



# Basic building construction Works Level I

# Learning Guide-60

Unit of Competence: Erect and Dismantle  
Scaffolding and **formwork**

Module Title: Erecting and Dismantling  
Scaffolding and Formwork

LG Code: EIS BBCW1 M15 LO1-LG-60

TTLM Code: EIS BBCW1 M15 TTLM 0919 v1

## LO 1: Plan and prepare

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<b>Instruction Sheet</b>	<b>Learning Guide #1</b>
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This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Applying and Confirming work instructions, plan, specification, quality.
- Following OHS requirements with Safety plans and policies.
- Identifying and implementing requirement signage.
- Selecting tools and equipment with the requirement jobs.
- Calculating the requirement materials with pans and specification.
- Identifying appropriate materials to work application.
- Handling and locate appropriate material safely.
- Identifying and apply environmental protection requirement.

This guide will also assist you to attain the learning outcome stated in the cover page.

Specifically, upon completion of this Learning Guide, you will be able to:

- Apply and Confirm Work instructions, plan, specification, quality.
- Follow OHS requirements with Safety plans and policies.
- Identify and implement requirement signage.
- Select tools and equipment with the requirement jobs.
- Calculate the requirement materials with pans and specification.
- Identify appropriate materials to work application.
- Handle and locate appropriate material safely.
- Identify and apply environmental protection requirement.

**Learning Instructions:**

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below 3 & 4.
3. Read the information written in the information “Sheet 1, Sheet 2, Sheet 3 and Sheet 4, Sheet 5, Sheet 6”.
4. Accomplish the “Self-check 1, Self-check t 2, Self-check 3 and Self-check 4” , Self-check 5” ,Self-check 6,” in page 5, 10,13 , 17, and 21,24,27,29.

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<b>Information Sheet - 1</b>	<b>Applying and Confirming work instructions, plan, specification, quality.</b>
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## Introduction

Scaffolding is used in the construction industry in many different ways by a wide range of trades. It is platforms at different levels, to enable the construction worker to work at different heights of a building. A construction worker standing on ground can work up to a height of about 1.2m -1.5m. When construction is to be done more than this height, builder and labor required a temporarily platform. This a temporarily plat form provided with necessary supports close to the work to provide a limited space for the workers building materials, tolls, etc. is termed as scaffolding.

Formwork is a mould or open box, like container into which fresh concrete is pour and compact. When the concrete is set, the form work is removed and a solid mass is produce in the shape of the inner face of the formwork.



Figure 1.1 Scaffolding is used

## ❖ Rules, Regulations and requirements

Every job on a construction site requires a strong understanding of the rules, Regulations and requirements. Failure to follow these can lead to serious consequences for employers and/or workers. Scaffolding work can present many hazards, not only with erecting and working on the scaffold itself, but also from the site or area where the scaffold is located.

Before you pick up your first piece of scaffold, you need to be familiar with:-

- scaffolding.
- (WHS) Regulations
- requirements



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- procedures
- instructions

Company policies and

Manufacturers'

F

Figure 1.2 planning & instructing

All these can change over time, and new rules can be created; so you'll need to make sure you keep up-to-date. These Standards provide guidance on different aspects of scaffolding, including their design and manufacture, and how scaffolding installations should be designed, erected, managed and used. Many other scaffolding guidelines, such as manufacturers' instructions, are based on or refer to these Standards. While you don't need to know them by heart, it's important that you know they exist and consult them when you need them.



### Scaffolding codes of

#### practice

Codes of practice are created by states, territories and industry bodies. They set out industry standards of conduct and give detailed practical guidance on how to comply with the requirements of legislation, including things like the preferred method or course of action to be taken to manage hazards. They are not law, but should be followed. Safe Work Canada or Australia a Commonwealth Government agency responsible for the development of national policy to improve WHS across Canada /Australia is developing a code of practice for scaffolding and scaffolding work, which will have a specific focus on the WHS Regulations relating to scaffolding.



### Information, instruction

#### and training for workers using scaffolds

Where work is performed from a scaffold, you must ensure that the relevant workers understand:-

1. What loads the scaffold can safely take.
2. Not to make any unauthorized alterations to the scaffold (such as removing guard rails, planks, ties, toe boards and braces)
3. The working platforms need to be kept clear of debris and obstructions along their length,
4. The incomplete or defective scaffolds must never be accessed. Where work is performed using mobile scaffolds, workers should be trained to ensure the scaffold:
5. Using internal ladders for accessed.
6. Codes of practice and Ethiopian Standards for Scaffolding
7. Manufacturers' instructions

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8. Work health and safety (WHS) Regulations
9. Site-specific rules and requirements.
10. Environmental requirements

All these can change over time, and new rules can be created; so you'll need to make sure you keep up-to-date.

<http://youtube.com/watch?v=c0b0kw99mK4&pbjreload=10> (construction of scaffolding)

<b>Self-Check -1</b>	<b>Written Test</b>
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**Directions:** Answer all the questions listed below.

1. It is platforms at different levels, to enable the construction worker to work at different heights of a building  
A) Scaffolding    B) Formwork    C) Timber    D) All
2. In what height recommend to be done more than this height, builder and labor required a temporarily platform.  
A) 1.5-1.7m    B) 1.2m -1.5m.    C) 1.7m- 2m    D) All
3. What point we must be known before use scaffolding in the first time?  
A) Site-specific rules and requirements  
B) The world standards for scaffolding  
C) Work health and safety (WHS) Regulations  
D) All

**Note: Satisfactory rating – 3 points**

**Unsatisfactory - below 3 and 4 points**

You can ask you teacher for the copy of the correct answers.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

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<b>Information Sheet - 2</b>	<b>Follow OHS requirements with Safety plans and policies.</b>
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**Introduction**

Working on scaffolding is one of the most dangerous building activities. Building workers can accidentally fall off a platform or parts of scaffolding can drop and injure someone underneath. The workers on scaffolding must always stay alert and check that they can place their feet and hands safely. Self-employed persons also have duties under the law in relation to their own Health and Safety and ensure that their work does not put others at risk.

