Finishing Construction Works

Level-II

Learning Guide-47

Unit of Competence: Install Mechanically Fixed Plaster board

Module Title: Installing Mechanically Fixed Plaster board

LG Code: EIS FCW2 M 11LO1-LG -47

TTLM Code: EIS FCW2 M 11TTLM 0919v11

LO 1: Plan and prepare

Instruction Sheet	Learning Guide #47

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

- Obtaining the Work instructions and operational details
- Follow Safety (OHS) requirements
- identifying and implementing Signage and barricade requirements
- selecting Tools and equipment for carry out tasks
- calculating Material quantity requirements
- identifying Environmental protection requirements

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, specifications, quality requirements and operational details
- ✓ follow ***Safety requirements*** in accordance with safety plans and policies
- ✓ identify and implement Signage/barricade requirements
- ✓ select and check of tools and equipment for carry out tasks consistent with the requirements of the job, for serviceability and rectify any faults or report prior to commencement
- ✓ calculate Material quantity requirements in accordance with plans and/or specifications
- ✓ Identify and apply the Environmental protection requirements for the project in accordance with environmental plans and regulatory obligations

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below
3. Read the information written in the information Sheet
4. Accomplish the Self-check
5. If you earned a satisfactory evaluation from the Self-check proceed to Operation Sheet
6. Do the “LAP test”

Information Sheet-1	**Obtaining, confirming and applying work instructions**.

1.1 Work instructions

Introduction: -In construction site identifies plan location and specification according to work instructions techniques. A work instruction is a document that provides specific instructions to carry out any activity. It's a step by step guide to perform a single instruction. A work instruction contains more detail than a procedure and is only created if detailed step by step instructions are needed.

1.1.1 Plan

A drawing showing technical details of a building, machine, etc., with unwanted details omitted, and often using symbols rather than detailed drawing to represent doors, valves, etc.

The plans for many important buildings were once publicly available.

A set of intended actions, usually mutually related, through which one expects to achieve a goal. He didn't really have a plan; he had a goal and a habit of control.

A two-dimensional drawing of a building as seen from above with obscuring or irrelevant details such as roof removed, or of a floor of a building, revealing the internal layout; as distinct from the elevation.

1.1.2 Specification

Specification is defined as the designation or statement by which written instructions are given distinguishing and/or limiting and describing the particular trade of work to be executed. In short specification is a statement of particular instructions of how to execute some task. Specification is one of the contract documents.

Specifications are written based on the prepared design, drawings, general and scientific trends of workmanship, quality expected equipment involved and materials to be used for the particular trade of work.

1.1.3 quality requirements

Quality planning documents are used by organizations to ensure that quality at the highest level, quality goals and plans should be integrated with overall strategic to applicable standards, practices, procedures, and work instructions,

Quality in construction industry can be defined as the attainment of acceptable levels of performance from construction activities. This performance would be attained when the activity meets the requirements of client or owners

Self-Check -1	Written Test

Directions: Answer all the questions listed below.

Instruction: Choose the best answer for the following questions.

1. _____ defined as the designation or statement by which written instructions are given distinguishing and/or limiting and describing the particular trade of work to be executed? (3 points)

B. Plan C. manufacture specification

C. Specification D. all

2 ----------the attainment of acceptable levels of performance from construction activities. (3 points)

A. Product specification C. Quality

B. Specification D. all

Note: **Satisfactory rating - 3 and 6 points Unsatisfactory - below 3 and 6 point**

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

Answer Sheet

Score = _____

Rating: _____

Information Sheet-2	Follow *Safety requirements*

2.1 Occupational health and safety (OHS)

Occupational health and safety (OHS) relate to health, safety, and welfare issues in the workplace. OHS includes the laws, standards, and programs that are aimed at making the workplace better for workers, along with co-workers, family members, customers, and other stakeholders.

2.1.1 Protective clothing and equipment

An important aspect in the construction site is following safety to protect the work force from danger and to keep materials, tools and equipment's from damage.

Benefits of a construction safety program;

- Allow workers to go home safely at the end of the work day;
- Increase productivity;
- Provide higher profit margin for the company;
- Provide lower insurance costs;
- Enhance the company reputation;
- Offer better personnel policy;
- Support compliance with the law;

1. Personal Safety

Using personal protection and safety equipment as required by the organization;

- Types of PPE (personal protective equipment)

Helmet

It is used to Protects the carrier from down falling items. It should be a must for everybody who works or moves on a building site.

Fig.2.1 Helmet

Ear protection

- It is used to protect the carrier from damages of the ears. Continuously working in a very noisy environment harms the eardrums forever. Once the eardrums are damaged there is no way of restoring the sense of hearing again.

Fig. 2.2 Ear Protection

Safety boots

- Safety boots are equipped with three safety measures. It must have:
  - ❖ Toes protection hood

    A steel hood to protect the toes from down falling heavy thing
  - ❖ A steel layer inside the soles protects the carrier from stepping into a tuned up nail.
  - ❖ Benzene and oil resistant soles

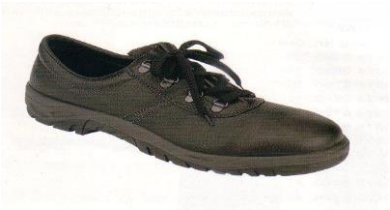

Fig.2.3 **Safety boots**

Safety goggles

- It is used to Protects the carrier from down falling items. It should be a must for everybody who works or moves on a building site.

Fig.2.4 Safety goggles

Knee pads

It used to protect the knees during long time kneeling.

fig.2.5Knee pads

Gloves

It used to protect the hands from the aggressive attack of the cement, very important.

Fig.2.6 Gloves

2 Over All: - Protects the inner clothes of the worker from dust and other spoiling materials.

Fig.2.7 over All

Rubber Boots: - Protects the workers' feet from cold, chemicals and mud in the working area.

Fig.2.8 Rubber Boots

Mask: - Protects eyeglass of the worker from other endangering object and dust during construction.

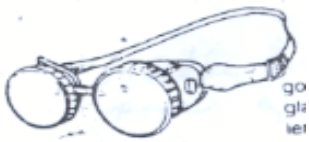

fig.2.9Mask

Safety Belt: - Secure the laborers working in a place where the construction is done at high level using safety belt on net.

fig.2.10 Safety Belt

2.1.2 Use of tools and equipment

The importance of using the right tool for the job. Each tool is precisely designed for a specific purpose, so choosing the correct tool will also decrease the amount of effort required to get a job done right without causing damage to either the equipment or the surface being worked.

2.1.3 Workplace environment and safety

A healthy work environment is about more than being safe. A Healthy workplace is one where employees in addition to feeling secure and enjoying a safe physical work environment; feel recognized for the work they do. enjoy a positive social environment that encourages respect, fosters a sense of belonging and purpose.

Handling of materials

Stacks of gypsum panel products are very heavy and can become unstable if proper stacking and handling procedures are not followed. Workers shall always be extremely careful when stacking or working in an area where gypsum panel products are stacked. For example, a 4 ft. (1220 mm) wide by 12 ft. (3660 mm) long by 1/2 in. (12.7 mm) thick gypsum board can weigh over 80 pounds (36kg); this means a stack of only 25 of these boards weighs over a ton (900 kg). Heavy equipment is frequently used to move, stack, load, stock, or otherwise handle gypsum panel products. Only trained, qualified, and properly certified drivers may operate this equipment. Suitable safety measures shall always be followed when operating or working around these machines.

