



Bar bending & concreting

LEVEL II

Learning Guide-22

Unit of Competence: Prepare for stone masonry

Construction process

Module Title: Preparing for stone masonry

Construction process

LG Code: EIS BBC2 MO7 LO1-LG-22

TTLM Code: EIS BBC2 TTLM 0919v1

LO 1: Plan and prepare



Instruction Sheet

Learning Guide #22

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

- 1.1. Plan/working drawing interpretation
- 1.2. Identifying and applying necessary requirements
 - Safety requirements
 - Regulatory requirements
 - Environmental protection
- 1.3. Types, characteristics and uses of materials, tools and equipment
- 1.4. Calculating materials quantity requirements
- 1.5. Measuring tools & equipment
- 1.6. Materials handling and storage

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:

- Obtain, confirm and apply Work instructions, including plans, and specification
- Follow Safety (OHS) requirements in accordance with safety plans and policies.
- Identify and implement signage and barricade requirements.
- Check and report for serviceability of plant, tools and equipment
- Calculate Material quantity requirements
- Identify appropriate Materials to the work
- Identify and apply Environmental requirements

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described in number 3 to 7.
3. Read the information written for each “Information Sheets given below
4. Accomplish the “Self-check after reading & understanding of each information sheet
5. If you earned a satisfactory evaluation from the “Self-check” proceed to “Operation Sheet
6. Lastly do the “LAP test If you have any question ask your teacher



Information Sheet-1	Plan/working drawing interpretation
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1.1. Plan/working drawing interpretation

- ✓ interpret drawings to establish the location, shape and size of the masonry structure to be set out drawings: block plans, site plans, general location, assembly, sectional, details, orthographic projection (first angle), isometric projection
- ✓ check specifications and schedules for conformity of setting out information
- ✓ check that information sources comply with British Standards
- ✓ record discrepancies in information relating to setting out
- ✓ report discrepancies to an authorized person
- ✓ produce a work method statement to establish all aspects of the setting out process
- ✓ prepare construction sites for setting out activities
- ✓ produce a checklist of resources required to prepare construction sites for site clearance activities
- ✓ carry out walk-over survey to establish site conditions
- ✓ record results of walk-over survey
- ✓ use results of walk-over survey to establish site clearance requirements: site planning, positioning of resources, removal of obstacles on site, hedges and tree tops, flat and sloping sites, demolition and surface strip, types of soil including property of top soil
- ✓ carry out calculations required for site clearance activities: materials by volume, areas, perimeter, quantities, costings, mid-girth, measuring skills to set out and check dimensions, percentage for wastage/bulking.



- **Select resources for setting out work**

- ✓ produce a checklist of resources required to carry out setting out activities: ordnance survey map, site plan, block plan, working drawing, compass, ranging lines, builder's square, timber for pegs and profiles, measuring tapes, water level, spirit level, straight edge, optical squaring equipment, hand tools (hammers, saws), optical laser level, optical level
 - ✓ select resources for setting out masonry structures to required accuracy
 - ✓ carry out calculations required for setting out activities
 - ✓ carry out checks on resources to be used for setting out checks: on equipment for accuracy, maintenance and adjustment
 - ✓ accurately locate the position of the building line using the site datum(s) and temporary bench mark (protect by triangular wooden frame and surround in concrete)
- 3.6 accurately locate the position of the site datum point

- **Set out regular-shaped masonry structures on level ground**

- ✓ accurately locate position of setting out from block plan, site plan and north point.
- ✓ accurately establish corner positions along building line
- ✓ accurately set out right-angled corners.
- ✓ construct single wall and corner type profiles
- ✓ mark walling and trench positions onto single wall and corner type profiles. transfer levels from given datum heights
- ✓ use hand tools to facilitate setting out operations
- ✓ check dimensional accuracy of setting out from information and specifications applying industrial standards.

- **Dimensional accuracy**

- ✓ Building/frontage line is set out as indicated on drawing
- ✓ Corner points of building are established as indicated on drawing ± 5 mm
- ✓ Building set out square, with diagonal measurements.



- ✓ Foundation trench and walling positions transferred onto profiles, as required on drawing
- ✓ Transfer datum points by spirit level and straight edge, within a tolerance of 5 mm in any 10

Self-Check 1	Multiple Choice Item
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Directions: Select the correct answer and encircle the letter of your choice.