**Work health and safety Regulations**

Scaffolding can be very effective protection in preventing falls; however, there are specific requirements that apply under the OHS Regulations.

A person with management or control of a scaffold must not allow the use of a scaffold from which a person or object could fall more than four meters unless a competent person provides written confirmation that the scaffold has been completed.

**Environmental requirements**

Construction projects often have an impact on the environment – from the clearing of land through to the materials that are used and the waste created. There are rules and Regulations covering environmental requirements. Some of these are laws; others are local government or council requirements. You have a responsibility to minimize the impact you make on the environment as you go about your work tasks.



Figure 2.1 West Management

Although erecting and using scaffolding does not consume materials, scaffolding can affect the environment by damaging the area where it is set up, Example- ground and plants, through dust and debris generated by work done on the scaffold, and through waste left by workers using the scaffold. The scaffolding you erect is your responsibility, so make sure you check the area around the scaffold for damage and waste on a regular basis.

**Site- specific rules and requirements**

Different worksites have their own rules and requirements and these vary depending on things like the location, size and type of project, and company/employer policies. For example, a project on a small residential site in a busy inner city area is likely to have to manage site traffic and deliveries very carefully and this could have significant impact



Figure 2.2 Site Sign

on

Scaffolding management, Waste management, noise rules and signage are examples of other requirements that will vary from site to site. There will

Often also be work practices the way things are done, which isn't necessarily a specific policy or procedure, but expected ways of working.

**Site- specific environmental requirements**

Some projects may have an environmental plan that you'll need to follow when designing and erecting scaffolding. This could include things like protection of the site, including the flora and fauna within it, as well as noise, dust and water monitoring and management.

You'll generally be expected to inspect your work and storage areas daily to ensure that they comply with site environmental requirements; you may have to record this in a log.

**Work health and safety**



It's the responsibility of every worker to take every possible measure to keep them and their fellow workers safe in the workplace. There are a range of rules to be followed and actions to be taken to support this.

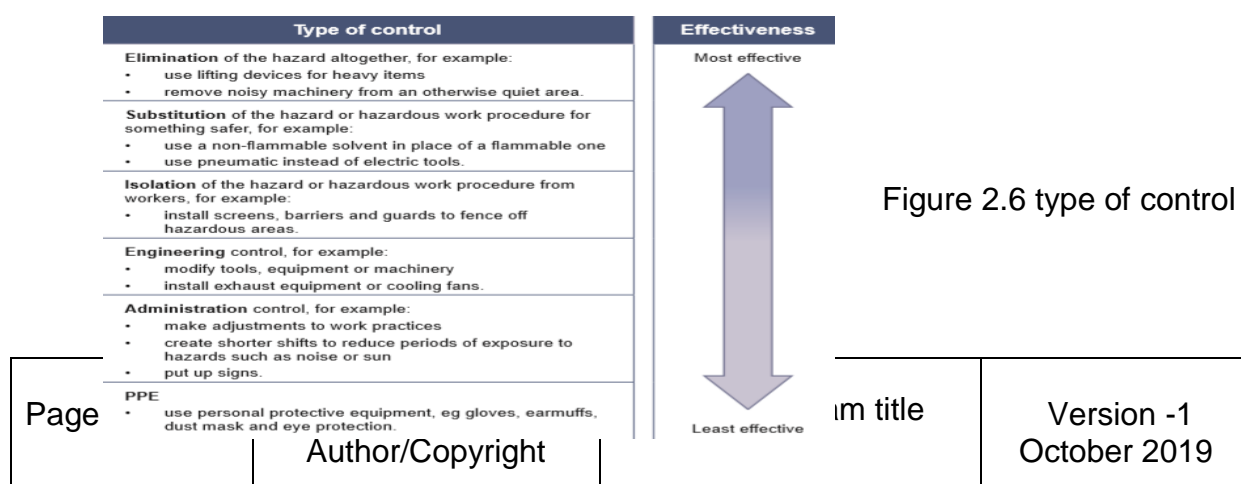
Hazards and risks there are hazards and risks in any workplace, but construction sites are among the most dangerous. Knowing some of the things to watch out for,

Figure 2.3 Personal protection

ways to minimise risk and what to do if something goes wrong are important things to learn as soon as you can, if you want a long, successful and accident-free career. If you have an accident, a near-miss or see any potential hazards on site, you should let your employer or supervisor know immediately

**The hierarchy of hazard control**

The hierarchy of hazard control is a systematic approach to managing safety and is standard practice in many workplaces. It provides a structure to help workers select the most effective ways to eliminate or reduce the risk of hazards. The most effective measure elimination, i.e. removal of the hazard completely is at the top of the hierarchy. The least effective measure is at the bottom. The idea is you choose a measure from as close to the top as possible to control the hazard you're dealing with. Take a look at the following diagram, which shows the hierarchy of hazard control.





## Site hazard assessment

You need to assess a site for hazards before the erection of scaffolding, as well as continuously monitor the area while the scaffold is in use to ensure that nothing has changed to make the site unsafe. When you conduct an initial site assessment, you should look for the following:

- Surfaces that may be affected by weather Example, asphalt may become soft in hot weather; ground may become boggy in wet weather
- Soft or uneven ground surfaces
- The possibility of scaffolds / tradespeople falling or dropping equipment on others below.
- The proximity of power lines to the intended scaffold location.
- The movement of vehicles, forklifts, cranes and other plant or equipment; open trenches or areas that have been trenched and backfilled.
- Areas likely to be excavated while the scaffold is still in place.

The minimum distance required between scaffolding and power lines is three metres for a power line less than 33 kv; six metres for over 33 kv and eight metres for over 133 kv. These requirements differ across Australia.