Procedures and techniques presented in this guide shall be followed to handle gypsum panel products properly. Workers who are inexperienced in using any of the tools or equipment in the procedures described, or are uncertain about the safety of these procedures for a particular activity or undertaking, shall consult with someone who is skilled or certified in this area of work before beginning. Seeking help from a more

experienced worker or supervisor when uncertain about proper safety measures can safeguard against possible injury. Time, material, property, and equipment can also be preserved. Safe work practices can make the job easier and more enjoyable as well as help prevent harmful and costly accidents. Remember and follow the safety tips below while handling gypsum panel products.

- Work in pairs whenever possible.
- Lift carefully with good techniques by using the legs, not the back.
- Stack gypsum panel products flat – not on edge or end.
- Wear a dust mask when conditions warrant.
- Ground electrical power tools properly.
- Select and use the correct tool for each job.
- Ensure that all tools are in good repair.
- Protect eyes with safety glasses or goggles when necessary.
- Proceed at a deliberate but steady pace.
- always take precautions and time to make sure the work is done safely.
- Wear other personal protective devices and clothing such as a hard hat, gloves, safety shoes, etc.

Storage

Gypsum panel products shall be stored in a warehouse or other suitable structure where they will not be exposed to inclement weather or to temperatures that frequently exceed 125°F (52°C).

- Stacks of gypsum panel products shall be stored supported evenly on a firm, dry, level, and structurally sound floor.
- Stacks of gypsum panel products shall be limited to a maximum height of 17 feet (5 m).
- Gypsum panel products shall always be stored flat.
- Gypsum panel products shall not be stored in areas of excessive humidity nor shall they be stored beneath overhead equipment which may have a tendency to drip grease, oil, or water.

  Gypsum panel products shall not be left in heavy traffic areas or where they can be damaged by lift trucks and other warehouse equipment, nor shall they be stored at aisle intersections. If panels are stored at aisle junctions because of absolute necessity, corner protectors constructed of sheet metal or similar suitable materials shall be used.

- Exposure of gypsum panel products to rain and other high moisture levels may result in water stains, discoloration, mold, paper delimitation, and sag.
- This sensitivity of most gypsum panel products to adverse moisture conditions requires that gypsum panel products NOT be stored outdoors without complete protection from the weather.
- The plastic covering provided for product protection during shipment on rail flatcars or flatbed trucks is not suitable for storage of the gypsum panels and shall be removed upon arrival at the destination prior to warehouse storage.
- Failure to remove this plastic covering can result in damage to the gypsum panels due to moisture, condensation, wet product, and/or mold.
- The Gypsum Association does NOT recommend outside storage of gypsum panel products

2.1.4 Use of firefighting equipment

Firefighting equipment is equipment designed to extinguish fires or protect the user from fire. Firefighting equipment includes not only fire hoses and fire extinguishers but also fire-resistant protective clothing, fire-resistant gloves, respirators, and communication equipment.

Fire is the rapid oxidation of a material in the exothermic chemical process of combustion, releasing heat, light, and various reaction products. The flame is the visible portion of the fire. If hot enough, the gases may become ionized to produce plasma. Depending on the substances alight, and any impurities outside, the colour of the flame and the fire's intensity will be different.

2.1.5 Organizational first aid

When hazards were happened that is: -

• If plaster compound or dust comes into contact with the eyes wash eyes thoroughly with water.

• If plaster compound or dust comes into contact with skin wash skin thoroughly with soap and water.

• If dust is inhaled move to a fresh air environment.

• If plastering compound or dust is ingested drink plenty of water.

2.1.6 Hazard control and hazardous materials and substances

WHS legislation in New South Wales requires that PCBUs, in consultation with workers identify all potentially hazardous things or situations that may cause harm. In general, hazards are likely to be found in the following;

- ✓ Physical work environment,
- ✓ Equipment, materials or substances used,
- ✓ Work tasks and how they are performed,
- ✓ Work design and management

In order to identify hazards, the following are recommended:

I. Past incidents/accidents are examined to see what happened and whether the incident/accident could occur again.

II. Employees be consulted to find out what they consider are safety issues, I.e. ask workers about hazards near misses they have encountered as part of their work. Sometimes a survey or questionnaire can assist workers to provide information about workplace hazards.

III. Work areas or work sites be inspected or examined to find out what is happening now. Identified hazards should be documented to allow further action. The work environment, tool and equipment as well as tasks and procedures should be examined for risks to WHS.

IV. Information about equipment (e.g. plant, operating instructions) and Material Safety Data Sheets be reviewed to determine relevant safety precautions.

Self-Check -2	Written Test

Directions: Answer all the questions listed below.

1._____ is used to protect the carrier from damages of the ears. (5 points)

A. Helmet *C.* Ear protection

B. *Glove* D. All

2. _____ is equipment designed to extinguish fires or protect the user from fire. (4 points)

A. Firefighting equipment C. Tools

B. Overall D. All

3. Rubber Boots is Protects the workers' feet from cold, chemicals and mud in the working area. (1 points)

A. True B. False

Note: **Satisfactory rating - 5 and 10 points Unsatisfactory - below 5 and 10 points**

Answer Sheet

Score = _____

Rating: _____

Information Sheet-3	**identifying and implementing Signage and barricade requirements**

3.1 GENERAL REQUIREMENTS

A variety of situations exist at Council worksites where barricading and/or safety signage are required. Barricading and safety signage draw attention to hazardous objects and situations that may affect health and safety, reducing the potential of injury to personnel and damage to property. Examples include warning tape, mesh barrier, road barriers, traffic control signs, emergency signage, mandatory PPE signs and precautionary signage.

Barricading and safety signage shall be used:

- when there are no other practical control measures available to control a hazard;
- as an interim measure until a more effective way of controlling the risk can be used or the hazard is no longer present; and
- as a secondary control measure to supplement higher level control measures.

The type and number of barricading or safety signage erected must be assessed adequately and positioned to be suitable for the intended purpose.

Barricading Requirements

Barricading is one of the risk control measures used to protect personnel from hazard such as:

- being struck by falling objects, material movements or plant;
- fall from height, including falling into open excavations or penetrations;
- fall from unprotected edges (e.g. removed flooring, walkways, stairs and handrails);
- exposure to hazardous substances, process or activities;

- unauthorized entry into a confined space or other restricted work areas; and
- Any potentially hazardous work processes, such as hot works, demolition work, scaffolding, radiation work and work involving asbestos.

Barricading may also be used as part of incident management and emergency response procedures.

Selection of Barricade

The following factors are to be considered as part of a risk assessment when selecting the type of barricade (soft or hard):

- risk associated with the hazard;
- required strength of the barrier (e.g. impact potential); and
- The amount of clearance provided from the hazard by the barricade.

Barricading shall be used to manage the risk of fall from height greater than two meters and excavations greater than 1.5 meters deep.

All barricading shall be designed, installed and used in accordance with the relevant Australian Standards and the recommendations of the manufacturer. Where barricades are supported by star pickets, the star pickets shall be protected by using a suitable cap fitted to the star pickets.

Erection and Use of Barricade

The barricade shall be placed so that the whole area affected by the hazard is appropriately identified, taking the following factors into account:

- distance to/from the hazard;
- possible movement of an object inside the barricade if it falls;
- access and egress; and
- Sparks or slag generated from hot work activities.

An appropriate sign shall be affixed to barricades at all access points, indicating the following:

- The hazards present within the barricaded area; and
- The name and contact details of the person in charge of the barricaded area.

Self-Check -3	Written Test

Directions: Answer all the questions listed below.

1. _____ is one of the risk control measures used to protect personnel from hazard. (3 pointe)

   A. Barricade C. Hazard

   B. Safety D. All

2. Barricading and safety signage shall be used as a secondary control measure to supplement higher level control measures. (2 pointe)

   A. True B. False

Note: **Satisfactory rating - 3 and 5 points Unsatisfactory - below 3 and 5 points**

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

Answer Sheet

Score = _____

Rating: _____

Information Sheet-4	Consisting, checking, reporting and selecting tools and equipment

4.1 Tools Selection

Selection of appropriate tools is important for drywall installation. Tools used should be of good quality and properly maintained. They should be checked and cleaned on a daily basis. Tools should be stored in a dry and safe place.

