



Carpentry NTQF Level II

Learning Guide #49

Unit of Competence: Install Lining, Paneling and Molding

Module Title: Installing Lining, Paneling And Molding

LG Code: EIS CRP2 M12 LO2-LG-49

TTLM Code: EIS CRP2 M12 TTLM 0919v1

LO 2 Prepare surface for lining/paneling and cladding



Instruction Sheet	Learning Guide #48
--------------------------	---------------------------

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics.

- Selecting Fixing procedures for specified lining materials
- Setting out Surface
- checking Timber frame and trimming or packing studs
- fitting and fixing Additional row/s of noggin to line,

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 –

- Select Fixing procedures for specified lining materials
- Setting out Surface
- check Timber frame and trimming or packing studs
- fitting and fixing Additional row/s of noggin to line,



Learning instruction

- ✓ Read the specific objectives of this Learning Guide.
 - ✓ Read the information written in the “Information Sheets 1”. Try to understand and familiarize what are being shown and discussed. Ask your teacher for assistance if you have hard time understanding them.
 - ✓ Accomplished and submit “Self-checks 1” for evaluation.
 - ✓ If you earned a satisfactory evaluation for "self-check 1" then proceed to “Operation Sheet 1”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Information Sheet 1.
 - ✓ Read the “Operation Sheet 1” and try to understand the procedures discussed.
 - ✓ Accomplish and submit “Operation Sheet 1” for evaluation.
 - ✓ If you earned a satisfactory evaluation for one "Operation Sheet 1" then proceed to the next “Information Sheet”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Operation Sheet where you get unsatisfactory evaluation.
 - ✓ Continue to the next “Information Sheet” and follow instruction for learning activities in “2-7”.
 - ✓ After all “Self Check” and “Operation Sheet” is accomplished and evaluated proceed to “LAP Test”.
- Your teacher will evaluate your output either satisfactory or unsatisfactory. If unsatisfactory, your teacher shall advice you on additional work. But if satisfactory you can proceed to the next topic.



Information Sheet 6

Selecting Fixing procedures for specified lining materials

6.1. Selecting Fixing procedures for specified lining materials

Surface preparation is the process of treating the **surface** of a substance in order to increase its adhesion to coatings. The single most important function that influences coating performance is the quality of **surface preparation**.

✓ **Surface Preparation**

The surface preparation process is used for clearing a surface of any:

- Pre-existing coatings
- Surface imperfections
- Residue
- Organic matter
- Oxidation
- Other contaminants

Methods of surface preparation include:

- Chemical cleaning (SSPC-SP1): Prior to using any method of surface preparation, it is essential to carry out chemical cleaning, which involves the removal of dirt, oil, grease and other foreign materials with organic solvents or detergents.
- Tool cleaning: This involves two types - hand tool cleaning (SSPC-SP 2) and power tool cleaning (SSPC-SP 3). Loosely adhering mill scale, rust and old paint coatings may be removed from steel by hand wire brushing, sanding, scraping and chipping. However, these methods are incomplete, and always leave a layer of tightly adhering rust on the steel surface. Power tools include rotary wire brushes, sanding discs and needle guns. Power tool cleaning is in general more effective and less laborious than hand tool cleaning for the removal of loosely adhering mill scale, paint and rust.



- High-low or Combinational Pressure Water Cleaning (SSPC-SP 12): Fresh water cleaning is always necessary to remove salts, fouling, any loose paint and other contaminants.
- Abrasive Blast Cleaning (SSPC-SP5 / NACE 1 from SSPC-SP11 / NACE 5): Blast cleaning is based on the principle of an abrasive jet of particles in a compressed air stream impinging on the surface, removing impurities, mill scale, rust and old paint. Abrasive blast cleaning is the most thorough and widely used method of surface preparation in the shipbuilding and repair industry.

Surface Preparation

Surface Preparation is a full line distributor of abrasives, replacement parts, equipment, and services for both industrial and commercial surface finishing needs. Our primary finishing technologies are:

- Abrasive Air Blasting
- Wheel Blasting
- Vibratory and Mass Finishing

Additionally, our expertise includes specialized and complementary areas of surface preparation such as:

- Shot Peening
 - Wet Blasting
 - Micro Blasting
 - Lapping and Grinding
 - High Energy Disc Finishing
-
- High Energy Barrel Finishing
 - Drag Finishing
 - Wastewater Treatment
 - Dust Collection
 - Painting/Coating



Surface Preparation is one of the largest surface finishing suppliers in the world. Our sixteen sales and service facilities located in the US and Canada provide convenient access to the largest and most complete inventory in the industry. Please contact us for help with your surface finishing application. We're looking forward to being of service.



Figure 1 surface preparation

- ✓ **Cladding** is the material used to treat a vertical surface. Brick cladding, Zinc **cladding** etc. **Facade** is the elevation of that whole wall itself including windows doors etc. ... To use both in a sentence the front **facade** has brick **cladding**.

Some of the more common types of cladding are described below.

- Curtain walling.
- Sandwich panels.
- Patent glazing.
- Rain screen.
- Timber cladding.
- Metal profile cladding.
- Tensile fabric coverings.
- Brick slips.



✓ What is interior wall cladding?

As the names suggest, **interior wall cladding** is about covering and **paneling** of **interior walls** with a different material, whereas exterior **cladding** entails covering of exterior **walls** of any building or property.

Paneling. ... If you have really dark **wood paneling** in your house, you **can** try to lighten it up with paint, but use a primer first because the dark stain tends to show through paint. Although **paneling** usually refers to **wood** covering on a wall, the word **paneling** is derived from panel, which originally referred to cloth.

Paneling. Paneling, also spelled panelling, in architecture and design, decorative treatment of walls, ceilings, doors, and furniture consisting of a series of wide, thin sheets of wood, called panels, framed together by narrower, thicker strips of wood.

Paneling (or paneling in the U.S.) is a millwork wall covering constructed from rigid or semi-rigid components. These are traditionally interlocking wood, but could be plastic or other materials. Paneling was developed in antiquity to make rooms in stone buildings more comfortable.

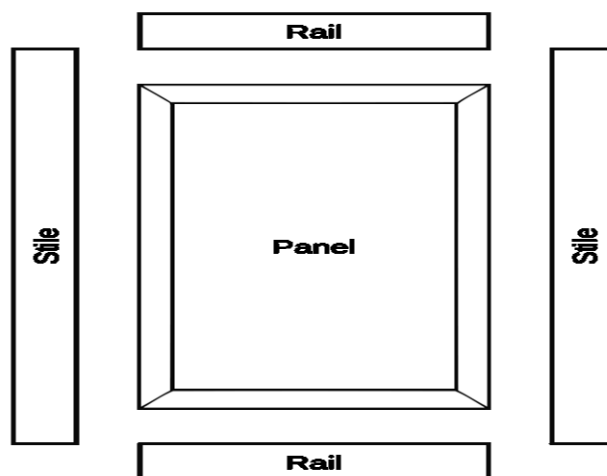


Figure 2 interior wall cladding



Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Multiple choices and write short answer

1. -----is the process of treating the surface of a substance in order to increase its adhesion to coatings.
 - A. Seasoning
 - B. Surface
 - C. Surface preparation
 - D. None

2. Write common types of cladding
 - I.
 - II.
 - III.

Note: Satisfactory above – 4 out of 8 points Unsatisfactory - below 4 out of 8 point



7.1 Setting out (laying out)

In order to begin digging the trenches required for a building's foundation, the builder must first transfer the lines and measurements indicated on his or her foundation plan to the building site. That is, the exact length, width, depth, and position of the foundation trenches must be marked on the ground.