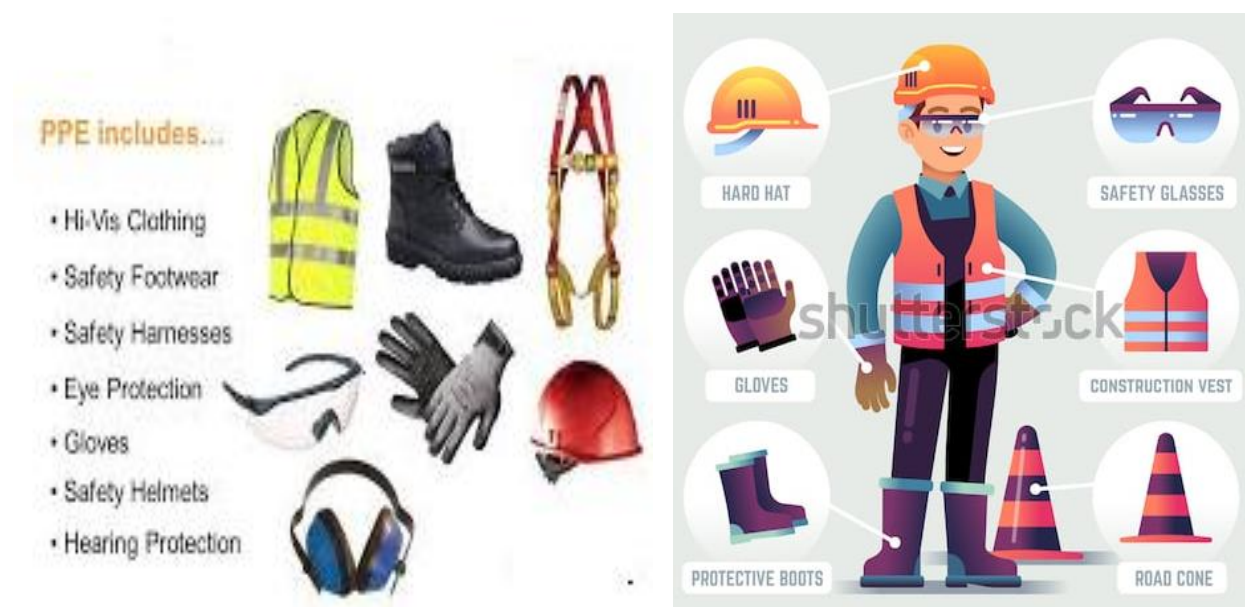
### Personal protective equipment

You must wear PPE at all times when you're erecting and dismantling scaffold.

This includes:

- Steel cap boots
- Hard hat
- safety glasses
- Gloves.

As scaffolding is predominantly an outside job, it's also a good idea to wear a long-sleeved, collared shirt and sunscreen. On noisy worksites, remember to use hearing protection. If site conditions are dusty, wear a dust mask.



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Figure 2.7 Personal protective

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## **First aid**

First-aid kits and boxes should contain simple and clear instructions to be followed, be kept under the charge of a responsible person qualified to render first aid and be regularly inspected and kept properly stocked. First-aid kits and boxes should contain simple and clear instructions to be followed, be kept under the charge of a responsible person qualified to render first aid and be regularly inspected and kept properly stocked. The employer should be responsible for ensuring that first aid, including the provision of trained personnel, is available.



Figure 2.8 Fire Aid Kite

Arrangements should be made for ensuring the removal for medical attention of workers who have suffered an accident or sudden illness. The manner in which first-aid facilities and personnel are to be provided should be prescribed by national laws or regulations, and drawn up after consulting the competent health authority and the most representative organizations of employers and workers concerned. If a minimum number of workers as prescribed is employed in any shift, at least one suitably equipped first-aid room or station under the charge of qualified first-aid personnel or a nurse should be provided at a readily accessible place for treatment of minor injuries and as a rest place for seriously sick or injured in scaffolding workers.

## **Fire prevention and fire fighting**

Fire-extinguishing equipment should be properly maintained and inspected at suitable intervals by a competent person. Access to fire-extinguishing equipment such as hydrants, portable extinguishers and connections for hoses should be kept clear at all times. All supervisors and a sufficient number of workers should be trained in the use of fire-extinguishing equipment, so that adequate trained personnel are readily available during all working periods, where appropriate, suitable visual signs should be provided to indicate clearly the direction of escape in case of fire.

All appropriate measures should be taken by the employer to:-

- Avoid the risk of fire.
- Control quickly and efficiently any outbreak of fire.
- Bring about a quick and safe evacuation of persons.
- Secure storage areas should be provided for flammable liquids, solids and gases.
- Smoking should be prohibited and "No Smoking" notices be prominently displayed in all places containing readily combustible or flammable materials.



Self-Check - 2	Written Test
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**Directions:** Answer all the questions listed below.

- 1 \_\_\_\_\_ the most dangerous working activity in building site?  
A) Concrete work B) Scaffolding work C) sitting out work D) All
- 2 What types PPE wear at all times when erecting and dismantling scaffold?  
A) Steel cap boots B) Hard hat C) Gloves D) All
3. What the minimum distance required between scaffolding and power lines for 33 KV \_\_\_\_\_?  
A) Five metres B) Six metres C) Eight metres D) All

**Note: Satisfactory rating – 3 points**

**Unsatisfactory - below 3 and 4 points**

You can ask you teacher for the copy of the correct answers.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

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<b>Information Sheet- 3</b>	<b>Identifying and implementing requirement signage.</b>
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## Introduction

Safety signs are displayed in the working environment to inform workers of the rules and regulations especially relevant to inform and give warning of possible danger and **must be obeyed**. There are **four types** of safety signs:

- a. Warning signs
- b. Advisory signs
- c. Mandatory signs
- d. Prohibition signs particular section of the workplace

### A. Warning Signs (these give safety information)

These are triangular yellow signs with a black border and symbol as shown in Fig. 3.1



### B. Advisory Signs (these also give safety information)

Advisory or safe condition signs are square or rectangular green signs with a white symbol as shown in Fig.3.2 They give information about safety provision



### C. Mandatory Signs (these are 'MUST DO' signs)

These are circular blue signs with a white symbol as shown in Fig.3.1 They give instructions which **must be obeyed**.