- **Selecting the Right Tool for the Job**

Before you select a tool, think about the job you will be doing. Tools are designed for specific Purposes.

Using a tool for something other than its intended purpose often damages the tool and could

Cause you pain, discomfort, or injury. You reduce your chances of being injured when you select a tool that fits the job you will be doing. Examples include the following:

- ✓ A job requiring cutting, pinching and gripping will require hand tools like pliers, snips and cutters.
- ✓ A job requiring you to strike something will require a hammer.
- ✓ A job requiring you to drive or turn something will require screw ornate drivers and wrenches.

- **What is the Best Tool?**

The best tool does the following:

- ✓ fits the job you are doing
- ✓ fits the work space available
- ✓ reduces the force you need to apply

- ✓ fits your hand
- ✓ can be used in a comfortable work position
- ✓ does not require you to raise or extend the elbows (heavy tools)

- **How to choose right construction equipment for your project?**

Most of the construction projects involve laborious work which is to be handled by men and the equipment designed for doing the work undersigned.

It is difficult for workers to accomplish all things in a project and so there comes the need for machines particularly the construction equipment (machinery) that is widely used nowadays almost everywhere in the world.

For speedy and economic construction of a project, proper choice of equipment is of preliminary importance for civil engineers. The versatile range of equipment available commercially involves the decision of people. There are few basic things that are considered in selection of suitable equipment.

They are as follows:

- **Use of Available Construction Equipment:**

Where the full utilization of new equipment for its entire working life is not foreseen, or its utilization on further projects is uncertain, it may be desirable to use existing old equipment even if its operation is somewhat more expensive. The depreciation cost of the new machine is likely to be high, and this would raise the owning cost of the equipment and thus the unit cost of work.

Suitability for Job Conditions:

The equipment chosen should suit the conditions of the job, soil, valley, working conditions and climate of the region.

- **Uniformity in Type:**

A minimum number of types should be acquired so that there is uniformity in the type of equipment on a job. A common type of engine should be selected for the different type's machines such as excavators, dump trucks, tractors and scrapers that are on the project.

- **Size of Construction Equipment:**

Larger equipment gives higher output on full load, but its cost of production on part load is usually greater than that of smaller units working on full load. Larger equipment needs correspondingly larger size of matching units, and shutting down of one primary unit may render several other large units idle.

Transportation to works is generally difficult and costly. Servicing, maintenance and repair facilities have to be greater for larger units. However, larger machines are usually sturdier and more suitable for tough working conditions.

It is desirable to have equipment of same size on the project. With standbys, the cost of larger size standby equipment is more than that of smaller size.

Self-Check -4	Written Test

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

1. The best tool does follow:(5 points)

   a. fits the job you are doing

   b. fits the work space available

   c. reduces the force you need to apply

   d. All

Note: **Satisfactory rating - 3 and 5 points** **Unsatisfactory - below 3 and 5 points**

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

Answer Sheet

Score = _____

Rating: _____

Information Sheet-5	calculating material quantity requirements

5.1 Calculate the amount of plasterboard

Calculate the amount of plasterboard needed from square meters of an area that needs to be boarded.

Plasterboard Materials

Square Meters to be Boarded		m²
Board Size	length: width:	mm mm
Waste Percentage		%
Results:		
Boards Needed		#
Boards Needed Including Waste		#
Length of Tape Needed		m
Number of Screws		#
Lightweight All-Purpose Joint Compound		liters

The Calculation

1. the area that needs to be boarded measured in square meters
2. the size of board you are using measured in millimeters
3. waste factor in a percentage

Results

1. number of plasterboard's needed
2. number of boards including waste factor
3. tape needed in lineal meters of tape
4. number of screws needed
5. lightweight all-purpose compound in liters

Self-Check -5	Written Test

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

1. List out the purposes of Calculate the amount of plasterboard. (5 points)

Note: **Satisfactory rating - 3 and 5 points** **Unsatisfactory - below 3 and 5 points**

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

Answer Sheet

Score = _____

Rating: _____

Information Sheet-6	**Applying and identifying environmental protection requirements**

6.1 Safety requirements

- **Safety**

Although there are no known health hazards associated with standard plaster board installation, the following precautions are recommended:

- ✓ Avoid creating dust when handling plaster board or mixing plaster board compounds.
- ✓ After toweling, reduce sanding by wiping a wet sponge over the edges of finished joints.
- ✓ If dry sanding is necessary, minimize the effect of dust by:
    - providing adequate ventilation
    - wearing eye protection
    - Wearing a respiratory mask conforming to Australia/New Zealand Standard AS/NZS 1716:1994 Respiratory protective devices.
- ✓ Keep all tools and materials out of the reach of children.
- ✓ Use mechanical sanding tool fitted with dust extractor and storage bag.

- **First Aid**

- ✓ If plaster compound or dust comes into contact with the eyes wash eyes thoroughly with water.
- ✓ If plaster compound or dust comes into contact with skin wash skin thoroughly with soap and water.
- ✓ If dust is inhaled move to a fresh air environment.
- ✓ If plastering compound or dust is ingested drink plenty of water.

Regulatory requirements: It menace respect rule &regulation work place & apply OHS rules.

Before starting the work to full fill use of materials, tools &equipment's based on apply regulatory requirements.

6.1.1 Environmental protection

- **Health and safety**

✓ -For information regarding the safe use of USG Boral products and accessories please refer to instructions on the product packaging or contact your local USG Boral Sales Office or for a current copy of the Material Safety Data Sheet

✓ It is the works of project protect d/f hazards to environmental protection. There are d/f mechanisms environmental protections

✓ health welfare

✓ protect noise the environment

✓ Protect d/t hazards are: physical hazard, mechanical hazard& chemical hazards etc.

Self-Check -6	Written Test

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

1. What is Safety? (5 points)

Note: **Satisfactory rating - 3 and 5 points** **Unsatisfactory - below 3 and 5 points**

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

Answer Sheet

Score = _____

Rating: _____

Finishing Construction Works

Level-II

Learning Guide-48

Unit of Competence: Install Mechanically Fixed Plaster board

Module Title: Installing Mechanically Fixed Plaster board

LG Code: EIS FCW2 M 11M01 LO2-L048

TTLM Code: EIS FCW2 M 11TTLM 0919v1

LO2:Install and finish plasterboard and fiber cement product

Instruction Sheet	Learning Guide #48

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

- marking and measured ***Materials***
- cutting and specifying to fit Boards
- fixing Boards to specified locations with mechanical fastenings.
- Applying relevant Ethiopian Standards and specifications
- Jointing and finishing of plasterboard

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**:

- measure and mark materials for ensure compliance with work requirements and minimal wastage.
- cut boards to fit specific locations with clearance to manufacturers' specifications.
- fix to specify Boards of locations with mechanical fastenings to manufacturers' specifications and relevant standards.
- carry out the all work to manufacturers' specifications and relevant Ethiopian Standards.
- complete the Joint and finishing of plasterboard in accordance with manufacturers' specifications.

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below
3. Read the information written in the information Sheet
4. Accomplish the Self-check.
5. If you earned a satisfactory evaluation from the Self-check proceed to
6. Operation Sheet Do the “LAP test”

Information Sheet-1	Measuring and marking *Materials*

1.1. How to Measure Up for Ordering

1. Draw a diagram of each room opened up like a shoebox. You don't have to draw it to scale. Just mark all the measurements on it, including windows and doors.