1. Interpret information to establish setting out implies :
 - A. Interpreting drawings to establish the location
 - B. shape and size of the masonry structure
 - C. Reporting discrepancies to an authorized person
 - D. All
2. Preparing construction sites for setting out activities includes:
 - A. producing a checklist of resources required
 - B. preparing construction sites for site clearance
 - C. Establishing site conditions
 - D. All
3. In dimensional accuracy:
 - A. Building/frontage line is set out as indicated on drawing
 - B. Corner points of building are established as indicated on drawing
 - C. Building set out square, with diagonal measurements
 - D. All

Note: Satisfactory rating - 2 points Unsatisfactory – below- 2points

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

Answer Sheet

Score = _____

Rating: _____



Information Sheet-2	Identifying and applying necessary requirements
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1.2. **Identifying and applying necessary requirements**

- **Safety requirements**

Site is a permanent working place for masons, concrete workers and others. Masons and concrete workers are working for longer times in construction sites. Due to the nature of their trade while finishing workers like plasterer tile painter and other finishing workers are on site during finishing work stages of the construction process so that they are short time workers.

Working place or area is whole building/construction/ site including equipment, machines, storerooms, etc. Within the general working place there is a personal working area /space/, where someone is building up a wall or other related activities. Working space is essentially required for all construction workers, to accommodate materials and equipment's for the process; therefore, it is a crucial and necessary to keep them all in proper manner.

A neat and tidy site saves time, eases the work and avoids accidents. If things like tools, battens, boards, stones, cables, steel bars etc. are not used or kept improperly they are obstacles for the construction process and can be the cause for accident.

Every year, there are a number of accidents from using work equipment, including machinery. Many are serious and some are fatal. This hand out (leaflet) gives simple, practical advice on what you can do to eliminate or reduce the risks from work equipment.

It covers all workplaces and situations where the health and safety at work etc. It is mainly for those who have responsibility (directly or indirectly) for work equipment and how it is used. If you are an employer, a manager, a supervisor or hire out equipment for use in the workplace, this hand out (leaflet) will help you understand what you can do to reduce the chances of an accident happening.

Accidents not only cause human suffering, they also cost money, for example in lost working hours, training temporary staff, insurance premiums, finance and managers' time. By using



safe & well-maintained equipment operated by adequately trained staff, you can help prevent accidents and reduce these personal and financial costs.

For some operations you will need more detailed information. If you wish to build, modify or add equipment (for example to a production line) you will probably need to seek advice from competent engineer or equivalent person who is aware of the relevant Ethiopian standards and requirements. If you would like more information on the law, or on other publications which give you more guidance on selection, protection measures and the safe use of particular types of machinery or other work equipment

- **Types of Safety**

- ✓ personal safety:

- Always wear appropriate safety clothes.
 - Do not attempt to dismantle the machine unless you switch off the electric power.
 - Remove your watch, rings etc before performing maintenance activity.

- ✓ **Machine Safety:**

- Never attempt to dismantle the machine until you have been instructed properly.
 - Switch off the electric power before dismantling the machine.
 - Use proper hand tools to dismantle the machine.
 - Clean the machine parts before and after dismantling.
 - Place the dismantled machine parts in proper sequence and easy for assembly.
 - Never attempt to carry heavy machine parts alone.

- ✓ **Workplace Safety**

- i. Keep all tools clear of a work table.
 - ii. Change coolant, fluid before it becomes contaminated.
 - iii. Wipe up all spilled coolants from the floor around the machine right away

- **Regulatory requirements**

This implies the rules and regulations of the work place like

- First aid kit
- Fire extinguisher

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- Posters etc.

Regulatory Requirements means all applicable approvals, licenses, registrations (including but not limited to, the Registrations), and authorizations and all other requirements of each applicable Regulatory Authority in relation to the Products, including, but not limited to, each of the foregoing which is necessary for, or otherwise governs, the Manufacture, handling, use, storage, import, transport, distribution or sale of Products.

Regulatory Requirements means the laws, rules and regulations on a national, state and local level that apply directly or indirectly to the delivery of Services under the Engagement Schedule.

Regulatory Requirements means all applicable federal and state statutes, regulations, regulatory guidance, judicial or administrative rulings, requirements of Governmental Contracts and standards and requirements of any accrediting or certifying organization, including, but not limited to, the requirements set forth in a Product Attachment.

- **Environmental protection**

Environmental protection is the practice of protecting the natural environment by individuals, organizations and governments. Its objectives are to conserve natural resources and the existing natural environment and, where possible, to repair damage and reverse trends to Protect the environment directly and in directly from dangerous happenings by:

- Work man design
- Effective collecting of wastage
- Recycling process
- Minimization of extravagancy



Fig 1.1 Environmental protection



Self-Check 2	Choice Item
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Directions: Select the correct answer and encircle the letter of choice.