### D. Prohibition Signs (these are 'MUST NOT DO' signs)

These are circular white signs with a red border and Red Cross bar as shown in Fig. 3.4 They indicate an activity which **must not** be carried out.



Signs and barricades should be used on or near scaffolding to help keep everyone in the vicinity safe. They provide warning of any potential danger, give direction as to what to do and direct both pedestrians and vehicles safely around scaffolding work areas. Signs should be positioned at eye level so they're easily seen. When you're planning to erect scaffolding, you need to determine which signs to use and whether barricades will be required – both during erection of the scaffold and while it's in use. You can get this information from a site inspection, by looking at the project plans (particularly site and location plans) and talking with supervisors. If you're erecting scaffolding near roads or any other area where vehicles are moving close by, you may need a spotter or flagman to control the traffic and keep people in the area safe during the erection process.

1. A spotter's job is to be the eyes and ears of the workers. They will direct them, Example:-to stop or wait if a vehicle's approaching.
2. A flagman directs traffic, Example:-to stops traffic so that scaffolding can be carried safely across a road. Spotters and flagmen may use mobile phones, two-way radios and hand signals to communicate with workers.

### Scaffold Signs & Tagging Systems

Clear user information regarding the intended use, duty, status and residual hazards relating to the scaffolding must be provided. A scaffold tagging system shall be used on all scaffolding structures. The 'red' do not use sign should be displayed as soon as possible during construction, in addition to any other scaffold incomplete signs required. The tag holders should be positioned at each access point

Following the commissioning inspection a tag insert must be completed with the relevant data and inserted in the holder.

If, during use or through the course of an inspection, a defect or hazard is identified then the scaffold tag insert should be removed to display the prohibition 'do not use' sign. The person responsible for the scaffold concerned must be notified directly and the insert returned to them. Note that the holder showing the red prohibition sign can only be used as an interim arrangement until suitable physical measures to restrict access can be taken. Scaffolding loading bays/towers and lifting frames must display a sign clearly stating the Maximum Load Rating and any other loading information (e.g. uniformly distributed load, rigging point for lifting equipment etc.).

All signs and tags must be written in easy untestable language



Figure 3.5 Deferent types of



Self-Check - 3	Written Test
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**Directions:** Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. \_\_\_\_\_ Signs are displayed in the working environment to inform workers of the rules and regulations?  
A) Safety signs B) Warning signs C) Danger tags D) All
2. These are triangular yellow signs with a black border and symbol  
A) Warning Signs B) Mandatory Signs C) Prohibition Signs D) All
3. These are square or rectangular green signs with a white symbol  
A) Warning Signs B) Mandatory Signs C) Prohibition Signs D) Advisory Signs
4. These are circular blue signs with a white symbol  
A) Warning Signs B) Mandatory Signs C) Prohibition Signs D) All

**Note: Satisfactory rating – 3 points**

**Unsatisfactory - below 3 and 4 points**

You can ask you teacher for the copy of the correct answers.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

<b>Information Sheet-4</b>	<b>Selecting Tools and Equipment with the Requirement jobs.</b>
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### Introduction

Tools used to erect scaffolding need to be small, light and able to be carried easily. They can be kept in a special scaffolder's belt to keep them handy when moving around and working above the ground. As with all tools, the tools used for scaffolding need to be well maintained and checked for damage before and after use. The following provides some information about the basic tools used for erecting scaffolding. There are a range of tools and maintenance equipment you can use for the various different tasks need to construct scaffolding or cantilevered hoist.

➤ **Tools for tightening and loosening fastening (e.g. Nuts and Bolts):-**

Referred to as a shifter or an adjustable spanner, you use a wrench to loosen and tighten the nuts of couplers. The head of the wrench is adjustable to suit different size nuts. Figure 4.1 Tools for tightening and loosening



Spanners



Box Spanners



Adjustable spanner (Wrenches)

➤ **Tools used for Cutting Wire And other Equipment:-**



Wire nips



Cutters



Bow saw

Figure 4.2 tools used for cutting

**Impact tools:** - You use a claw hammer to hammer down joining pins to make sure they're fixed securely.



Hammers ,



Sledge Hammers



Hammer Drills

Figure 4.3 tools used for impact

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**Tools For Moving Materials:-**



Shovels



Wheel barrows

Figure 4.4 tools used for Moving Materials

**Measures instrument:** - You use a tape measure to measure distances when you're setting up the base and constructing the scaffold.

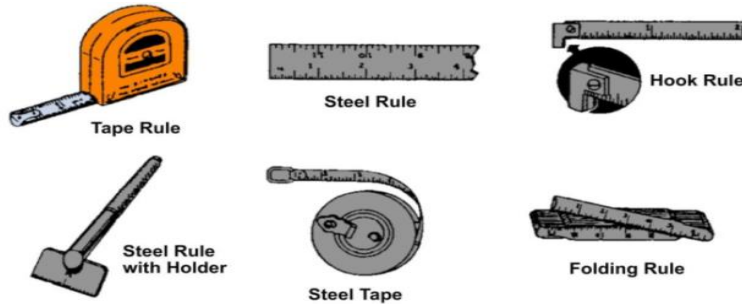


Figure 4.5 tools used for Measures

**Spirit level:** - You use the spirit level during scaffold erection to check that the frames and standards are level and plumb (vertically straight). A small (300 mm) level that fits into the scaffolder's tool belt is the easiest size to use when you're climbing about on scaffolding.