2. Take your diagram along to your Gyprock™ plasterboard supplier. They will help you work out how many sheets of plasterboard, lengths of cornice, and quantities of accessories you will need.

1.1.2 Components and equipment relating to types

Basically, there are three major components in every system, namely input, processing and output. In a system the different components are connected with each other and they are interdependent. For example, human body represents a complete natural system.

1.1.2 Quantity, quality and sizes of standard and/or specialist

What is a quality control standard?

Statements on Quality Control Standards (SQCSs) are issued by the ASB. Firms that are enrolled in an AICPA-approved practice-monitoring program are obligated to adhere to quality control standards established by the AICPA.

What is a QC checklist?

The most important document QC staff use to inspect a product is the quality control, or QC, checklist. QC checklists serve as a guide for your inspector during inspection, providing details related to product requirements, on-site testing, packaging and more.

What are quality checking procedures?

Quality control (QC) is a procedure or set of procedures intended to ensure that a manufactured product or performed service adheres to a defined set of quality criteria or meets the requirements of the client or customer. QC is similar to, but not identical with, quality assurance (QA).

1.1.4 Manufactured proprietary boards

Manufactured Boards

Manufactured or man-made boards - are made from wood products and have new/different properties to the wood they were made from. Board sizes are 8ft x 4 ft. (2440 x 1220 mm). The main types of manufactured boards are: -

MDF (medium density fiberboard) made by a process which glues wood fiber together using heat and pressure. The boards are smooth and strong. They are resistant to warping. They have a layered structure which makes fixing to the edges difficult. MDF is a board used industrially for the production of furniture (especially shelves and cupboards). Special fixings have been designed to enable MDF to be joined effectively. Dowel joints can be used. The router can be used to cut rebates and housing joints, which work well on MDF. Dust is a problem when working with MDF, dust extraction systems should be used when machining it. Face masks can also be used to reduce the problem.

MDF is available in a range of thicknesses, 3mm, 6mm, 9mm, 12mm, 15mm, and 18mm.

Plywood is made from layers of thin wood glued together at 90 degrees to each other; this makes plywood very strong as it cannot split along the grain like solid timber. If waterproof glue is used the plywood can be used in damp or even wet conditions. Marine ply can withstand sea water. Aero ply is made from three thin layers of birch and is only one mm thick when bonded together;

this ply was designed to be used on aero plane wings as it can be curved so effectively. Available in a range 1mm, 2mm, 3mm, 4mm, 6mm, 9mm, 12mm, 15mm and 18mm.

Chipboard is made from softwood chips glued together. It is a very cheap material and is used to make kitchen worktops and carcass (cupboard shells) where it is laminated with a melamine layer to give it a decorative and hardwearing finish. Usually available as 18mm thick.

Hardboard (particle board) is also used in furniture making usually as a back to a shelving unit or cupboard. Usually available as 4 or 6mm thick.

Block board is used to make strong shelves. It is made from pieces of softwood in a sandwich with a thin layer of wood top and bottom. Main board is similar but with thinner pieces of wood in the sandwich.

1.1.5 Fixtures and fittings

Framing

Framing Check Prior to installing plasterboard, a building should be thoroughly

Checked to ensure that:

- The framing is plumb, level and square
- Other trades have finished their ‘rough-ins’
- Noggins supporting services such as taps and cisterns do not protrude beyond the face of the framing
- Plumbing and electrical services have been installed and do not protrude beyond the face of the framing
- The area is weatherproof
- The spacing of studs, joists or battens takes into account the spacing required by the linings given in the Frame Spacing table

• When the installation is completed, the plasterboard will comply with the required level of finish.

1.1.6 Jointing materials

Type of Joint Materials

Hairline cracks may appear over time particularly so after air-conditioning is in use at drywall joints. Such cracks can be mitigated with proper installation and joint treatment. It is recommended to provide joint materials (Figure 3.4a) to seal joint followed by the application of joint compound (Figure 3.4b). This will control the movement between the boards and prevents cracks from forming.

Types of Joint Materials	Characteristic
1. Perforated paper tape	• Embedded onto a bedding compound. • Control shrinkage cracking at the wall board joints • Applicable for dry areas
2. Alkali-resistant fiberglass mesh tape	• Used on its own. • Self-adhesive backing allowing faster application in the absence of bedding compound • Ideal when water resistance is a requirement • Applicable for wet areas • Control shrinkage cracking at joints
3. Glass fiber tissue	• Serves as a reinforcing bridge for paint film, covering hairline cracks that occur in the plaster substrate • Mitigates re-appearance of fine plaster

	cracks

Table 1.1.6 Type of Joint Materials

1.1.7 Hand and/or powered tools and equipment

1. Measuring tape: -To measure dimension of various materials
2. Carpenter's pencil: -To mark the length before cutting
3. Plumb bob: - To transfer set out marks from the floor to the ceiling and vice versa
4. Plastering knife: -To apply joint compound to plasterboard
5. Plastering hawk: -To transfer joint compound from its container to plasterboard
6. Spirit level: - To ensure verticality and alignment
7. Aviation snipper: - To snip tracks, bracings and studs into appropriate sizes
8. Hammer: -To anchor framing onto ground with nails
9. Drill & Drill Bit: -To fasten tracks, studs, bracings and boards into position
10. Crowbar: -To adjust plasterboard into position
11. Crimper: -To join stud and track together
12. Ink pad: -To mark out setting out position
13. Builder's square: -To verify right angle
14. Flat file: -To file plasterboard and tracks/studs
15. Auto-level: - To make setting out position
16. Ladder or bench: -Ladder or bench
17. Miter Saw: - To make accurate crosscuts
18. Fastener: - To secure board

Table 1.1.7 Hand and/or powered tools and equipment

List of tools	Measuring tape 	Carpenter's pencil 	Plumb bob 
Usage	To measure dimension of various materials	To mark the length before cutting	To transfer set out marks from the floor to the ceiling and vice versa

List of tools	Plastering knife 	Plastering hawk 	Spirit level 
Usage	To apply joint compound to plasterboard	To transfer joint compound from its container to plasterboard	To ensure verticality and alignment

List of tools	Aviation snipper 	Hammer 	Drill & Drill Bit 
Usage	To snip tracks, bracings and studs into appropriate sizes	To anchor framing onto ground with nails	To fasten tracks, studs, bracings and boards into position

List of tools	Crowbar 	Crimper 	Ink pad 
Usage	To adjust plasterboard into position	To join stud and track together	To mark out setting out position

List of tools	Builder's square 	Flat file 	Auto-level 
Usage	To verify right angle	To file plasterboard and tracks/studs	To make setting out position

List of tools	Ladder or bench 	Mitre Saw 	Fastener 
Usage	To access to top track/ runner and top of board	To make accurate crosscuts	To secure boards

Table 1.1.7 Hand and/or powered tools and equipment

Self-Check -1	Written Test

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

1. List at least six types of tools that are used to Measuring and marking *Materials*. (5 points)

Note: **Satisfactory rating - 3 and 5 points** **Unsatisfactory - below 3 and 5 points**

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

Answer Sheet

Score = _____

Rating: _____

Information Sheet-2	Cutting and specifying boards to fit locations

2.1 Cutting plaster boards

Plasterboard is an undisputed favorite for wall and ceiling cladding: It offers excellent value for money, optimal fi re protection and is easy to work with using the right tools.

Plasterboard comprises a plaster core covered with a special cardboard on both sides. For interior construction, we recommend the ceiling-high format with a width of 125 cm or „one-man boards “in 60 x 260 cm format. For damp rooms, you should use impregnated boards specially designed for bathrooms.

