practice the equipment being worked on is likely to be remote from the consumer unit, for example, a socket-outlet located remotely from the means of isolation. In this case it is necessary to check that all the socket-outlet contact terminals are **dead**.
- When checking for a voltage between an earth terminal and live (including neutral) terminals, the test probe should make contact with the earth terminal first, to reduce the risk of the remaining probe becoming live.



Step 4

Prove the voltage detection instrument again against the known source to check that it was functioning correctly when the circuit(s) were tested for the presence of voltage.



NOTES (also see notes overleaf)

- The *Electricity at Work Regulations 1989* require precautions to be taken against the risk of death or personal injury from electricity in work activities. Regulation 12 requires that, where necessary to prevent danger, a suitable means is available for cutting off the supply of electrical energy to any electrical equipment, and isolation of any electrical equipment.
- The Health and Safety Executive booklet HSR25 - *Memorandum of guidance on the Electricity at Work Regulations 1989* is intended to help duty holders meet the requirements of the Regulations.



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