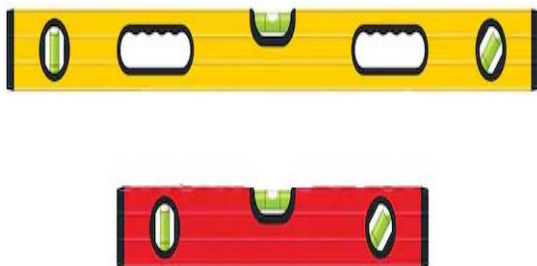


Figure 4.6 tools used for level

**Scaffolding tool belts:** - This is a scaffolder's belt worn around the waist to keep tools in order and at hand while the scaffolder's climbing and building the scaffold at height. Frogs are the leather pouches the tools sit in.



Figure 4.7 Scaffolding tool belts



Figure 4.8 Scaffolding podger tools from Priory.

All tools and equipment used for the erection, modification and dismantling of scaffolding must be:-

- Used in accordance with the manufacturer's specifications, organisational policies and procedures and safety work practices.
- Read the operator's manual before using any equipment for the first time. do not exceed the limitations of the equipment. It could be extremely dangerous and could damage the equipment.
- Used for the purpose it was designed for never use tools or equipment for any purpose or job other than the one it was intended to do.
- Inspect all tools and equipment before using them. If you find any defects or faults during the inspection do not use the equipment.
- Faulty tools and equipment must be tagged out according to procedures.
- Cleaning after use, storing neatly, slightly greasing if necessary and regular maintenance.
- Visually checked for faults before use, If using electrical powered equipment a residual Current Device (RCD) connection should be used or equipment should be 220 volt or battery operated
- Ensure tools are used correctly and as intended by the manufacture, don't get involved in horseplay.
- Do not use power tools unless you have been trained and authorised to do so.
- Employer should ensure that a maintenance record is available and kept up to date and power tools should be pat tested.



Self-Check -4	Written Test
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**Directions:** Answer all the questions listed below.

1. \_\_\_\_\_ used to erect scaffolding need to be small, light and able to be carried easily

- A) Tools      B) Equipment      C) A and B      D) None

2. \_\_\_\_\_ for tightening and loosening fastening?

- A) Spanners      B) Box Spanners      C) Adjustable spanner (Wrenches)      D) All

3. \_\_\_\_\_ use to distances when you're setting up the base and constructing the scaffold.

- A) Measures tools      B) Box Spanners      C) A and B      D) All

**Note: Satisfactory rating – 3      Unsatisfactory - below 3 and 4 points**

You can ask you teacher for the copy of the correct answers.

Score = _____
Rating: _____

Name: \_\_\_\_\_

Date: \_\_\_\_\_

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<b>Information Sheet-5</b>	<b>Calculating the requirement materials with pans and specification</b>
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Calculation on the quantity of scaffolding materials are depending on the intended used, how many locations as per drawings are in need to build temporary platforms? What are their length, width height and load to be imposed. You should include in the calculations the provision of ties, emergency exit route/ rescue and loading platform.

Work platforms and scaffolds will be capable of carrying the design load under varying circumstances depending upon the conditions of use.

The design load of all scaffolds will be calculated on the basis -

- Light - Designed and constructed to carry a working load permitting up to 120kg /square.
- Medium - Designed and constructed to carry a working load permitting up to 240kg / square
- Heavy - Designed and constructed to carry a working load of 75 pounds per square foot.

#### Calculating the Scaffolding Area

Multiply the horizontal length of a scaffold by the average height of the scaffold to give the scaffold area in square meters.

$$\text{Length (m) x average height* (m) = Area (m}^2\text{)}$$

**Example:** - A scaffold is 10 m high to the top working platform at one end and 5 m high to the top working platform at the other end. The scaffold is 24 m long Length: 24 m

Average height:  $10\text{ m} + 5\text{ m} = 15\text{ m} / 2 = 7.5\text{ m}$  area of scaffold:  $24\text{ m} \times 7.5\text{ m} = \underline{180\text{ m}^2}$