- **Cutting plasterboard in 3 steps**

The new plasterboard cutter makes cutting so much easier and saves you from continuously moving, turning and standing unwieldy boards on end. Extremely practical when you are carrying out the work on your own.

1. Simply place the 100 cm long rail on the board, draw the carriage with cutting blade across the cardboard and

2. Break the board by applying gradual, controlled pressure. Please do not strike the board as it is important that the layer of cardboard remains intact.

3. You do not have to change the position of the board to cut the cardboard on the back. One working step less to perform! Simply slide the carriage in the opposite direction, the integral hook blade will then cut the second cardboard layer cleanly on the way back.

The clean cut will make subsequent jointing work much easier. The interchangeable standard blades are very quick to replace.

If necessary, the rail can be extended to 200 cm using a suitable extension.

Cutting Sheets

1. Mark the sheet to the length required.
2. Check the measurement again so you will only have to cut once!
3. Use a trimming knife to cut through the paper liner, using a straight edge or T-square. Always cut the face (no printed) side first.
4. Push the off-cut side down and snap the sheet along the score line.
5. Cut along the fold line from the back of the sheet (printed side) and remove the off-cut.
6. Use a saw where intersecting cuts are needed, such as around openings.
7. Use a keyhole saw for openings such as arches and power points.
8. Drive the fastener heads just below the board surface, taking care not to break the face paper. Nail or screw every 300mm, at sheet ends and around all doors, windows and other openings.
9. Drive temporary nails or screws through a small plasterboard off-cut into every second stud in the middle of the sheet to hold it tight while the adhesive dries. Remove after 24 hours.

NOTE: If sheets must be joined in length, butt joints may be used. For simplicity, fix each sheet end to a stud with nails or screws at 150mm centers. Jointing should extend 500mm each side of the joint to reduce joint visibility.

Self-Check -2	Written Test

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

1. List out the three steps of Cutting plasterboard. (5 points)

Note: **Satisfactory rating - 3 and 5 points** **Unsatisfactory - below 3 and 5 points**

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

Answer Sheet

Score = _____

Rating: _____

Operation Sheet 1	Cutting Sheets

Procedure for Cutting Sheets

Step 1: Mark the sheet to the required length

Step 2: Push the off-cut side down and snap the sheet along the score line

Step 3: Cut along the fold line from the back of the sheet and remove the off-cut

Step 4: Use a saw where intersecting cuts are needed, such as around openings

Step 5: Use a keyhole saw for openings such as arches and power points

Step 6: Drive the fastener heads just below the board surface, taking care not to break the face paper. Nail or screw every 300mm, at sheet ends and around all doors, windows and other openings

Step 7: Drive temporary nails or screws through a small plasterboard off-cut into every second stud in the middle of the sheet to hold it tight while the adhesive dries. Remove after 24 hours

Information Sheet-3	Fixing and specifying boards to locations with mechanical fastenings

3.1 Fixing the Plasterboard

There is plenty of information available on how to fix plasterboard. The key points to remember are:

• Fix the plasterboard horizontally - This will ensure that joints are below eye-level and as a result any imperfections are more difficult to see. Any glancing light from windows or lights is less likely to show a shadow line if joints are finished slightly raised.

• Do not join sheets above the corners of windows or doors - this is where stresses from applied loads and shrinkage are greatest and hence have a greater cracking risk. The best method is to cut a full sheet around the windows. Failing this, joins should be made nearer the center of the window.

• Screw and glue: By screwing only around the perimeter of the board and using glue to fix the remaining areas of the board, the need to apply plaster over fixings in the middle of the board is eliminated, leading to a much better finish for the board. Don't fix through the adhesive.

- **Fixing to Stud Walls**

Check framing for alignment. Refer to the previous details.

1. Apply daubs of Gyprock™ Stud Adhesive about 25mm diameter and 15mm thickness, about the size of a walnut, onto the studs at 300mm centers.

2. Start about 200mm from where the edge of the sheet will go. Don’t put adhesive on studs at the ends of sheets, and keep adhesive at least 200mm from any nail or screw location.

3. Lift the sheet about 10mm from the floor, using off-cuts of plasterboard as packing.

4. Apply the Gyprock™ plasterboard horizontally. The recessed edges do not have to line up with wall noggins.

5. Using nails or screws 10 to 16mm from sheet edges, fix one recessed edge at each stud. Press the sheet firmly against the adhesive daubs and fix along the opposite edge.

- **Fixing to Ceilings**

Check framing for straightness.

1. Apply ‘daubs’ of Gyprock Stud Adhesive about 25mm diameter and 15mm thickness, about the size of a walnut, at 230mm maximum spacing.

2. Start about 200mm from where the end of the sheet will go and leave 200mm from the center nails or screw location.

3. Install sheets at right angles to the joists, using a single length across the room if possible. Nail or screw at 10 to 16mm from sheet edges, fixing one recessed edge to each joist. Press the sheet firmly against the adhesive daubs and fix along the opposite edge.

4. Drive the fastener heads just below the board surface, taking care not to break the face paper.

5. At the centerline of sheets, fasten to each joist with two nails 75mm apart or with a single screw. Nail or screw every 200mm at sheet ends and around any openings.

6. Drive temporary nails or screws through small plasterboard off-cut, mid way between the sheet centerline and edges, to hold sheets tight against joists while the adhesive dries (up to 48 hours).

NOTE: To place ceiling sheets in position against joists requires a lift by at least two people. A good idea is to hire a mechanical plasterboard lifter.

- **Types of Fasteners**

  - ✓ Screws Corrosion-resistant screws
  - ✓ Nails Corrosion-resistant nails

Types	Detail
1. Screws 	• Corrosion-resistant screws
2. Nails 	• Corrosion-resistant nails

Table 3.1 Types of Fasteners

Self-Check -3	Written Test

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

1._____ is will ensure that joints are below eye-level and as a result any imperfections are more difficult to see? (5points)

A/. Fix the plasterboard horizontally

B/. Do not join sheets above the corners of windows or doors

C/. Screw and glue

D/. All

Note: **Satisfactory rating - 3 and 5 points** **Unsatisfactory - below 3 and 5 points**

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

Answer Sheet

Score = _____

Rating: _____

Operation Sheet 2	Fixing the Plasterboard

Procedure for Fixing the Plasterboard

Step 1: Apply daubs of Gyprock™ Stud Adhesive about 25mm diameter and 15mm thickness, about the size of a walnut, onto the studs at 300mm centers

Step 1: Start about 200mm from where the end of the sheet will go and leave 200mm from the center nails or screw location

Step 3: Install sheets at right angles to the joists, using a single length across the room if possible

Step 4: Drive the fastener heads just below the board surface, taking care not to break the face paper

Step 5: At the centerline of sheets, fasten to each joist with two nails 75mm apart or with a single screw. Nail or screw every 200mm at sheet ends and around any openings

Step 6: Drive temporary nails or screws through small plasterboard off-cut, mid way between the sheet centerline and edges, to hold sheets tight against joists while the adhesive dries (up to 48 hours).

Information Sheet-4	Applying relevant Ethiopian Standards and specifications

4.1 Foreword

This Ethiopian Standard has been prepared under the direction of the Technical Committee for Biomass Cook Stove (101) and published by the Ethiopian Standards Agency (ESA). The standard has been developed to address observed needs and to support the local industry in order to make progress through upraising competitiveness and maintain comparative market advantage both domestically and internationally. Information has been gathered from various relevant sources in developing the technical specifications.

What is Plasterboard?

Plasterboard is a lining material for walls and ceilings. It consists of a gypsum plaster core that is encased in a heavy-duty paper liner, which wraps around the long edges of the sheet. It is available in many types and sheet sizes to suit a variety of applications.