This movement from the plan to the actual site is called setting out. It is probably the most critical step in the entire construction process.

The purpose of setting out is to provide necessary resources to enable the management of health and safety risks associated with undertaking excavation work or work in proximity to excavation work.

- ✓ Setting out of building. ... It is the process of developing the physical positions of corners and walls of a building, and it's done by transferring dimensions from the layout plan (also called as setting out plan, demarcation plan) to the ground.

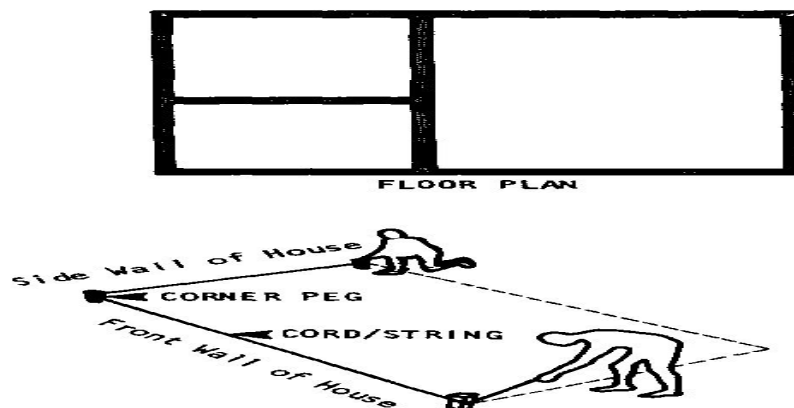


Figure 3 floor plan
Floor plan

A building that is set out accurately will be:

- level: no part of the floor or foundation higher than another;



- square: walls parallel and the same length;

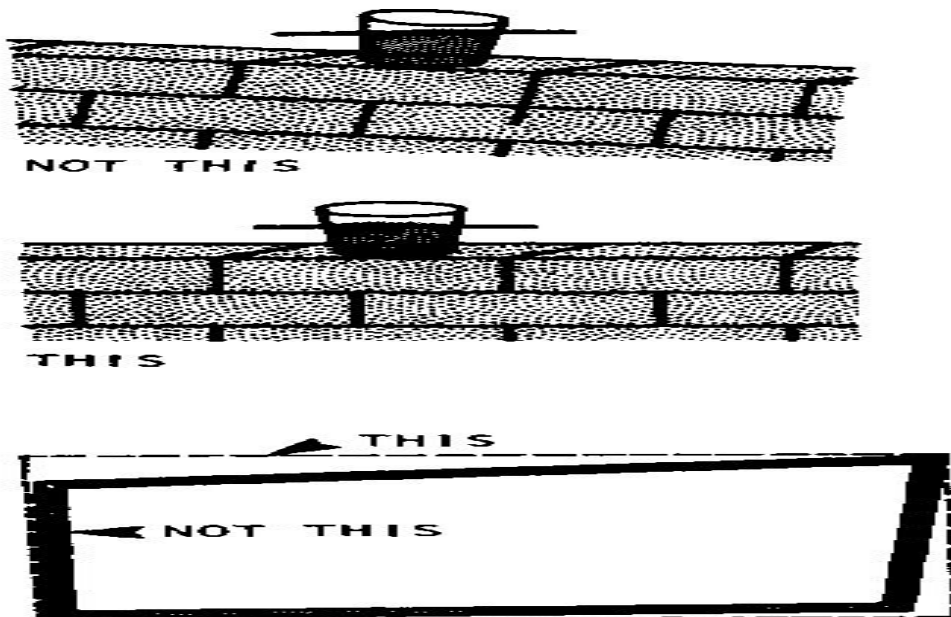


Figure 4 level

Level

- plumb: straight up and down, not leaning to one side or the other

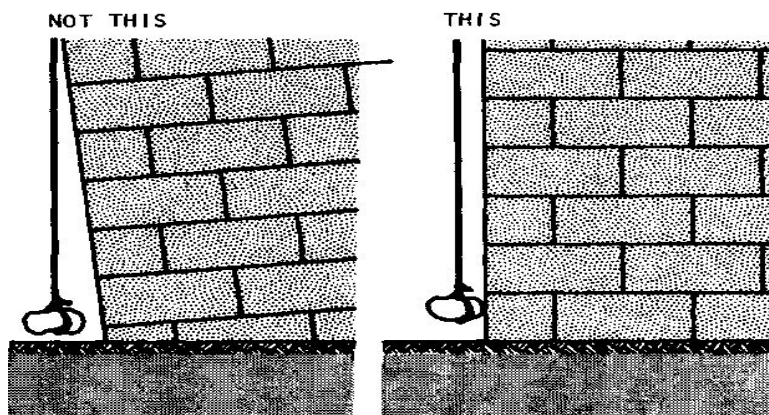


Figure 5 plumb

Plumb

A building that is set out carelessly will be difficult or impossible to construct according to plan. As a result, the finished structure may be expensive to maintain and unhealthful. So it is important to take special care when setting out.



There are three major steps to setting out:

- Orientation of the building on the site;
- Marking a simple outline of the building's foundation on the ground;
- Placing "batter boards" around the foundation outline and marking the position of inside walls, doors, and windows on the boards.

The tools shown on this page are needed to set out a building so that it will be level, square, and accurately measured.