1. Site is a permanent working place for:
A. Mason
B. concrete workers
C. Tilers
D. All are correct
2. Who is responsible for Environmental protection?
A. Individuals
B. Organizations
C. Governments
D. All are correct
3. Which of the following safety type is best for the site?
A. personal safety
B. Machine Safety
C. Workplace Safety
D. All are correct
4. What is regulatory Requirements?
A. Regulations
B. Guidance rulings
C. Administrative
D. All are correct
5. Environmental protection is the practice of protecting the natural environment.
A. True
B. False

Note: satisfactory rating-2.5 points Unsatisfactory-below 2.5.points

You can ask your teacher for the copy of the correct answers

Score _____
Rating _____



Information Sheet-3	Identifying and ,applying types, characteristics and uses of materials, tools and equipment and necessary requirements.
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1.3. Identifying, applying types, characteristics and uses of materials, tools and equipment necessary requirements.

Masonry is the craft of shaping rough pieces of rock into accurate geometrical shapes, at times simple, but some of considerable complexity, and then arranging the resulting stones, often together with mortar, to form structures.

Stone Masonry. The construction of stones bonded together with mortar is termed as stone masonry where the stones are available in an abundance in nature, on cutting and dressing to the proper shape, they provide an economical material for the construction of various building components such as walls, columns, footings.

1.3.1. A good building stone should have the following qualities.

- **Appearance**

For face work it should have fine, compact texture; light-colored stone is preferred as dark colors are likely to fade out in due course of time.

- **Structure**

A broken stone should not be dull in appearance and should have uniform texture free from cavities, cracks, and patches of loose or soft material. Stratifications should not be visible to naked eye.

- **Strength**

A stone should be strong and durable to withstand the disintegrating action of weather. Compressive strength of building stones in practice range between 60 to 200 N/mm².

- **Weight**

It is an indication of the porosity and density. For stability of structures such as dams, retaining walls, etc. heavier stones are required, whereas for arches, vaults, domes, etc. light stones may be the choice.

- **Hardness**

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This property is important for floors, pavements, aprons of bridges, etc.

- **Toughness**

The measure of impact that a stone can withstand is defined as toughness. The stone used should be tough when vibratory or moving loads are anticipated. Porosity depends on the mineral constituents, cooling time and structural formation. A porous stone disintegrates as the absorbed rain water freezes, expands, and causes cracking.

- **Fire-resistance**

Stones should be free from calcium carbonate, oxides of iron, and minerals having different coefficients of thermal expansion. Igneous rock show marked disintegration principally because of quartz which disintegrates into small particles at a temperature of about 575°C. Limestone, however, can withstand a little higher temperature; i.e. up to 800°C after which they disintegrate.

1.3.2. Common Masonry Tools used in Masonry Construction

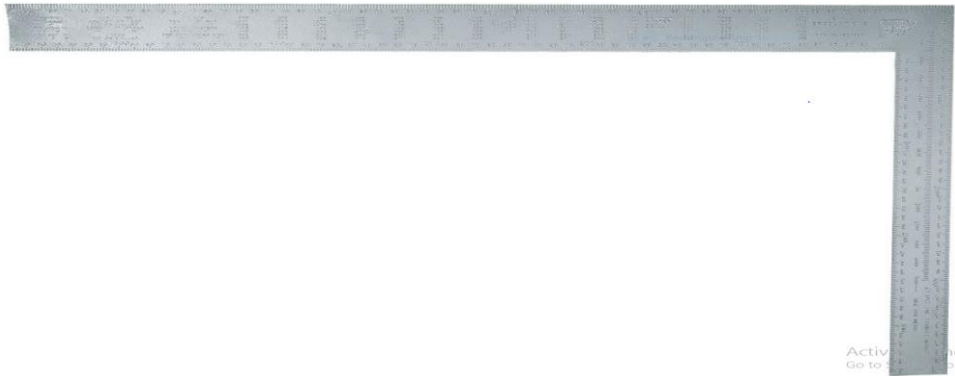
- ✓ **Trowel**

It is made up of steel. Wooden/plastic handle is provided for holding. The ends of trowel may be bull nosed or pointed. This is used to lift and spread mortar in joints during masonry construction. There are different kinds and sizes of trowels used in masonry work.



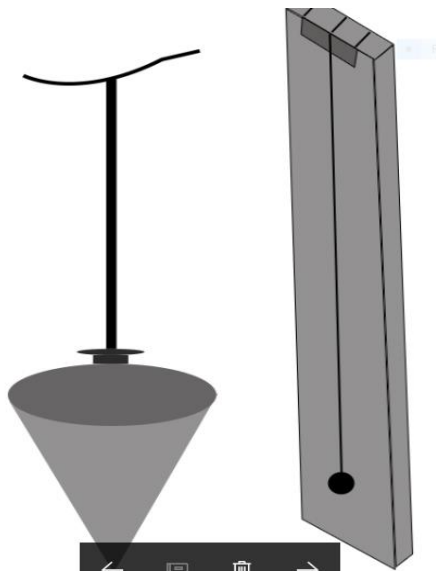
- ✓ **Setting Out Square or Mason Square**

It is used to set out right angles at the corner of masonry wall. This is very important and basic tool used in masonry work. This tool has “L” shape. It is made of flat steel having each arm about 0.5 m long.