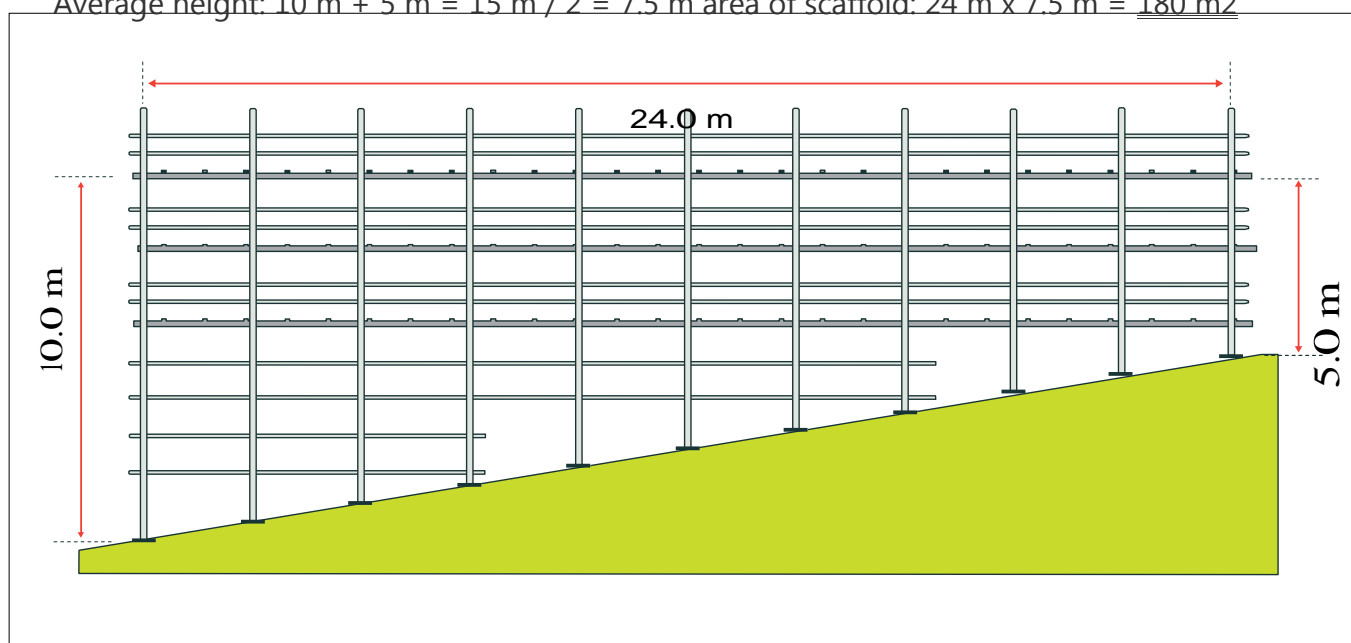


Figure:-5.1 Example calculation for the area of a scaffold



In order to calculate the height of the scaffolding you have to divide the height of the single scaffolding section **and** divide it by the height of single scaffolding. This gives you the exact Calculation of the number of rows required in scaffolding, In the end you have to multiply the number of rows with the number of columns and you get the number of scaffolding that the total project will require.

Example:-

- **How do you calculate scaffolding material?**

Divide the total height measurement by the height of a single scaffolding section. This will determine the total number of rows of scaffolding the project will require. Multiply the number of rows by the number of columns to find the total number of scaffold sections necessary for the project.

- **What is the minimum weight scaffolding planking must be able to support?**

Platform Construction & Safety

The space must not exceed 9 inches (22.86cm) when side brackets or odd-shaped structures result in a wider opening between the platform and the uprights. Scaffold planking must be able to support its own weight and at least four times the intended load.

- **What is the maximum width of spacing between scaffolding planking under normal conditions?**

The standard requires that the space between the scaffold planks or between scaffold planks and uprights be no more than one inch wide unless the employer can demonstrate that a wider space is necessary. However, the platform must still be planked or decked as fully as possible.

- **At what height must a scaffold be supported to help prevent tipping?**

Guardrails, a personal fall arrest system, or both must protect each employee more than 10 feet (3.1 meters) above a lower level from falling. A competent person must inspect ropes for defects prior to each work shift and after every occurrence that could affect a rope's integrity.

- **How far must the planking on the working floor of a scaffold overlap?**

Tiebacks when used shall be installed at right angles to the face of the building and securely fastened to a chimney. (1) Carpenters' bracket scaffolds. (4) The platform shall consist of not less than two 2- by 9-inch nominal size planks extending not more than 18 inches or less than 6 inches beyond each end support.

- **How do you calculate scaffolding rates?**

Ask the price of the rental rate per scaffold unit. A majority of the scaffold units are 8 feet long and 6 feet high. Divide the entire length of the working area you measured by the actual length of the scaffolding units. This calculation will give you the total number of units needed to cover the span of the project.

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- **How much weight should a scaffold support?**

Multiply 3.25 M<sup>2</sup> by 11.34kg per square Meter and the scaffolding can be loaded with no more than 396.9kg. Three persons (estimated at 113.4 kg each) and 56.7kg pounds of tools, materials, and equipment can be applied to the scaffold

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<b>Self-Check -5</b>	<b>Written Test</b>
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**Directions:** Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. \_\_\_\_\_ to know quantity of scaffolding materials are depending on the intended used.  
A) Analyzing scaffolding materials    B) Evaluating scaffolding materials  
c) Calculating scaffolding materials    D) All
  
2. A scaffold is 15 m high to the top working platform at one end and 7 m high to the top working platform at the other end. The scaffold is 25 m long Length: 25 m find the area of scaffolding?  
A) 275 meter    B) 200 meter    c) 375 meter    D) All
  
3. Designed and constructed to carry a working load permitting up to 120kg /square.  
A) 120kg /square.    B) 220kg /square.    C) 420kg /square.    D) All

**Note: Satisfactory rating – 3 points**

**Unsatisfactory - below 3 and 4 points**

You can ask you teacher for the copy of the correct answers.

**Answer Sheet**

Score = \_\_\_\_\_

Rating: \_\_\_\_\_

Name: \_\_\_\_\_

Date: \_\_\_\_\_

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<b>Information Sheet-6</b>	<b>Identifying appropriate materials to work application.</b>
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## Introduction

Different projects and tasks have different scaffolding requirements. Depending on the type and size of the scaffolding you need, there can be quite a lot of pieces to collect. This is where your sketch and plan come in really handy – you can use them as a reference for all the items you need, and then as a checklist to mark off items as you collect them.

The regulations and various standards prescribe scaffolding made of timber, bamboo, steel tubes, aluminum tubes or prefabricated frames. Other materials, provided they are suitable and adequate in strength, may be used subject to the approval of the Secretary of Labor. All scaffold materials must be in sound condition and be examined by a competent person before use.

Scaffolding has been used for many centuries to provide access areas for building and decorating structures taller than people who work on them. Scaffolding material must meet government standards of the area where the construction is occurring.

Scaffolding will have rails for the safety of the workers and all kinds of back up measures to assure no injuries occur below. Testing of the scaffolding is done before work begins in earnest. Scaffolding made of timber, bamboo, steel tubes, aluminum tubes or prefabricated frames. Aluminum alloy pipes and couplers were developed for their lighter weight and speedier construction.

Aluminum alloy is only two-thirds as strong as steel, but it is only one-third to one-half its weight. Because of the higher initial cost, aluminum is restricted mostly to building maintenance scaffolds and suspended platforms. Other materials, provided they are suitable and adequate in strength, may be used subject to the approval of the secretary of labor. All scaffold materials must be in sound condition and be examined by a competent person before use.

Today bamboo is used in Asia in the scaffold industry, but would never be considered for use in an advanced society's construction work. The scaffold industry does well in times of a construction boom. Related industries thrive as well, such as the metal industry which produces steel scaffolding and companies producing the boards for the scaffolding. In a booming economy, one witnesses scaffolding all around when construction is going on at a rapid pace. Compound what you see going on around you and multiply this many times over to see how a construction boom helps various sectors of the economy.