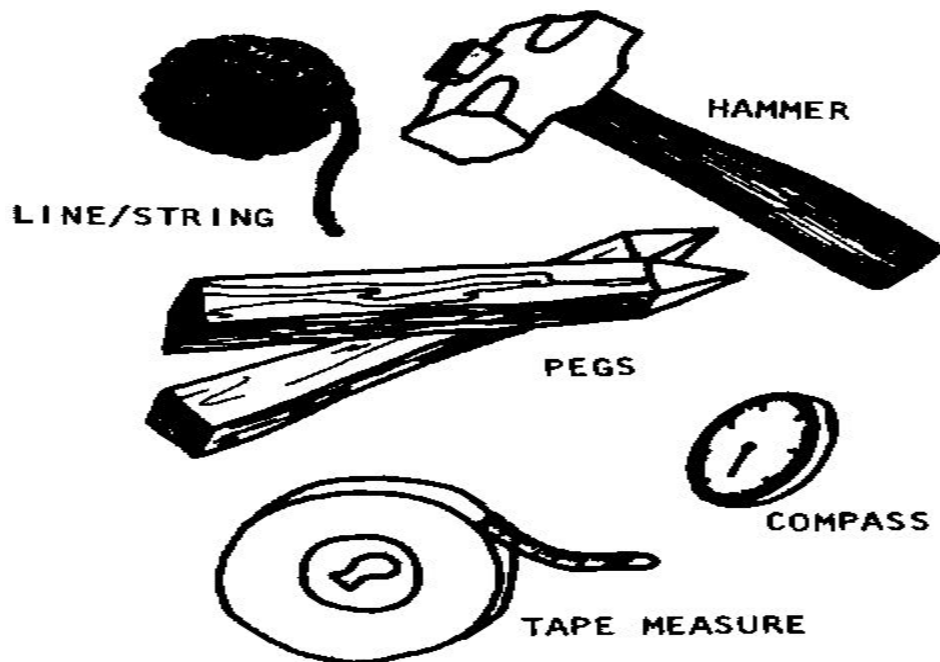


Figure 6 tape measure

Tape measure

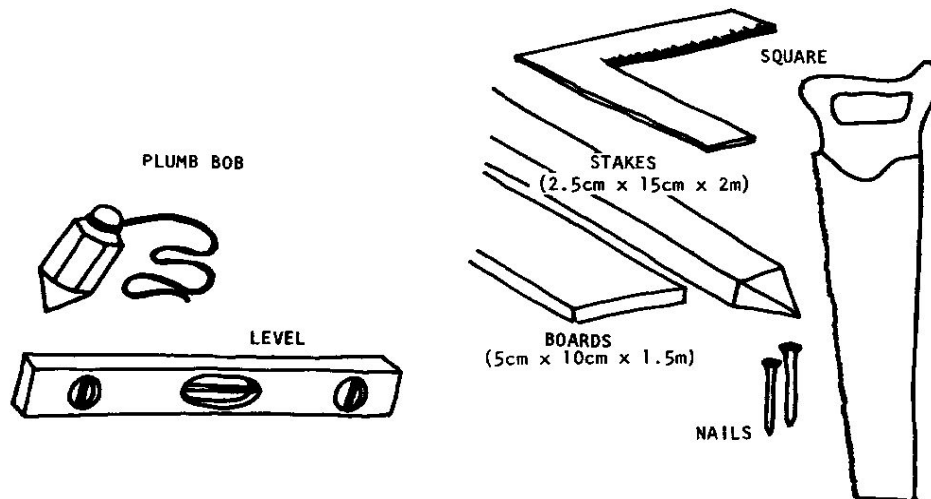


Figure 7 plumb bob

✓ Plumb bob

Orientation

The orientation of a building is the direction its front walls face: north, east, south, west or something in between.

To mark the orientation on the site, first find north. This is easiest with a compass. But if no compass is available, finding north is still fairly simple.

The builder should stand at the building position so that his/her right arm points at the spot where the sun rose in the morning while the left arm points to where the sun set the last night. In this position the builder will be facing north.

Standing in the same position, if the builder moves his/her arms so they form a straight line to the sides, they will be pointing due west (left arm) and east (right arm).

Once the main compass points have been established, use a stick to mark out the shape and position of the building. Add about 2 meters to the dimensions of the building on all sides: the extra space will be needed for supplies and work space during construction.

Next, clear the ground inside this area of trees, shrubs, and loose plant growth. If the topsoil is loose, clear away the top 15cm or so to get down to hard earth: loose soil will not support a building.

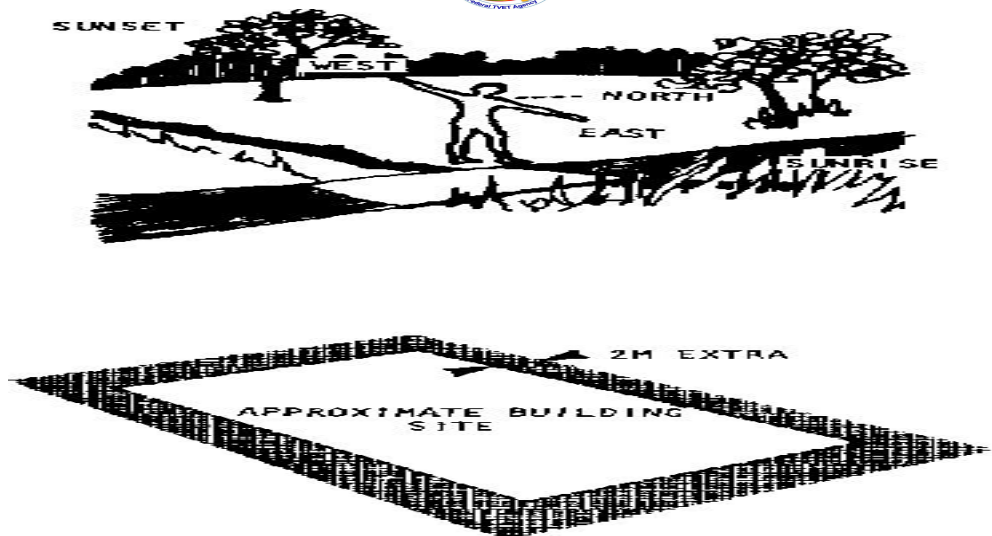


Figure 8 building site

✓ Approximate building site

If clearing the land at the position outlined proves too difficult, or if it would require felling trees that are desired for their shade or beauty, consider moving the building a short distance before clearing the land.

✓ **Marking the foundation outline**

The next step is to mark the outline of the foundation on the site using string and pegs.

Three measures are very important:

- * the length of each wall must be marked exactly;
- * the string must be exactly level;
- * the corners must be square: exactly 90°

The length of each wall is easy to set out on level ground. Simply measure it with a tape measure, making sure to pull the measure tight.

When the site is on uneven ground, care must be taken to measure the length of the wall along a level line: following the slope of the ground will throw off the measurements.