✓ Plumb Rule and Bob

It is used to check the verticality of walls. It is also very basic and important tool. It consists of a string tied to a weight at bottom called bob and straight wood board with uniform edges which is called plumb rule. On its center a groove is provided in which plumb bob is placed. When the rule is placed vertically with the wall the plumb bob must be in the groove line otherwise the wall will not be vertical.



✓ Spirit Level

It is used to check the horizontality and verticality of the surfaces. Spirit level is made of hard plastic or wood with bubble tube in the middle. The bubble tube is partially filled with alcohol. So that, the air bubble is formed in it. The spirit level is placed on surface of masonry wall and bubble is checked. The surface is called leveled when the bubble in the tube settles at middle of tube.



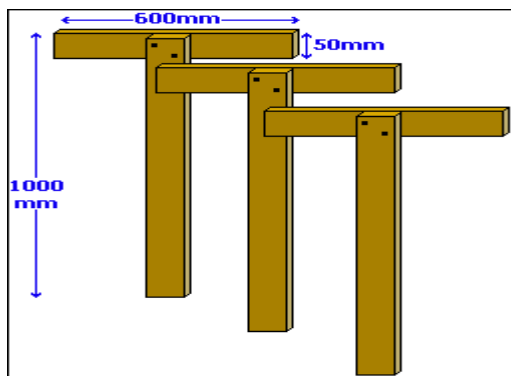
✓ Water Level

It is used to transfer and check level. It is a simple tool to measure the level at two different points. It is a tool that works on the principle that water always seeks its own level. It consists of flexible tube with liquid, and the liquid at both ends will be at the same level whether you're holding them together or spreading them a hundred feet apart.



✓ Boning Rods

It is used for levelling from two fixed points in surveying. It consists of an upright pole having a horizontal board at its top, forming a 'T' shaped rod. Boning rods are made in set of three rods, and many consist of three 'T' shaped rods, each of equal shape and size, or two rods identical to each other and a third one consisting of longer rod with a movable or detachable 'T' piece. The third one is called traveler or traveling rod.



✓ Spades (Phavadas)

They are used to mix mortar and also used to place cement, mortar, concrete in head pan. Spade is also used to dig the soil for foundation trenches etc. It consists of metal plate at the end of long wooden handle.



✓ Jointer

A jointer in masonry construction is a tool in the form of a striking iron or a striking tool used to finish the horizontal or the vertical mortar joints. A jointer or brick jointer is a hand tool designed to imprint grooves into recently filled mortar joints at the stage when they are starting to set. Using a brick jointer helps to improve and visual impact and the lifespan of the mortar. Jointer is used to refer to any tool which can shape the mortar between bricks.

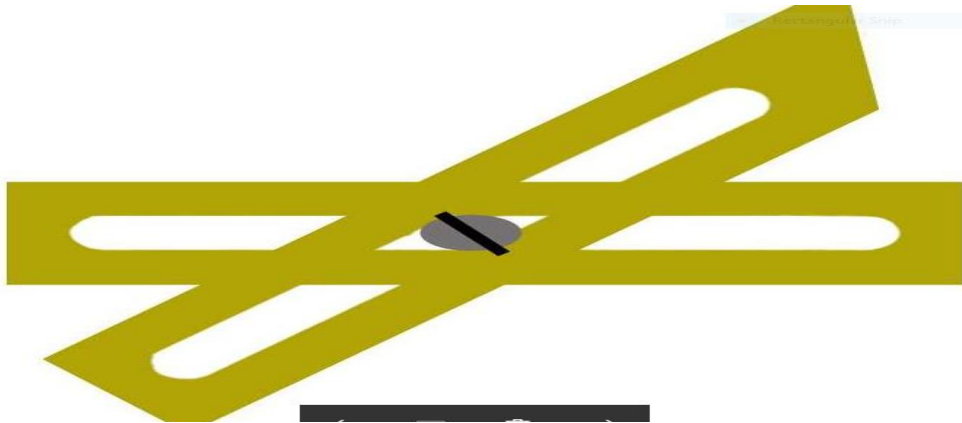


✓ Jointer

3.3. Masonry Tools for Stone Masonry

✓ Bevel

It is employed to set out angles. It comprises of two slotted blades of steel and fixed with each other with thumb screw. It is a tool consisting of two rules or arms jointed together and opening to any angle



✓ Pick Axe

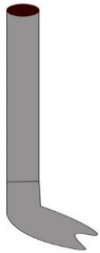
It is employed for rough dressing of stones and to split the stones in the quarry. It has a long head pointed at both ends.