Standards

Boral plasterboard is manufactured under strict factory conditions in accordance with the Australia/New Zealand Standard Gypsum plasterboard.

Stability

Under normal temperature and humidity conditions, Boral plasterboard has a:

• Thermal Coefficient of Linear Expansion =16.2x10-6mm/(mm C) at temperature range 4 to 38 C

• Hygrometric Coefficient of Expansion = 7.2x10-6mm/mm/%RH (5 to 90%RH).

Thermal resistance

Under normal ambient temperatures, the ‘R’ values for plasterboard sheet thicknesses are as follows:

- **Plasterboard types and applications**

Boral plasterboard is ideal for:

• Walls – 10/13mm Standard Core

• Ceilings and weather-protected garage and verandah soffits

10mm Units PAN and 13mm Standard Core

• use as a tiling substrate on wet area walls

– 10/13mm Wet Area Board

• curved surfaces – 6.5mm Flexi BOARD

• reducing noise – 10/13mm Sound STOP®

• fire rated walls – 13/16mm Fire Stop and 25mm Shaft LINER

Features and benefits

Boral plasterboard:

• is lightweight and fast and easy to install

• provides a smooth, stable and durable surface ready for paint or wallpaper

• can be fitted to timber, steel or masonry substrates

• can provide high levels of acoustic insulation in specially designed wall and ceiling systems

• is non-toxic.

Self-Check -4	Written Test

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

1. carry out the all work to manufacturers' specifications and relevant Ethiopian Standard? (5 points)

Note: **Satisfactory rating - 3 and 5 points** **Unsatisfactory - below 3 and 5 points**

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

Answer Sheet

Score = _____

Rating: _____

Information Sheet-5	Jointing and finishing plasterboard

5.1 Jointing

Jointing is the process of covering and reinforcing the join between sheets to give a flush, seamless appearance. Paper Tape is embedded into compound, and then covered with two more layers of compound spread wide to each side of the joint. For external corners, a steel or PVC reinforcing bead also set with compound is used for protection. Easy Tape is a self-adhesive mesh that is stuck directly to the board and can be used where strength is not critical.

Recessed Joints

- **For recessed joints use a three-coat system as follows.**

First Coat

1. Fill recess in plasterboard evenly and fully with Gyprock™ Total Joint Cement or Multi-Purpose Joint Compound using a 150mm broad knife

2. Bed in Gyprock™ Paper Tape centrally over the joint and cover lightly with compound

3. Cover all fastener heads.

4. Allow to dry and harden for at least 24 hours, until the compound appears dry.

Second Coat

1.When the tape coat is dry, sand off any lumps and apply a second coat, about 170mm wide, finishing slightly above the board surface. Cover all fastener heads.

2.Smooth the joint edges with a trowel to remove any lip to reduce sanding.

Finishing Coat

1. When the second coat is dry, apply a thin finish coat over the previous coat, about 250mm wide.

2. Smooth the joint edges with a trowel to remove any lip to reduce sanding.

3. Cover previously coated fastener heads with a third coat of compound, laid in a different direction, extending beyond the previous coat by about 25mm.

4. Allow to dry and harden for at least 24 hours.

Sanding

1. Using the sandpaper and sanding float, carefully sand the joint to a smooth, even finish.

2. You will get best results by using a sanding float diagonally across the joint.

3. Avoid scuffing the paper face of the plasterboard where it meets the jointing cement.

4. using a 250mm broad knife apply a third coat of Compound about 250mm wide on both sides of the corner. Ensure the compound is smooth and completely fills the surface to the outer face of the protruding metal nib. Smooth the outer edges of the compound with a broad knife to remove any ridge and to reduce sanding.

5. Allow at least 24 hours to completely dry. Sand smooth with 150 grit paper or 220 grit sanding mesh. Take care not to scuff the paper face of the Gyprock™ plasterboard where it meets the jointing compound.

Self-Check -5	Written Test

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

1. _____ is the process of covering and reinforcing the join between sheets to give a flush, seamless appearance. (5 points)

A. Jointing C. Sanding

B. plasterboard D. All

Note: **Satisfactory rating - 3 and 5 points** **Unsatisfactory - below 3 and 5 points**

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

Answer Sheet

Score = _____

Rating: _____

Operation Sheet 3	Jointing and finishing plasterboard

Procedure for Jointing and finishing plasterboard

Step 1: Fill recess in plasterboard evenly and fully with Gyprock™ Total Joint Cement or Multi-Purpose Joint Compound using a 150mm broad knife

Step 2. Bed in Gyprock™ Paper Tape centrally over the joint and cover lightly with compound

Step3. Cover all fastener heads.

Second Coat

Step 1. When the tape coat is dry, sand off any lumps and apply a second coat, about 170mm wide, finishing slightly above the board surface. Cover all fastener heads.

Step 2. Smooth the joint edges with a trowel to remove any lip to reduce sanding.

Finishing Coat

Step 1. When the second coat is dry, apply a thin finish coat over the previous coat, about 250mm wide.

Step 2. Smooth the joint edges with a trowel to remove any lip to reduce sanding.

Step 3. Cover previously coated fastener heads with a third coat of compound, laid in a different direction, extending beyond the previous coat by about 25mm.

Step 4. Allow to dry and harden for at least 24 hours.

LAP Test	Practical Demonstration

Name: _____ Date: _____
Time started: _____ Time finished: _____
Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within 4 hours.

Task 1 Cutting Sheets
Task 2. Fixing the Plasterboard
Task 3. Jointing and finishing plasterboard

Finishing Construction Works

Level-II

Learning Guide-49

Unit of Competence: Install Mechanically Fixed Plaster board

Module Title: Installing Mechanically Fixed Plaster board

LG Code: EIS FCW2 M 11LO3-LG-49

TTLM Code: EIS FCW2 M 11 TTLM 0919v1

LO 1: Clean up

Instruction Sheet	Learning Guide #49

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

- Disposing and recycling waste materials
- Maintaining tools and equipment's

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**:

- dispose clear and reuse materials and work area in accordance with legislation/regulations/codes of practice and job specification
- Clean, check, maintain and store tools and equipment in accordance with manufacturer recommendations and standard work practices

Learning Instructions:

- Read the specific objectives of this Learning Guide.
    2. Follow the instructions described below
    3. Read the information written in the information Sheet
    4. Accomplish the Self-check.
    5. If you earned a satisfactory evaluation from the Self-check proceed to
    6. Operation Sheet Do the "LAP test"

Information Sheet-1	Disposing and recycling waste materials

1.1 Disposing and recycling waste materials

- All excess material should not be wasted, but used or safely removed from site according to appropriate legislation.
- Identify the waste types that are likely to be produced and aim to reduce the amount of waste as much as possible, through identifying routes to reuse or recycle materials.
- Control access to storage areas to minimize risk of theft or damage.
- Set up a dedicated store for timber, from which workers can re-use supplies.
- Store any materials away from sensitive locations in fenced off areas.
- Label all waste storage and skips, detailing the type of waste.
- Employ a just-in-time policy to deliver materials in order to reduce the storage time on site.
- Consider using recycled materials and recycle any materials used on site rather than disposing of them (including timber, Brick Block) CIRIA provides lists of recycled materials that companies will accept.

Disposal methods adopted depend on the nature of the material. To obtain this information, a comprehensive sampling and analysis program is required so that the correct route for disposal can be determined. For an old tip, sampling should also ascertain the odor levels, presence of methane, groundwater levels and leachate quality.

Solid inert wastes

Solid inert waste found on construction sites usually consists of building rubble, but may also include as demolition material, concrete, bricks, timber, plastic, glass, metals,

bitumen, trees and shredded tyros. Such wastes should be used, recycled, or disposed of to a landfill site licensed to take such wastes.