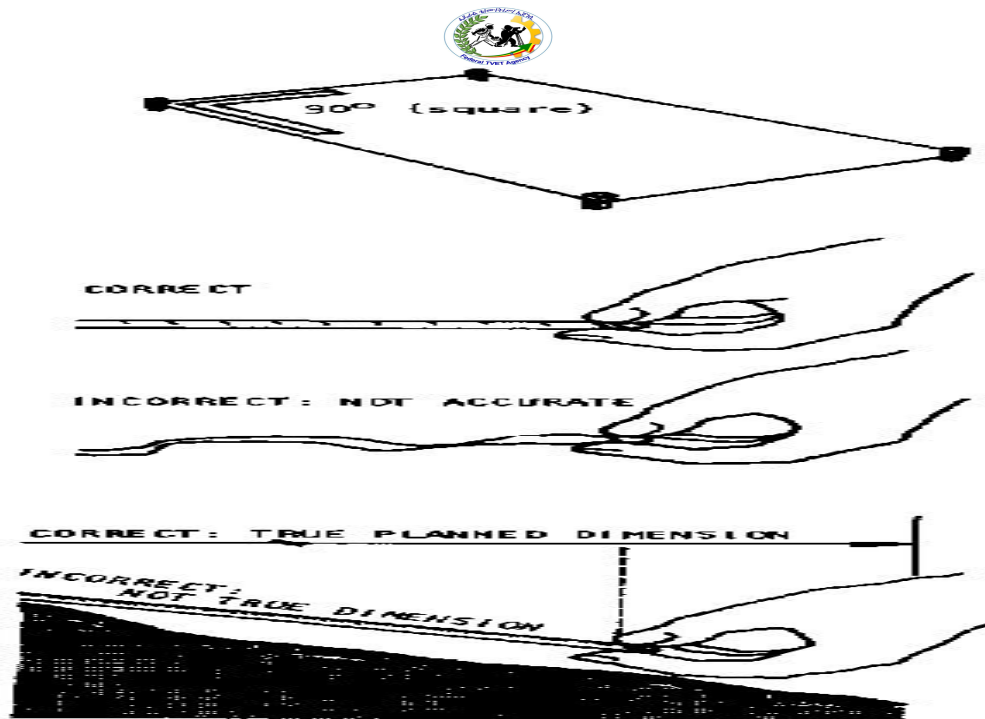


Figure 9 marking the foundation outline

✓ Marking the foundation outline

To prevent errors, begin at the highest end of the first wall's length and attach the string to a peg planted at the end-point. Set a new peg every 2 meters to prevent the string from sagging, and test to make sure the string is level by using a plumb bob and mason's square as shown: when the plumb bob stops swinging it will be plumb (straight up and down); the string will be exactly level when it is a 90° to the bob string.

Repeat this process until the length of string set out is equal to the planned length of the first wall.

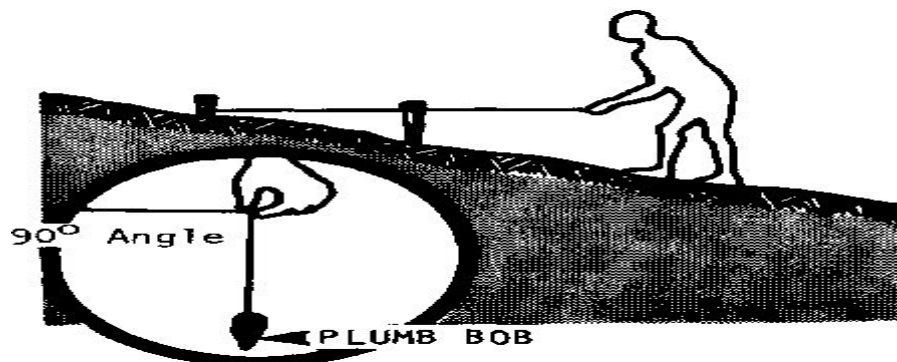


Figure 10 plumb bob

✓ Plumb bob



If the ground is sloped very steeply, it may be easier and more accurate to measure the wall's length in steps or stages. To do this run a new length of string from the bottom of every second peg (that is, every 4 meters). Test with a plumb bob to be sure that every peg is straight up and down. In addition, to be sure there are no gaps or overlaps in the measurement of each new stage, plant a small block with a circle on it right next to every other peg: then in measuring the next stage (or step) along the wall, hold the tape measure to the point in the circle that marks the end of the last stage.

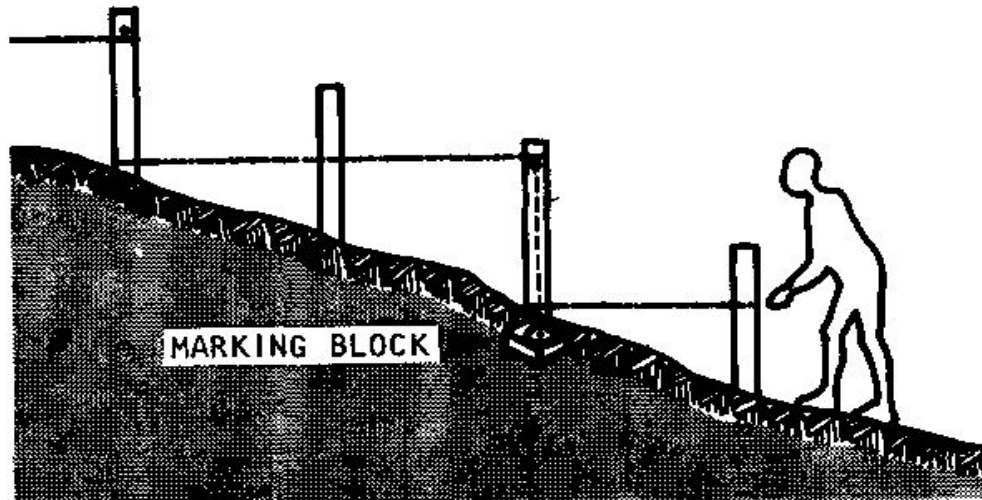


Figure 11 marking block

✓ Marking block

Once the first wall has been set out, the second wall should be set out at right angles to it (90°). There are several ways to make sure that this angle, and the angles between all the walls set out are square:

- A mason's square is good for distances up to 3 meters. Use it to get started, but don't use it to check the entire outline.
- One of the easiest and most accurate methods of checking large distances for squareness is to compare the diagonals. Simply measure the diagonal lines from opposite corners of the foundation. When they are exactly equal in length, all the angles will be 90° . On uneven ground, be sure to use the tape measure along a level line'
- If measuring the diagonals is inconvenient, or if the building is not a simple rectangle, another method is the 3-4-5 calculation:

If the wall on one side of a right angle is 3 units long and the wall on the other side is 4 units long, a line drawn between their ends will always be 5 units long. Here's how to use this rule to test whether the angle between two walls is square: Along the string set out for one wall, measure and mark off 1.5 meters ($3 \times .5\text{m}$). Then, along the string set out for the second wall, measure and mark off 2 meters ($4 \times .5\text{m}$). Next, measure and cut a piece of string 2.5 meters long ($5 \times .5\text{m}$) and hold its ends to the points marked off along each wall. When the 2.5 meter string just touches both marks with no slack left



over, the angle between the two wall strings will be exactly square. If the 2.5 meter string is too short or long, adjust either one of the wall strings until it fits exactly.