✓ Crow Bar



It is employed for dressing the surface of stones. This consists of an iron edge with a number of teeth from 3 mm to 9mm.



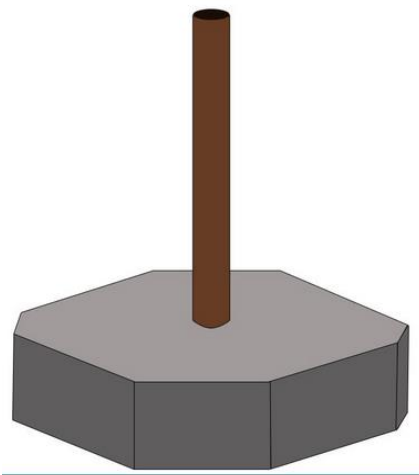
✓ **Chisel**

They are used with mallets and with hammers. A chisel is used for normal splitting, roughing out and shaping the stone. Chisels are available in different sizes with bladed, flat, tapered and other shaped chipping points. Blade of chisel is made from iron or metal and the handle is made from wood.



✓ **Spalling Hammer**

It is a stone mason's tool. It is a heavy hammer used for rough dressing of stones. It has a beveled striking face. It is a large hammer usually with a flat face and straight peen for rough dressing and breaking of stone. It is also designed for cutting and shaping of stone.

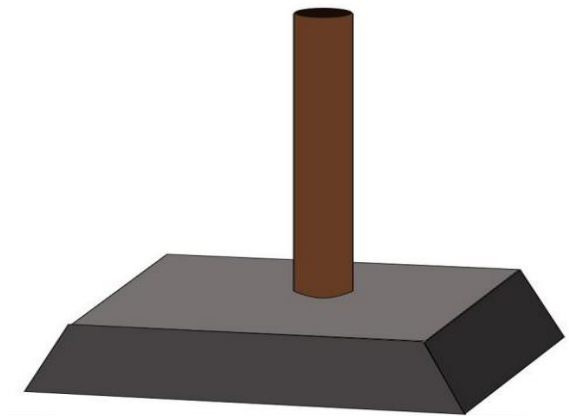




Spall Hammer

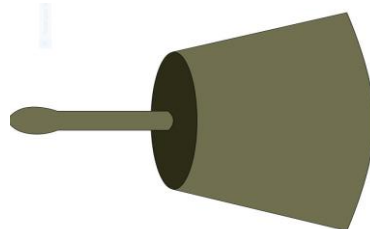
✓ **Mash Hammer**

A mash hammer is also known as a stone mason's hammer. It is used to hit and drive chisel for rough dressing of stone. It is double-sided with two striking faces, most often used in stone masonry work. It should only be used to strike stones, but can also be used for such tasks as chipping away mortar in stone masonry. This hammer consists of a handle to which is attached a heavy head, usually made of metal. And its handle is made of wood.



✓ **Mallet**

It is a basic tool used for shaping of stone. It is a wooden hammer used for driving

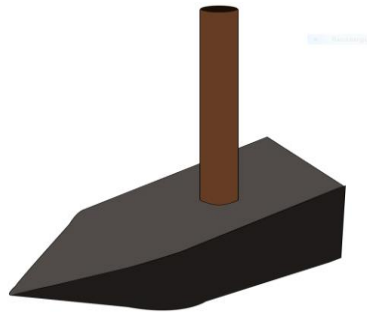


Wooden headed chisels. It has usually large head.

✓ **Scrabbling Hammer**



Scabbling also called scrapping is the process of reducing stone while dressing of stone. In scabbling dressing only irregular angels are taken off with a scabbling hammer. Hence scabbling hammer is a tool used to break small projections of stones or removing irregular bushings from the face of stone. It has also large head made of iron and wooden handle.



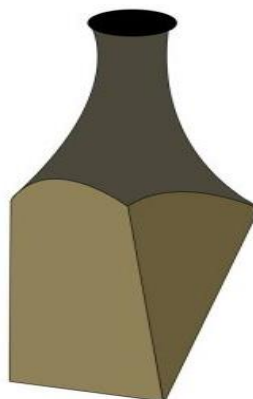
✓ **Claw Tool**

It is employed for dressing the surface of stones. This consists of an edge with a number of teeth from 3 mm to 9 mm. Claw tool is used after the coarse carving with the point tool. The claw tool, with its row of pointed teeth, acts like a rake to even out the surface irregularities left by the point. During use of this tool chisel's teeth should all be in contact with the stone in order to prevent breakage.



✓ **Gad**

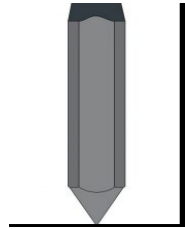
It is also used for splitting of the stone. This is a small steel wedge shaped tool.