Putrescible wastes

Old tips that accepted municipal rubbish also contain putrescible wastes. Putrescible wastes are defined as waste able to be decomposed by bacterial action.

Low-level contaminated soil Old tips may contain soil contaminated with chemicals such as heavy metals and hydrocarbons. Construction sites may also intersect contaminated sites, with elevated levels of heavy metals, hydrocarbons or other toxic chemicals.

Prescribed wastes If on-site materials that have to be excavated are prescribed waste

Contaminated Material and wastes

To ensure that all contaminated material uncovered on a construction site are excavated and disposed of in an environmentally responsible manner. Suggested measures

- Assay material uncovered on-site prior to disposal.
- Excavate material in a manner which avoids off-site environmental problems.
- Seal remaining contaminated material or wastes, where only part of the tip has been excavated, to ensure that there is no off-site effect now or in the future.
- Transport odorous wastes in covered vehicles.
- Dispose of contaminated material in a land fill licensed to take the type of contaminated material or wastes uncovered.

B. What are Hazardous Wastes?

Your solid wastes may also meet the federal definition of hazardous waste. If that is the case, you are responsible for proper handling, storing, transporting, and/or disposing of them according to the federal requirements of RCRA and/or state requirements, from the point of generation to ultimate disposal. While states have the sole responsibility for regu-lating non-hazardous construction and demolition debris, they may also have authorization to implement EPA's RCRA Subtitle C - Hazardous Waste Program. State hazardous waste programs are at least as stringent as the federal hazardous waste program. Always contact your state authority to determine which state require-ments apply to your site.

To determine if you must follow haz-ardous waste management requirements, you must first determine if your construc-tion project will generate (i.e., produce or have present on site) hazardous wastes. RCRA Subtitle C defines solid waste as hazardous in one of two ways. Either the waste is one of the over 500 RCRA-listed wastes or it has one of the four following characteristics:

- Ignitable (flashpoint of less than 140 degrees), such as paint thin-ners, paints, paint and varnish strippers, epoxy resins, adhesives, degreasers, and spent cleaning sol-vents.
- Reactive (explosive or violently reactive), such as cyanide, plating waste, bleaches, and waste oxidizers.
- Toxic (meeting certain concentrations), such as materials containing metals (e.g., mercury, cadmium, or lead) or solvents (e.g., carbon tetrachloride or methyl ethyl ketone).
- Materials may include adhe-sives, paints, coatings, polishes, varnishes, thinners, or treated woods. Listed wastes are divided into the four following waste codes:
- The "F" List contains nonspecific source wastes from specific industrial or manufacturing processes (e.g., spent solvents used to strip paint). • The "K" List contains specific source waste (this list does not typically include waste from construction and demolition sites).

- The “P” and “U” Lists contain pure or commercial grade unused chemicals (e.g., left-over chemicals or container residues such as toluene or acetone). Note that unused pesticides and their containers are covered by the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). Additionally, some commonly recycled materials are considered to be “universal wastes.

” These are hazardous wastes that are subject to less stringent requirements. Universal wastes include the following hazardous wastes:

- Batteries;
- Pesticides (as defined by the Universal Waste definition);
- Thermostats; and
- Lamps.

In 2002, EPA proposed to add mercury-containing materials to the list of universal wastes. A final ruling on this proposal is expected in 2005. For more information on hazardous wastes, refer to the resources listed in Section VI-G of Part I of this guide. You can also reference the Notification of Regulated Waste Activity, Instructions and Forms booklet.

Hazardous wastes are discovered during construction activities (e.g., grading or digging) or removed during demolition (e.g., mercury-containing fluorescent bulbs); or

- Hazardous wastes are produced by construction activities (e.g., spent materials such as paints and degreasers, used oil). When hazardous wastes are already present at the site, the contrac-tor or subcontractor who first discovers the material is responsible for notifying the general contractor, developer, and/or owner. You should also notify local, state, and federal authorities. Because the hazardous waste was present at the site prior to construction activities, the developer or owner typically is

responsible for ensuring that the hazardous wastes are handled and disposed of properly. When hazardous wastes are produced at the site, the contractor or subcontractor who produces the hazardous waste typically is responsible for ensuring its proper handling and disposal.

NOTE: Hazardous materials stored at your site that are being used for their intended purpose are not considered “wastes” and may be stored on site indefinitely. However, once the material is no longer usable, the material is con-sidered a waste and RCRA storage requirements (e.g., time limit before a permit is needed) apply.

1.1.1. WASTE DISPOSAL

Laboratory personnel have completed and affixed the hazardous waste label for all hazardous waste containers. Laboratory personnel have identified all unknown wastes? OEHS cannot pickup unknown materials. Laboratory personnel have segregated all labeled hazardous wastes by hazard class. Laboratory personnel have ensured that each hazardous waste container is leak proof and closed (e.g. lids or caps tightened, debris double bagged and air tight, questionable containers double bagged)? Laboratory personnel have contacted OEHS at 862-4041 to request a hazardous waste pick-up for unwanted hazardous materials and hazardous waste

1.1.2. Recyclability

Recyclability measures a material’s capacity to be used as a resource in the creation of new products. Steel is the most commonly recycled building material, in large part because it can be easily separated from construction debris by magnets.

Many building materials that cannot be reused in their entirety can be broken down into recyclable components. Often, it is the difficulty of separating rubble from demolition that pre- vents more materials from being recycled.

Once separated, glass is very easy to recycle: post-consumer glass is commonly used as a raw material in making window glass, ceramic tile, and brick. Concrete, unlike steel and glass, cannot be re-formed once set, but it can be ground up and used as aggregate in new concrete or as road bedding. Currently, very little concrete and glass from site demolition is recycled because of the difficulty in separating these materials from construction debris. Plastics alone are easy to recycle but are often integrated into other components which make separation difficult or impose- sible. Plastic laminates are generally adhered to plywood or particleboard, making these wood products also hard to recycle. Some foam insulation can be reformed, but the majority cannot. Foam insulation can, like glass, be used as filler in concrete and roadbeds.

Reduction in Construction Waste Many building materials come in standard sizes, based on the 4' x 8' module defined by a sheet of plywood. Designing a building with these standard sizes in mind can greatly reduce the waste material created during the installation process. Efficient use of materials is a fundamental principle of sustainability. Materials that are easily installed with common tools also reduce overall waste from trimming and fitting.

Waste Disposal Collect, store, and remove combustible waste products at the end of each workday or at the end of each work shift. Use only noncombustible containers to dispose of waste and rubbish and equip them with fitted or self-closing covers. Promptly remove and dispose of spills of flammable or combustible liquids. Place scrap lumber in containers and do not allow it to accumulate in work areas. Remove or bend over protruding nails unless the scrap lumber is placed directly in containers for removal.

When choosing between waste minimization options, the following hierarchy for waste management is preferred:

i. waste avoidance and/or reduction
ii. Reuse

iii. Recycling Diverting the waste stream in these ways means that waste treatment and waste disposal options can be reduced. Construction sites should pursue this hierarchy and seek out waste reduction opportunities. To identify opportunities, it is necessary to consider all aspects of the project and the wastes it generates. Waste can be minimized by using improved technology, recycled or reused on-site, or by making purchasing decisions that favor recycled products. Wherever possible, include performance measures and targets for reduction, reuse and recycling options in the environmental management plan

Waste minimization opportunities include:

- obtaining construction materials, paints, lubricants and other liquids in reusable packaging or containers
- using noise barriers made from recycled materials
- Using overburden to construct temporary noise barriers.
- using contaminated water out of sediment dams for dust suppression and irrigating adjacent vegetated land
- sending waste concrete from demolition activities to a concrete recycler instead of landfill
- segregating and recycling solid wastes generated by construction activities, offices and mess-rooms
- collecting lubricating oil from the construction vehicle fleet and sending it to a recycle

Working in the building industry can be dangerous, but here are some general rules to follow in order to work safely:

- Always wear the appropriate Personal Protective Equipment (PPE) as instructed; this could be as simple as wearing gloves to carry off-the-saw (OS) timber.
- Always keep your working area tidy
- Always report any hazard you see

- Never carry on, or lark about on a site or in a workshop
- Always take care of, clean and maintain the tools you use
- Don’t talk to others, be distracted by or distract others while you are working
- At the end of a work session always leave the workshop or site the way you would hope to find it. If you leave stuff lying about someone could trip over it and injure themselves!