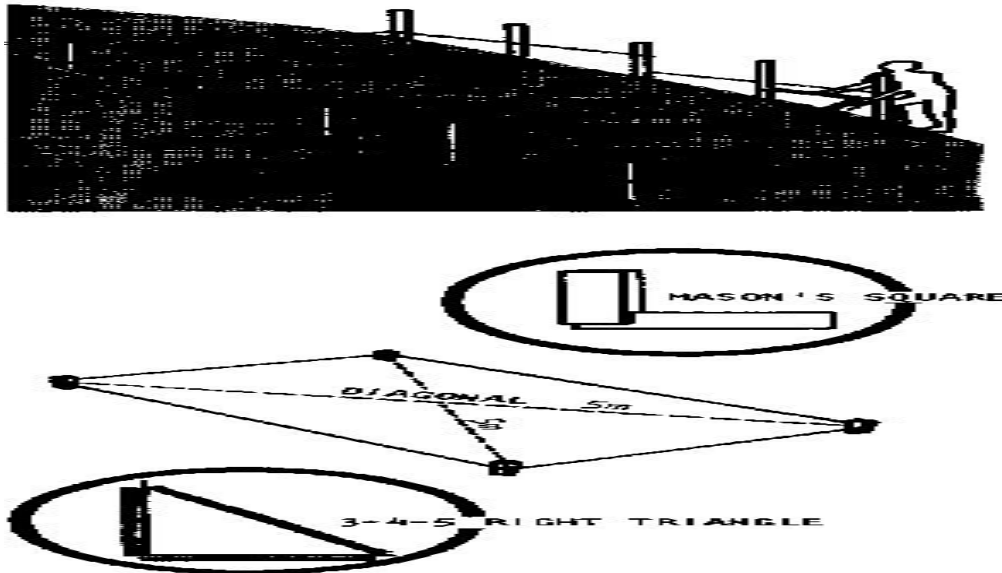


Figure 12 marking

✓ Mark

Marking the inside foundation lines

Once the outside walls of the foundation have been set out with pegs and string, the next step is to set out a second set of lines to mark the inside of the foundation walls. Use the same procedures to keep them level, accurate in length, and square.

The easiest way to begin is to measure the width of the foundation wall and mark it along the strings set out for two opposite walls. Then set out a string between these two points and fasten the ends with pegs. Use a plumb bob to be sure each peg is directly beneath the outside foundation line.

Next, repeat this process for each of the remaining walls. Place a peg at every point where the new lines cross: these are the inside corners of the foundation walls.

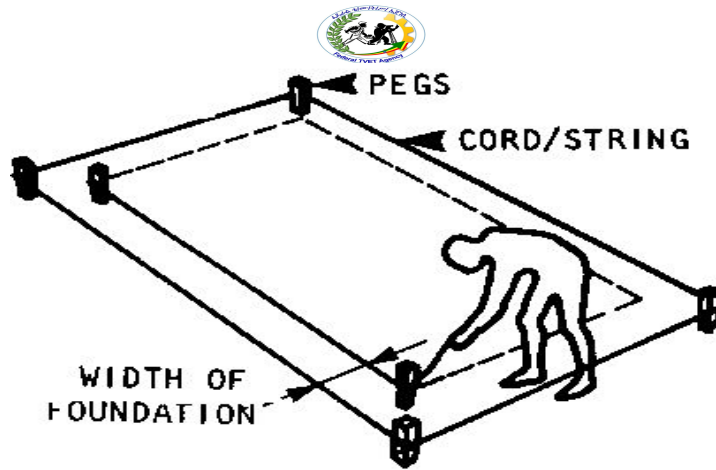


Figure 13 width foundation

Width of foundation

✓ **Batter boards**

Batter boards are like a single rail fence placed around the building position. They should be placed after the foundation lines have been set out and before any digging for construction begins. Batter boards are essential for two reasons:

- They provide permanent reference points for the position of the foundation walls: these will be needed once the string markings have been removed during construction;
- They can be used to measure and mark off the exact position of doors, windows, and floors, thus making it much easier to build the walls accurately.

To be useful, batter boards must be exactly level and should be set about 1 meter back from the string marking the outside foundation line.

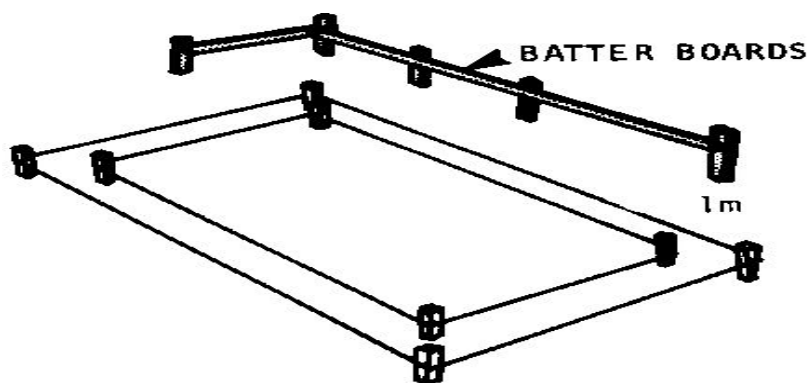


Figure 14 batter boards

Batter boards



✓ placing batter boards

To place batter boards around the building position, first find the highest point on the site about 1 meter outside the outer foundation line and place a wooden stake firmly in the ground.

Nail the first board to this stake so that the top of the board is at least as high as the top of the foundation walls will be. Since the foundation walls must be as high as the floor, this will be at least 20-30cm. above the ground.

Next, place a second stake 2 meters from the first and 1 meter outside the outer foundation line. When this stake is secure, nail the other end of the first batter board to it, taking care that the batter board is level. Nail a second board to this same stake and repeat the process of placing new stakes, leveling, and nailing the boards, until the batter boards form a fence that goes completely around the building position.

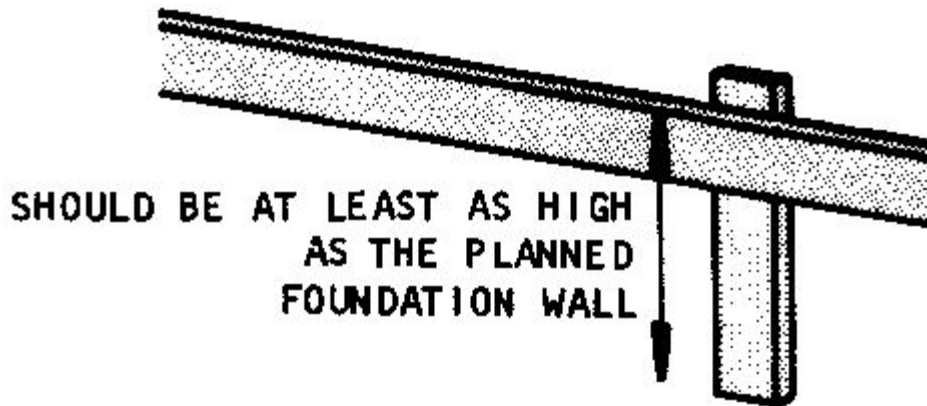


Figure 15 batter boards

Placing batter boards

✓ How to level batter boards

A commercially made "spirit level" is the easiest leveling device to use. Place it on the surface - in this case the top edge of the batter board - and keep adjusting the height of the board at the opposite end until the bubble is in the center.

When joining boards at stakes, place the level over the seam of the board to maintain a continuous level line.



An additional check on level can be made at the corners: use an extra board to provide a surface for the level.

Another method is to use a water level: this is a clear plastic hose that is filled with water, Adjust the first end of the hose to a known level mark. When the other end of the hose is placed at the next stake, the water inside will be at the same level as at the first end. To prevent spillage the ends may be plugged until the hose is in position, But all plugs must be removed to get an accurate measurement.