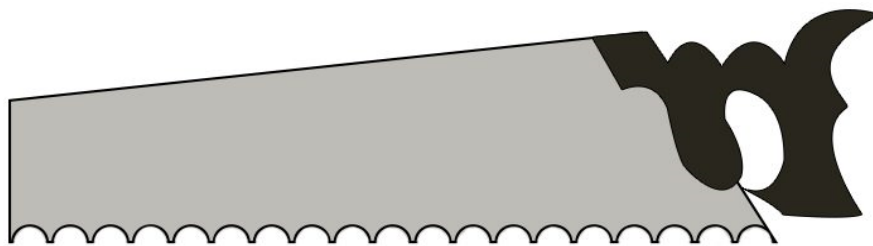
✓ **Punch**

It is employed to dress the hard stones roughly. It is one-piece rod-shaped tool made from metal designed to be struck by hammer. It's one end is pointed and other is round shape.



✓ **Hand Saw**

It is used to cut soft stones. It is a saw with wide blade and handle at one end. It has a wooden/plastic handle and it is used by one hand. Blade has crosscut teeth and blade is made from steel.



✓ **Boaster**

It is also used to cut soft stones. It is a broad-faced or wide-edged masonry chisel. Boasted finish is done by boaster. This type of finish includes intermittent parallel lines which are horizontal or vertical or inclined. Boaster has an edge of width about 60 mm.



✓ **Cross-cut-saw**

It is used to cut hard stones. It is designed specifically for rough cutting. It has a comparatively thick blade, with large, beveled teeth. Traditional 2-man crosscut saws (felling saws) have a handle on each end and are meant to be used by two people to cut stones.



✓ **Frame Saw**

This is used to cut large blocks of stones. It consists of a comparatively narrow and flexible blade held under tension within a (generally wooden) rectangular frame which is also called a sash or gate. The blade is held perpendicular to the plane of the frame, so that the stone being cut passes through the center of the frame.



Frame Saw

✓ **Drafting Chisel**

It is a chisel especially used for cutting a border or line at the edge of a stone. They come in different types of size. Grooves are made with the drafting chisel at the all four edges of stone. And, these stones are used in in plinths and at corners in building.





✓ **Tooth Chisel**

Tooth chisel is also used for fine dressing. It is a metal hand-held tool consisting of a long shaft, with a toothed cutting edge at one end. It is again usually hit with a mallet or metal hammer. The number of teeth on this cutting edge varies, generally between three and five, but a variation with two teeth also exists. The tooth chisel is normally used between roughing-out and finishing, to clear away the rough marks left by the point chisel and prepare the surface for finer work.





✓ **Lump Hammer and Bolster**

Lump hammer is used for light demolition work or to break masonry. In order to cut brick accurately a steel chisel with a very wide blade is employed which is popularly known as bolster.



- Wheelbarrow is used to dispose disposal materials from working place, to transport or serve materials and tools during construction activities in the site. It is the most efficient way in transporting materials or items. ; In comparison to a barilla, (commonly used in the country), a wheelbarrow is much more efficient. For this reason, it is operated by one person and can be carried up to 100 kg at once. So that it saves operation cost; it is time effective and therefore in general.



Wheelbarrow



Self-Check -3	Matching Item
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Directions: Match the item under column B with the corresponding item under A.

A	B
1. -----	A bonded together with mortar
2. ----- Stone	B Used to roughing surface
3. ----- Chisel	C Masonry unit
4. ----- Strength	D Characteristics of stone
5. ----- Stone Masonry	E light-colored

Note: Satisfactory rating -3 points Unsatisfactory below 3 points

answers.

Score = _____

Rating: _____



Information Sheet-4

Calculating materials quantity requirements

1.4. Calculating Material

1.4.1. For stone Masonry

- **Basic Data**

For one meter cube masonry work

- ✓ Sub Structure (foundation wall) = 1m^3 of stone/ m^3 of masonry
- ✓ Super Structure (semi dressed) = 1.25m^3 of stone/ m^3 of masonry
- ✓ Super Structure (dressed) = 1.5m^3 of stone/ m^3 of masonry

- **Stone Masonry Material Requirement**

- ✓ 50cm thick basaltic or equivalent foundation wall bedded in cement mortar 1:4

- 1) Stone = $1\text{m}^3/\text{m}^3$
- 2) Mortar = $0.4\text{m}^3/\text{m}^3$
 - 2.1) Cement = 150Kgs/ m^3
 - 2.2) Sand = $0.42\text{m}^3/\text{m}^3$

- 50 cm thick roughly dressed super structure stone wall bedded in cement mortar 1:4