Scaffolding is not a do it yourself project. Many amateurs are injured every year.

Engineering principles are involved, and every aspect of the scaffolding whether a steel

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Scaffolding tower or one made of other materials must meet the engineering supervisor's approval.

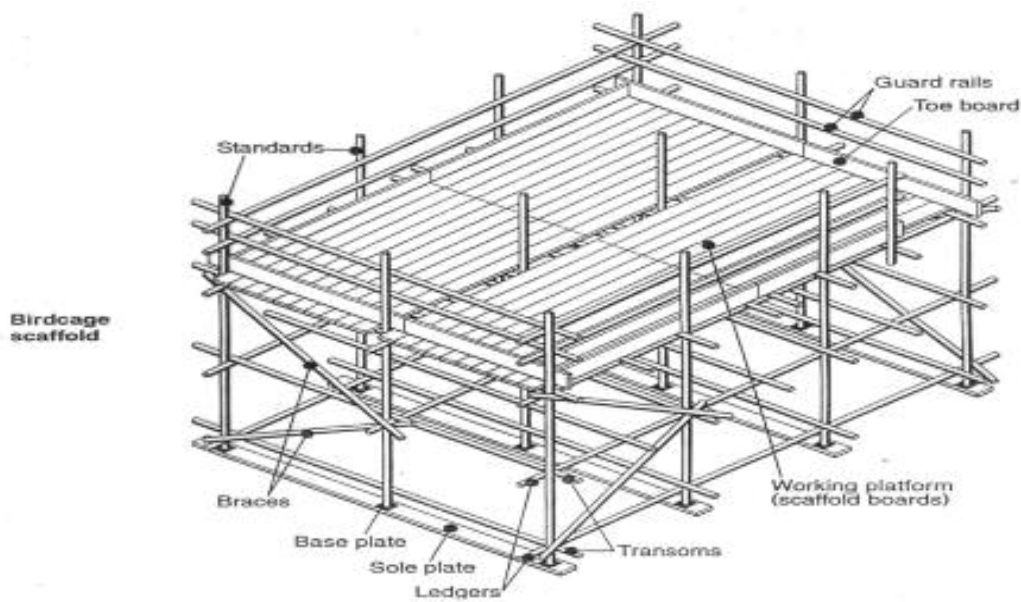


Figure 6.1 Timber Scaffolding



Figure 6.2 Bamboo Scaffolding

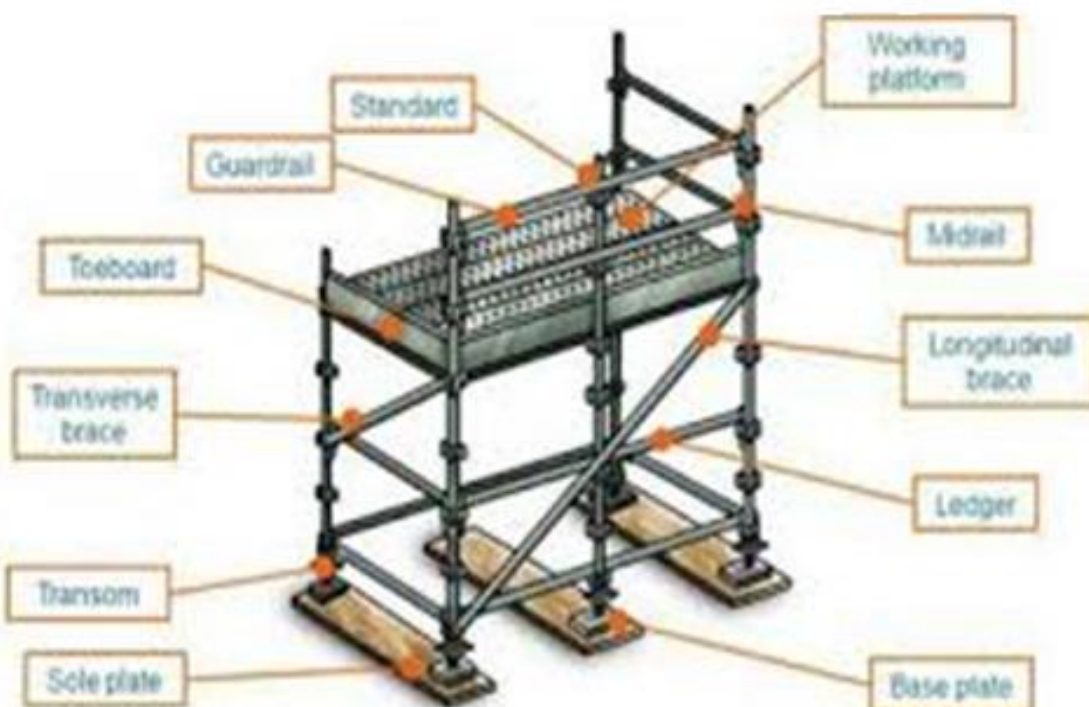




Figure 6.3 Steel or Aluminum Scaffoldin

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<b>Self-Check -6</b>	<b>Written Test</b>
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Directions: Answer all the questions listed below.

1. On it standards prescribe scaffolding made of \_\_\_\_\_  
A) Timber & bamboo    B) Steel & aluminum tubes  
C) Prefabricated frames    D) All
  
2. Which country use bamboo for scaffolding work?  
A) In Asia    B) In Africa    c) In Europe    D) All
  
3. Which scaffolding material is very strong and use for long time?  
A) Timber & bamboo    B) Steel & aluminum tubes  
C) Prefabricated frames    D) All

**Note: Satisfactory rating – 3 points**

**Unsatisfactory - below 3 and 4 points**

You can ask you teacher for the copy of the correct answers.