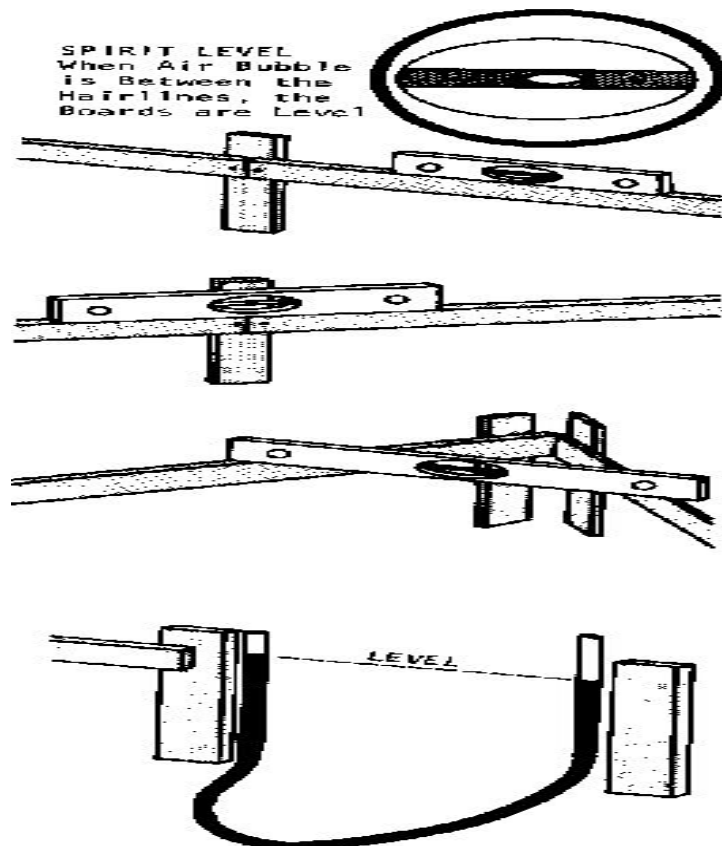


Figure 16 the way of level batter boards

How to level batter boards

✓ Transferring marks to batter boards



Once the batter boards are complete, all the measurements shown on the written foundation plans should be marked on the boards.

First, transfer the foundation lines marked by the strings set out earlier: run a string from one board to the opposite board directly over each foundation line. Use a plumb bob to make sure this new string is over the corner pegs.

Next, place nails or saw cuts in the tops of the boards where they intersect the strings.

A good system is to use different marks for the foundation lines than those to be used for other important measures such as wall lines and the positions of doors and windows. For example, use small notches cut with a saw to indicate the foundation lines. Then use nails to indicate the wall lines.

Once the foundation lines and wall lines have been marked on the batter boards, the builder is ready to start digging the foundation trenches. Note: the digging will be easier if the strings are left in place until the trenches have been well started.

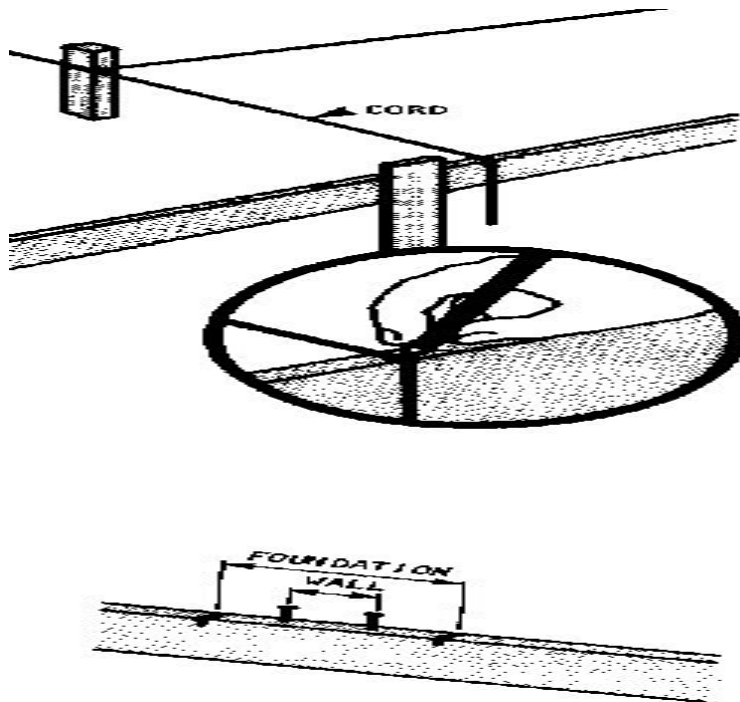


Figure 17 transferring marks to batter boards

Transferring marks to batter boards

Self-Check -2	Written Test
---------------	--------------



Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What is the purpose of setting out?

Note: Satisfactory above – 4 out of 8 points Unsatisfactory - below 4 out of 8 point



8.1 checking Timber frame and trimming or packing studs

A timber frame is a load-bearing wooden structure, held together with mortise and tenon joinery. ... Timber frames are cut so that their ends fit together like a puzzle, and the joinery is held fast with wooden pegs.

Traditional timber framing is the method of creating framed structures of heavy timber jointed together with various joints, commonly and originally with lap jointing, and then later pegged mortise and tenon joints. Diagonal bracing is used to prevent "racking", or movement of structural vertical beams or posts.

How to Prevent Wood Checking

1. Remove the bark with a hatchet or a draw-knife if it's already loose, to discourage damage from insects that live under the bark. ...
2. Coat the exposed end grain of the logs or boards with a thick layer of paint, varnish or a commercial green-wood sealer to prevent moisture from escaping too quickly.

Splits and **cracks** (known as 'checks' in the industry) occur when **wood** shrinks as it dries. **Wood** shrinks roughly twice as much along the growth rings (radially) as it does across the rings (tangentially)—and it is this uneven shrinkage that causes checks to develop.