- 1) Stone = $1.25\text{m}^3/\text{m}^3$
- 2) Mortar = $0.4\text{m}^3/\text{m}^3$
 - 2.1) Cement = 150Kgs/ m^3
 - 2.2) Sand = $0.42\text{m}^3/\text{m}^3$

- 50 cm thick dressed super structure stone wall bedded in cement mortar 1:4

- 1) Stone = $1.5\text{m}^3/\text{m}^3$
- 2) Mortar = $0.4\text{m}^3/\text{m}^3$
 - 2.1) Cement = 150Kgs/ m^3
 - 2.2) Sand = $0.42\text{m}^3/\text{m}^3$



Self-Check -4	Multiple Choice item
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Directions: Directions: Select the correct answer and encircle the letter of choice

- Which one of the following is unit of volume?
A. Meter square (m^2) C. All are correct
B. Cubic meter (m^3) D. None of the above
- One of the following masonry unit is naturally occurring material
A. Stone C. Block
B. Brick D. All are correct
- Which of the following formulas indicate volume of material?
A. Length x Width C. All
B. length x height x width D. None
- One is indicates density of cement.
A. $1400kg/m^3$ C. $1840kg/m^3$
B. $2250kg/m^3$ D. $1900kg/m^3$

Note: satisfactory rating-2 points Unsatisfactory-below 2.points

You can ask you teacher for the copy of the correct

answers

Score _____
Rating _____



Information Sheet-5	Measuring tools & equipment
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5.1. Measuring Tools and equipment

Measuring Hand tools and instruments are precise devices but needed to be handled with extra care, e.g. Spirit level should be checked every day before use!

✓ **Spirit level**

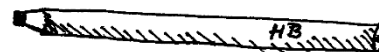
It is used to control the horizontal and vertical alignment of wall surface and edges. The length is at least 80 to 120cm long. It is made of metal, synthetic material or wood. It has two measuring bubbles: one is located at mid length is used to check horizontal positions. While the second one, at the end, is used to check vertical position. This tool requires always to be handled with care and needs to be checked from time to time whether it is still working accurate or not.



Spirit level

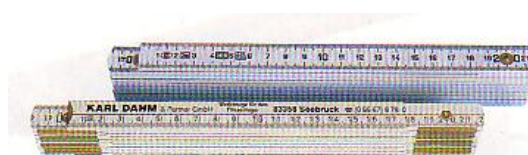
✓ **Graphite Pencil**

This is used for marking in wall construction. It is specially produced for this purpose in such a way that it will not wear out fast.



Graphite pencil

✓ **Folding meter**



For measuring length in wall construction, it is convenient to use rigid scales. Such a measuring scale/ folding rule/ is made of 20cm separate wooden pieces joined together by pins. The scale has subdivisions in cm and mm.

✓ **Water level**

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Based on the principle that water finds its surface level because of the effect of natural atmospheric pressure, this apparatus used to find horizontal levels over longer distance



✓ **Angle / Try square**

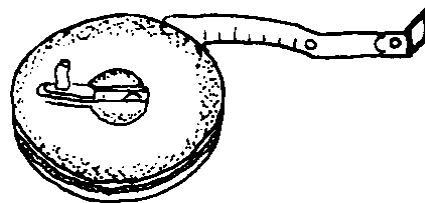
It is used to measure a right angle (90°) of a corner. Used in laying masonry units or blocks at corners of masonry wall.



Try square

✓ **Measuring tape**

Tape is used to measure dimensions of building parts and distances in site. It is manufactured from steel, plastic or fibre in lengths of 1m, 2m, 3m, 5m, 30m, etc. and 50m. In using tapes for measurements, the two points should be aligned perfectly. In addition, when long horizontal measurements are needed, care should be taken to avoid sag on the tape meters.



Measuring tape



Self-Check -5	Multiple Choice item
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Directions: Select the correct answer and encircle the letter of choice

1. Which one of the following measuring tools is used to measure horizontal level?

- | | |
|-----------------|---------------|
| A. Water Level | C. Chisel |
| B. Sprite Level | D. Hose level |

2. One of the following measuring instrument is use rigid scales

- | | |
|------------------|--------------------|
| A. Folding meter | C. Tape rule |
| B. Sprite level | D. All are correct |

3. Among the following, one is the function of Graphite Pencil

- | | |
|-------------|--------------|
| A. Marking | C. Measuring |
| B. Leveling | D. Cutting |

Note: satisfactory rating-1.5 points Unsatisfactory-below 1.5.points

You can ask you teacher for the copy of the correct

answers

Score _____
Rating _____



Information Sheet-6	Materials handling and storage
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1.6. Materials handling

1.6.1 Manual Handling

Handling and storing materials involve diverse operations such as hoisting tons of steel with a crane; driving a truck loaded with concrete blocks; carrying bags or materials manually; and stacking building stones, bricks or other materials such as drums, barrels, kegs, and lumber.