**Answer Sheet**

Score = _____
Rating: _____

Name: \_\_\_\_\_

Date: \_\_\_\_\_

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<b>Information Sheet-7</b>	Handling and locate appropriate material safely.
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### **Introduction**

Hanging scaffolds are platforms suspended by tubes, bolts, fixed-rope slings, or other methods and not intended for raising or lowering while in use. Any suspension point, member or attachment must be specially designed and formed in such a way that it cannot become dislodged or displaced by movement of the hanging scaffold.

The designer must be satisfied that the suspension points are strong enough to support the load and have a factor of safety.

If the hangers are scaffold tubes, they must be assembled using right-angle couplers, doubled up at the suspension points. Sleeve couplers or joint pins must not be used for vertical axial joints.

Check clips must be fitted not only to the top of the hanger, but also below the bottom ledger. Clips must also be fitted in such a direction that in the event of the bolt failure, or if it is accidentally knocked open, the clip will still hold.

Wire rope used for slinging must have a factor of safety of 5 and be fixed to the suspension point and the scaffold by two round turns and 3 bulldog grips for wire up to 19 mm in diameter, or by using an eye and a shackle capable of safely carrying the loads.

All lifting gear and means of suspension must be thoroughly inspected before and after it is installed and at regular intervals during use. Because of the risk involved while erecting or dismantling hangers, workers must wear safety harnesses, secured to independent lifelines as specified in

- Store all scaffolding parts in an organized manner in a dry and protected environment
- The location of the scaffold with respect to site coordinates or the location at the building or structure, so that the scaffolding can be clearly located.

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Figure: 7.1 Proper handling of Steel and Aluminum scaffolding tubes

Figure: 7.2 Proper handling of Bamboo Scaffolding



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<b>Self-Check -7</b>	<b>Written Test</b>
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Directions: Answer all the questions listed below.

1. In what methods we use for hanging of scaffolds?  
A) Platforms suspended by tubes, bolts    B) fixed-rope slings  
C) A and B                      D) None
2. Which country use bamboo for scaffolding work?  
A) In Asia    B) In Africa    c) In Europe    D) All
3. What is advantage of properly store all scaffolding Martials?  
A) Protected environment    B) To be organized the site  
C) To save money and time    D) All

**Note: Satisfactory rating – 3 points**

**Unsatisfactory - below 3 and 4 points**

You can ask you teacher for the copy of the correct answers.

**Answer Sheet**

Score = _____
Rating: _____

Name: \_\_\_\_\_

Date: \_\_\_\_\_



<b>Information Sheet- 8</b>	<b>Identifying and apply environmental protection requirement.</b>
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Environmental protection requirements control any aspect of the workplace activities from adversely affecting the environmental as much as practicable. When undertaking working work activities, personnel should always aim to reduce environmental risk and waste. To do this personnel are required:-

- Identify the environmental management plans, requirements and constraints.
- Confirm any aspect of the environmental management plans that may be unclear.
- Apply and comply with the project environmental protection requirements of all tasks undertaken in and around the workplace.

Environmental protection requirements include:-

- Waste management.
- Noise management.
- Clean-up management.
- Environmental plans.
- Regulatory obligations.
- Environmental protection.



Figure:8.1

An Environmental management plan outlines the steps and processes required to prevent or minimize harm to the environmental through the use of machinery, equipment and potentially hazardous materials and substances.

It is necessary for all personnel to have a good understanding of the environmental management processes that must be used in and around the site.





Waste and clean-up management includes implementing methods of sorting waste into categories for recycling and correcting disposal. The plan will outline:-

- Disposal of site waste materials and rubbish
- Recycling waste materials
- Re-use of waste materials. Figure: 8.2

<b>Self-Check - 8</b>	<b>Written Test</b>
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Directions: Answer all the questions listed below.

1. What is the advantage of environmental protection applied for scaffolding work?

- A) Reduce environmental risk    B) Reduce waste
- C) A and B                    D) None

2. What is the requirement includes environmental protection for scaffolding work?

- A) Waste management.            B) Environmental plans
- C) Regulatory obligations        D) All

3. What is the environmental management processes frame for scaffolding work?

- A) Disposal of site waste materials and rubbish    B) Recycling waste materials
- C) Re-use of waste materials        D) All

**Note: Satisfactory rating – 3 points**

**Unsatisfactory - below 3 and 4 points**

You can ask you teacher for the copy of the correct answers.

### Answer Sheet

Score = _____
Rating: _____

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Name: \_\_\_\_\_

Date: \_\_\_\_\_



Short Answer Questions

### List of Reference Materials

#### REFERENCES

The following is a listing of the legislation, regulations and standards that apply to scaffolding.

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2. Instructional Scaffolding /to Improve Learning Northern Illinois University, Faculty Development and Instructional Design Center
3. Safety and health in construction /Copyright © International Labour Organization 1992 First published 1992
4. Scaffolding General Requirements /This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee BD-036, Scaffolding. It was approved on behalf of the Council of Standards Australia on 2 October 2009 and on behalf of the Council of Standards New Zealand on 5 March 2010. This Standard was published on 19 March 2010.
5. Training Requirements in OSHA Standards/Occupational Safety and Health Administration U.S. Department of Labor
6. Part 12 Scaffolds and Scaffold Platforms by Miosha education and training services July 10, 2017
7. Estimation and Planning Methodology for Industrial Construction Scaffolding By Chandan Kumar © Chandan Kumar Fall 2013 Edmonton, Alberta
8. CODE OF PRACTICE FOR ACCESS AND WORKING SCAFFOLD

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9. Health and Safety /Advice for Scaffolders CITB-  
ConstructionSkills NI Nutts Corner Training Centre 17 Dundrod Road Crumlin  
Co. Antrim BT 29 4SR
10. Erect & dismantle restricted height scaffolding
11. SUPPORT MATERIALS/ Published by: Australian Training  
Products Ltd
12. 13 .804 Study Guide
13. Introduction to scaffolding and working platforms/22216VIC –  
Certificate II in Building and Construction (Carpentry) Copyright LAPtek Pty. Ltd

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