Figure 18 timber framing



8.1.1 Trimming or packing studs

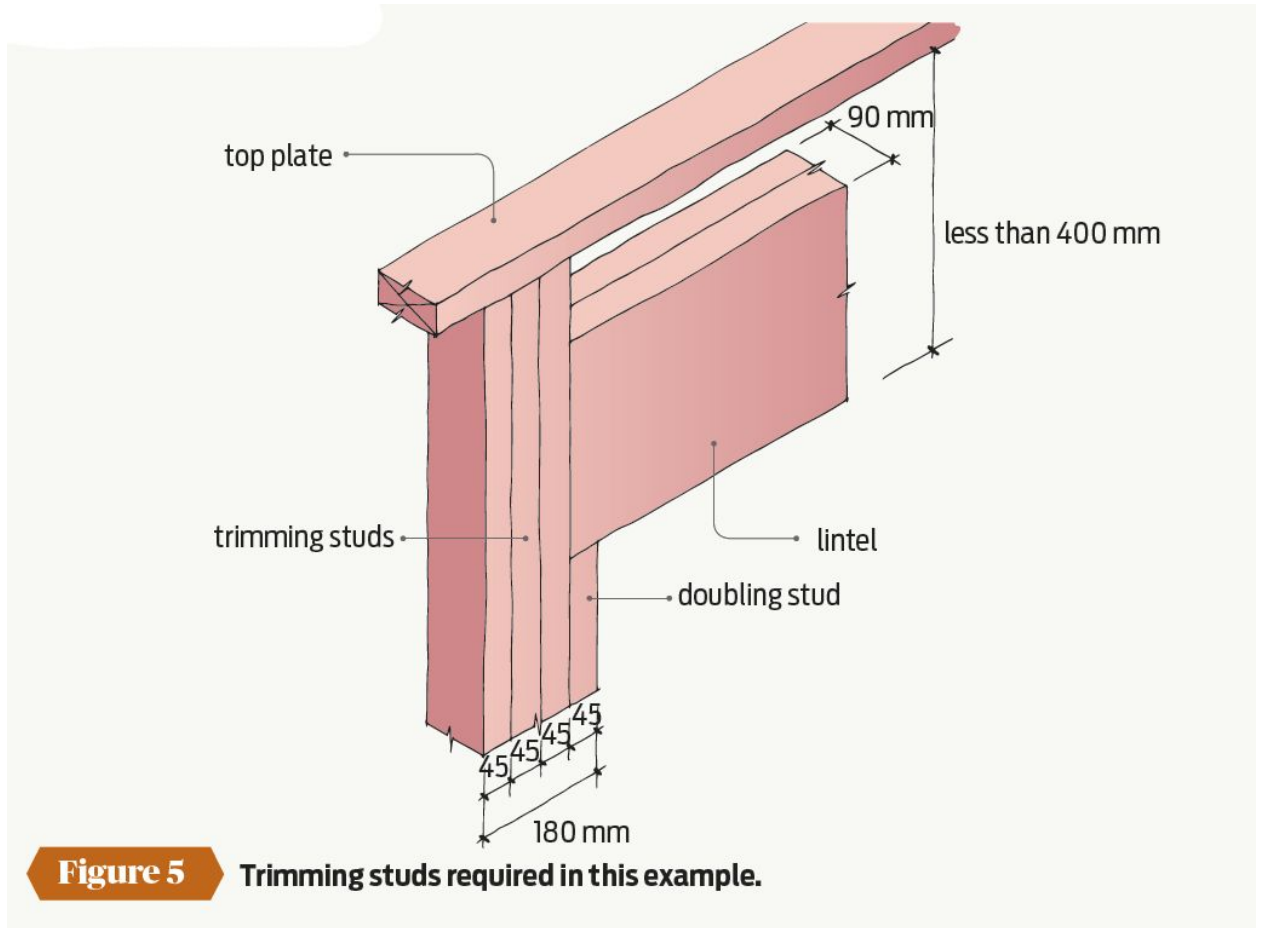


Figure 19

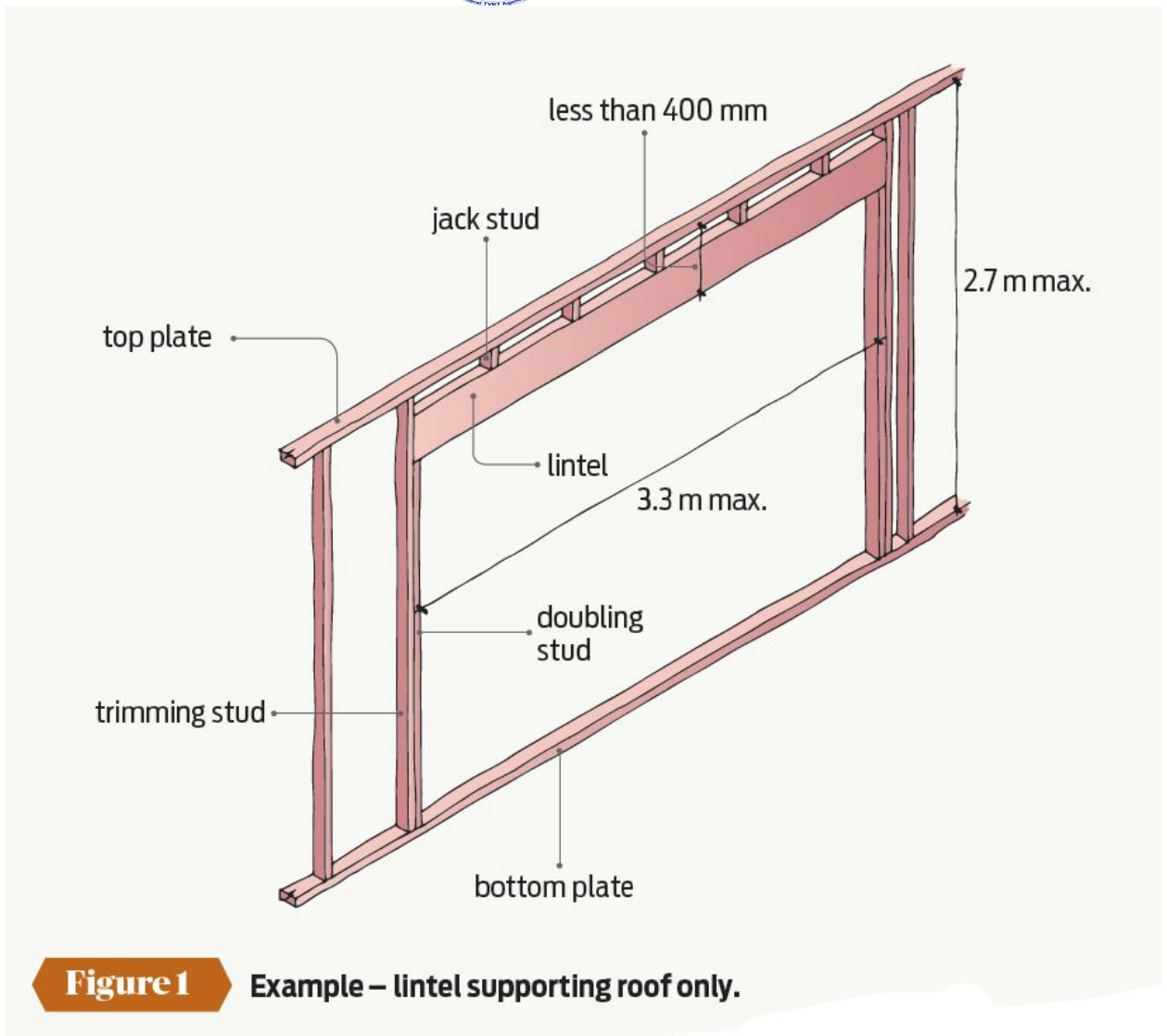


Figure 20



Self-Check -3	Written Test
----------------------	---------------------

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What is timber framing?

Note: Satisfactory above – 4 out of 8 points Unsatisfactory - below 4 out of 8 point

Information Sheet 9	fitting and fixing Additional row/s of noggin to line,
----------------------------	--

9.1 fitting and fixing Additional row/s of noggin to line,

The best material to use for **noggins** is rough 6" x 1" (150mm by 25mm) treated wood. The **noggins** are not visible so you do not need planed wood, which is more expensive.