The efficient handling and storing of materials are vital to industry. In addition to raw materials, these operations provide a continuous flow of parts and assemblies through the workplace and ensure that materials are available when needed. Unfortunately, the improper handling and storing of materials often result in costly injuries.

When heavy materials have to be handled manually each workman shall be instructed by his foreman or supervisor for the proper method of handling such materials. Each workman shall be provided with suitable equipment for his personal safety as necessary. Supervisors shall also take care to assign enough men to each such job depending on the weight and the distance involved.

Material handling refers to the movement of materials inside the work premise from raw materials stage to finished products storage. Maximum movement of activities takes place when the work is in progress. Material handling is actually the process of moving through a full cycle of operations from the procurement of raw materials, storage prior to the use, handling into and between and handling of the finished goods, packaging, storage and distribution. In other words material handling is the art of moving things economically, safely and used properly. Material handling result into some linking of all the processes within the functions of the business into a single efficient machine or system.



1.6.2. Materials Storage

The primary objective of the store is to provide storage of materials. It ensures that materials regularly required are stored accordingly. Adequate care of materials held within the company is very important and store staffs must be well trained in ensuring that materials held within the stores are well taken care of. Storage facilities such as racks, bins, shelves, flat pallets, box pallets, tanks etc. must be used to ensure safety of the materials.

Some methods of storage are associated with particular method of handling materials and therefore task of handling materials or stock and that of storage must be taken together. Therefore provision of material handling is another essential objective of the store function. Storage procedures and techniques also encompass store design and store location system. Storage cannot be effectively done without taking into consideration the design of the store which involves planning so that stocks are conveniently grouped and placed for efficient operation.

The store should be designed in such a way that easy flow of items or materials held are ensured

Without hindrances. Store location system is also important to ensure that stores can be found when needed with minimum waste of time. Material management is concerned with the flow of materials from the source of supply through the production line to the final consumer. Material management includes functions like purchasing materials, inventory control, receiving materials, warehousing as well as production planning and control.

1.6.3. What safeguards must workers follow when stacking materials?

Stacking materials can be dangerous if workers do not follow safety guidelines. Falling materials and collapsing loads can crush or pin workers, causing injuries or death. To help prevent injuries when stacking materials, workers must do the following:

- Stack lumber no more than 16 feet high if it is handled manually, and no more than 20 feet if using a forklift;
- Remove all nails from used lumber before stacking;
- Stack and level lumber on solidly supported bracing;
- Ensure that stacks are stable and self-supporting;



- Do not store pipes and bars in racks that face main aisles to avoid creating a hazard to passersby when removing supplies;
- Stack bags and bundles in interlocking rows to keep them secure; and
- Stack bagged material by stepping back the layers and cross-keying the bags at least every ten layers (to remove bags from the stack, start from the top row first).

During materials stacking activities, workers must also do the following

- Paint walls or posts with stripes to indicate maximum stacking heights for quick reference;
- Observe height limitations when stacking materials;
- Consider the need for availability of the material; and
- Stack loose bricks no more than 7 feet in height.



Self-Check 6	Multiple Choice item
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Directions: Select the correct answer and encircle the letter of choice

1. Handling and storing materials involve diverse operations such as:

- A. driving a truck loaded with concrete blocks
- B carrying bags or materials manually
- C. stacking building stones
- D. All are correct

2. What workers must do during materials stacking activities?

- A. Observe height limitations when stacking materials
- B. Consider the need for availability of the material; and
- C. Stack loose bricks no more than 7 feet in height
- D. All

3. One of the following is not personal protective equipment:

- A. safety helmets C. fall arrest or fall
- B. eye protection, D. None

Note: Satisfactory rating – 2 points Unsatisfactory - below 2 points

Answer Sheet

Score = _____

Rating: _____



Operation Sheet- 1 Perform Materials handling and storage

Procedure for performing Materials handling and storage

Step 1. Wear appropriate ppe

Step 2. Identify necessary materials

Step 3. Carry out Manual Handling.

Step 4. Select Appropriate place

Step 5. Apply the necessary Steps

Step 6. Observe height limitations when stacking materials.

Step 7. Consider the need for availability of the material

LAP Test

Practical Demonstration

Name: _____

Date: _____

Time started: _____

Time finished: _____

Instruction I: Given necessary templates, tools and materials you are required to perform the following tasks within 8 hours.

Task 2 Perform Materials handling and storage



Reference

1. Different internet & websites
2. Text book of Building Construction
2. Motivate Building Construction Principles & Practices

Author: -

3. Building Construction
4. Published by the Occupational Safety and Health Service Department of Labour
Wellington New Zealand

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