Self-Check -1	Written Test

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

1. Hazardous materials stored at your site that are being used for their intended purpose are not considered “wastes” and may be stored on site indefinitely? (2 points)

   A. True B. False

2.which one of the following is waste minimization opportunities? (3 point

   A. using noise barriers made from recycled materials

   B. Using overburden to construct temporary noise barriers.

   C. Obtaining construction materials, paints, lubricants

   D. All

Note: **Satisfactory rating - 3 and 5 points Unsatisfactory - below 3 and 5 points**

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

Answer Sheet

Score = _____

Rating: _____

Information Sheet-2	Maintaining tools and equipment's

1.1 Maintaining tools and equipment's

Proper tools and equipment are essential for the effective operation of any civil works site. Equipping the construction site with the correct tools and equipment plays an essential role in achieving timely and good quality results. For every construction activity there is an optimal combination of tools, equipment and labor. Depending on the nature and content of the works, the technical staff needs to know which tools to use and how to effectively combine them with manual labor.

Once on site, equipment requires trained operators and supervisory staff who are proficient in its operation and maintenance.

Faulty equipment is a common reason for delays on construction sites. A major responsibility of the project management is to ensure that tools and equipment are maintained in a good condition and are readily available when required for the various work activities.

For certain construction activities, particularly hauling of materials and compaction, high labor productivity and good quality of work may be difficult to achieve using only manual labor and hand tools. In such cases, using light construction equipment can increase the efficiency of work.

Site supervisors need to know how to use the tools and how to operate the equipment in order to secure good work progress and the expected high-quality results. It is also important that staff know the full potential, as well as the limitation, of the use of manual and equipment-based works methods.

Finally, tools and equipment need regular maintenance, requiring good workshop facilities, a reliable supply of spare parts and qualified mechanical staff.

Tools and Equipment

- Only tools and equipment which are in good condition may be used.
- Tools shall only be used for the purpose for which they were designed.
- Employees shall make frequent inspections of tools and equipment, and immediately remove from service any items found defective. The following are examples of the types of defects which should be looked for:
    A. Split, broken, cracked, or splintered wooden handles.
    B. Mushroomed heads on chisels or impact drills.
    C. Wrench jaws which slip or do not hold.
    D. Frayed cords damaged or modified grounding plugs, or broken insulation on electrical tools.
    E. Rounded edges on sharp-edged tools.
    F. Dull cutting tools.
- When using hand tools, the employee shall place himself in such a position that he will avoid injury if the tool slips.
- Only soft faced hammers (brass, plastic, rubber, or similar materials) shall be used on highly tempered steel tools such as cold chisels, star drills, etc. Proper eye protection must be worn when performing such an operation.
- Files, rasps, and other tools having sharp tangs shall be equipped with approved handles.
- Tools which are not in use shall be placed where they will not present a tripping or stumbling hazard.
- Pointed tools shall never be carried edge or point up in pockets.
- Tools shall not be thrown from one worker to another, or to another working location.
- Extensions shall not be used on wrenches to gain leverage unless the wrench is designed to be used in such a fashion.
- When cutting wire or any other material under tension, the material being cut shall be secured to prevent the ends from snapping free.

- All power tools must be properly grounded before their use.
- Gloves shall not be worn when operating lathes, drill presses, power saws, or similar equipment. Loose clothing must not be worn and long sleeves should be rolled up prior to operation.
- Hooks, brushes, vacuums, or special tools shall be used to remove dust or chips. Compressed air shall not be used.
- All machinery must be turned off when unattended.
- Maintenance, repairs, adjustments, and measurements must not be made while saws, lathes, grinders, and similar equipment are in operation.
- Compressed air shall never be used to dust off clothing, or be directed toward another person.
- Saw blades, gears, sprockets, chains, shafts, pulleys, belts, and similar apparatus shall not be operated without the proper guarding.
- Safety glasses, goggles, or face shields shall be worn when operating power tools

Checking and maintenance

- Before every use, look for signs of damage to blasting equipment and power tools.
- Before use, check compressed air lines; check that any compressed air cutout works properly.
- At least once a week, check the condition and operation of blasting equipment.
- At least once a quarter, maintain the equipment according to the manufacturer's instructions.
- Keep this information in your testing logbook.

Use care when handling hawks and trowels as the edges can become sharp with use. Keep the surfaces of application tools clean during use and when the work is done. Ensure that application tools are dry before storing them. Never use a trowel for chipping or chopping.

Self-Check -2	Written Test

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

1. Before every use, look for signs of damage to blasting equipment and power tools.

A. True B. False

2. When cutting wire or any other material under tension, the material being cut shall be secured to prevent the ends from snapping free.

A. True B. False

Note: **Satisfactory rating - 4 and 8points Unsatisfactory - below 4 and 8points**

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

Answer Sheet

Score = _____

Rating: _____

LAP Test	Practical Demonstration

Name: _____ Date: _____
Time started: _____ Time finished: _____
Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within 4 hours.

Task 1 Cutting Sheets
Task 2. Fixing the Plasterboard
Task 3. Jointing and finishing plasterboard

List of Reference Materials

1- www.IdealConcreteBlock.com
2- Mar 3, 2011 Halliburton Energy Services, Inc. Treatment fluids comprising transient polymer networks
3- Shower pan construction, **Marshland Glenn A** Oct 11, 1949
4- **https://www.youtube.com/watch?v=65jYtUMLl2E**

ANSWER KEY

Lo 1

Self-check 1 Self-check 2 Self-check 3

1 c 1. C 1. a

2. C 2. A 3. A 2. a

Self-check 4

1.d

Self-check 5

1. number of plasterboard's needed
2. number of boards including waste factor
3. tape needed in lineal meters of tape
4. number of screws needed
5. lightweight all-purpose compound in liters

Self-check 6

i. The condition or feeling of being safe; security; certainty.

Lo 2

Self-check 1

1. Measuring tape: -To measure dimension of various materials
2. Carpenter's pencil: -To mark the length before cutting
3. Plumb bob: - To transfer set out marks from the floor to the ceiling and vice versa
4. Plastering knife: -To apply joint compound to plasterboard
5. Plastering hawk: -To transfer joint compound from its container to plasterboard
6. Spirit level: - To ensure verticality and alignment

Self-check 2

1. Simply place the 100 cm long rail on the board, draw the carriage with cutting blade across the cardboard and

2. Break the board by applying gradual, controlled pressure. Please do not strike the board as it is important that the layer of cardboard remains intact.

3. You do not have to change the position of the board to cut the cardboard on the back. One working step less to perform! Simply slide the carriage in the opposite direction, the integral hook blade will then cut the second cardboard layer cleanly on the way back.

Self-check 3

1.A

Self-check 4

1. The standard has been developed to address observed needs and to support the local industry in order to make progress through upraising competitiveness and maintain comparative market advantage both domestically and internationally.

Self-check 5

1.A

LO 3

Self-check

1. A

2. D

Self-check 2

1. A

2. A

No	Name of trainer	Qualification	Region	E-mail
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