✓ What is the purpose of noggins?

A noggin (or occasionally **noggin**) is a strut used to give rigidity to a framework, fixed between joists or studs to their increase strength and stiffness. They are commonly used to brace floors or to stiffen timber stud frames.

✓ What height are noggins?

They are there to prevent the studs bowing under the load or warping. It is important that they fit exactly into the space. Maximum spacing between noggins and top and bottom plates is 1350mm. For walls up to 2.74m high a single **noggin** meets the standards.

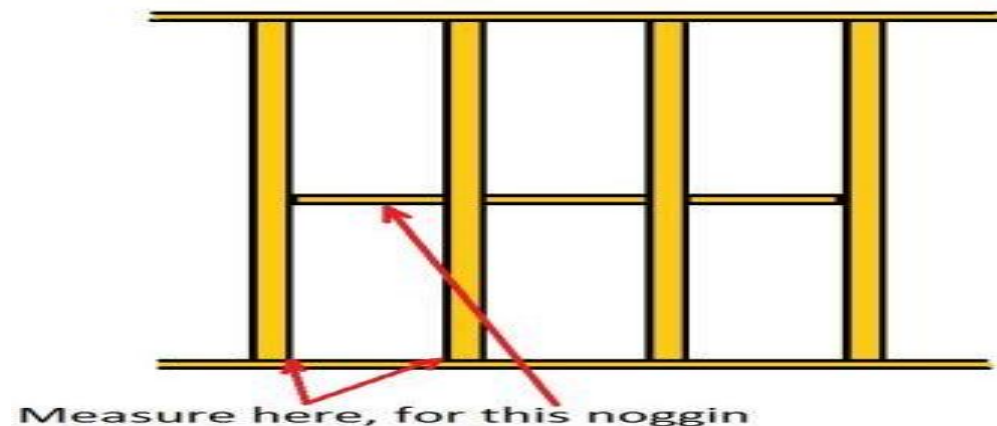
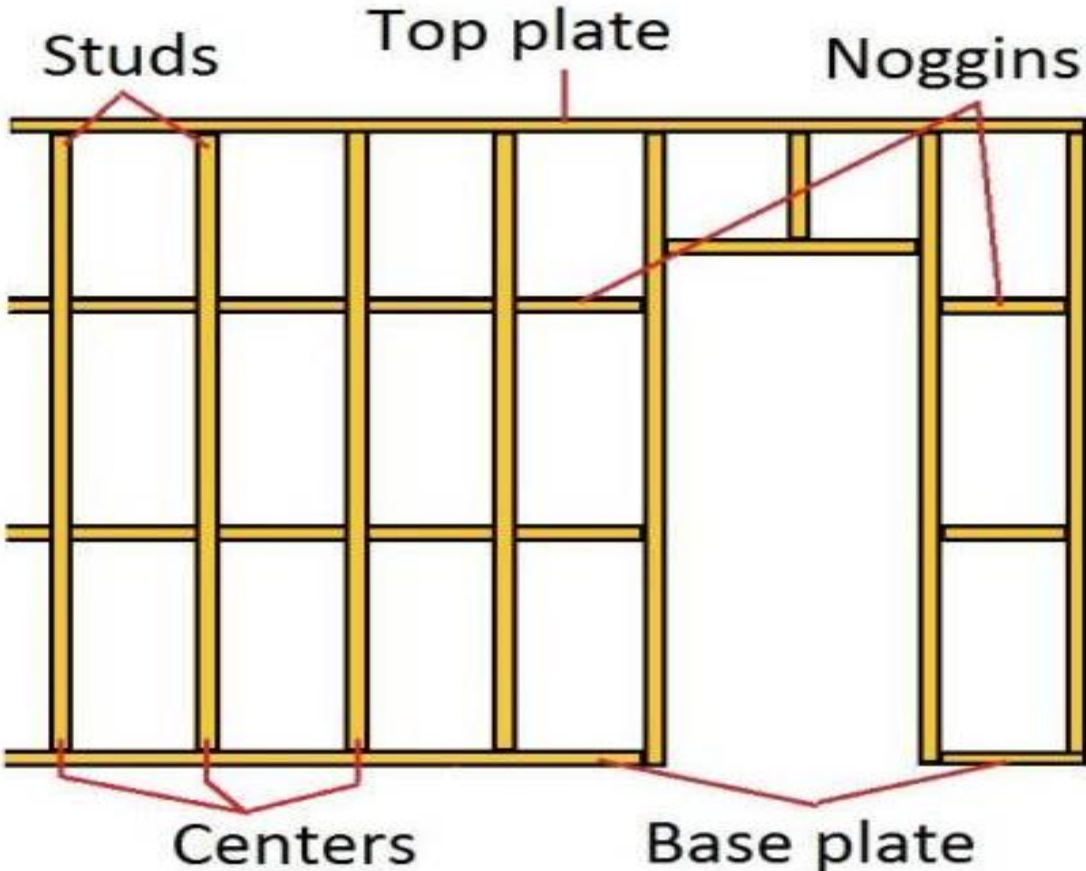


Figure 21 height of noggin

TTLM : door and window	TVET Program: carpentry	Page 27
	Author: FTA	



Self-Check -4

Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Write the importance of noggin?

Note: Satisfactory above – 4 out of 8 points Unsatisfactory - below 4 out of 8 point

TTLM : door and window	TVET Program: carpentry	Page 29
	Author: FTA	

List of Reference Materials

- https://www.ccaa.com.au/imis_prod/documents/Library Documents/C
- <https://www.houselogic.com/remodel/painting-lighting/concrete-painting/>
- <https://www.google.com/search?sxsrf=ACYBGNQHUi0Oo5VLVWER8HU5E4Hiyr5yWw:1569940933971&q=what+is+Applying+co>

TTLM : door and window	TVET Program: carpentry	Page 30
	Author: FTA	

The trainers prepare TTLM

No	Name	Region	Qualification level	TVET College	Phone number
Zeyede Tekle	B	Dire dawa	DDPTC	0921153259	zedjesus22@gmail.com
Yibeltal Shitie	B	Amhara	MOTTA PTC	0912455288	yibecon2019@gmail.com
Mihiretu Hambisa	B	Oromia	NEKEMTIE PTC	0910195546	mihambi@gmail.com
Tariku W/Agegne	A	SNNP	DILAPTC	0916512167	mamush572@gmail.com
Fikrie Shiferaw	A	Somale	JIGjigaPTC	0913294412	shiferawufikre@yahoo.com

Facilitator

No	Name	Region	TVET Bureau	Email & phone number	Phone no
1	Tilahun Tesfaye	Amhara	Amhara TVED Bureau	Tilahun tesfaye eewnetu@gmail.com	0940651823
2	Abere Dagnaw	Amhara	Amhara TVED Bureau	Aberedagnaw10@gmail.com	09 18 1 41 11

3	Abdulahi Muktare	Somale	Somalia TVET Bureau		0935635068
---	---------------------	--------	---------------------------	--	------------