



PARTICIPANT'S GUIDE

Helper Electrician

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Unit Summary

1. INTRODUCTION TO CONSTRUCTION INDUSTRY.....	11 - 17
2. SELECT & USE HAND, POWER TOOLS AND ELECTRICAL DEVICES.....	18 - 26
3. PERSONAL HEALTH, SAFETY & ENVIRONMENT PROTOCOL AT CONSTRUCTION SITE	27 - 60
4. MATERIAL HANDLING & STORING	61 - 77
5. FUNDAMENTALS OF ELECTRICITY	78 - 127
6. HOUSE WIRING & LIGHTING SYSTEMS	128 - 161
7. WALL CHASING & CONDUIT FIXING	162 - 186
8. PLAN & ORGANIZE WORK TO MEET EXPECTED OUTCOMES	187 - 212
9. WORK EFFECTIVELY IN A TEAM	213 - 230
10. CUTTING, FILLING, LEVELLING & COMPACTION OF EARTH	231 - 246
11. ERECT AND DISMANTLE 3.6 METER TEMPORARY SCAFFOLD	247 - 276



Table of Contents

Topics
Unit 1 - Introduction to Construction Industry
Introduction to Construction Organization
Structure of the Construction Organization
Types of Electrical Works at Construction Site
Role & Responsibilities of a Helper Electrician
Unit 2 - Select & Use Hand, Power Tools & Electrical Devices
Electrical Tools & Equipment
Types of Tools
Unit 3 - Personal health, safety and environment protocol at construction site
Introduction
Major Possible Injuries on Construction Site
List of Possible Accidents, Precautions and Actions
Causes of Electrical Accidents on Construction Site
Responsibilities in Cases of Accidents
First Aid
First Aid Kit
Monitoring Safe Work Practices
Personal Protective Equipment
Protective Clothing and Protective (Safety) Gear
Overcoming Staff Reluctance to Wear the Safety Gear
Electrical Hazards
Preventing Electrical Hazards
Using Electrical Equipments Safely
Preventing Electric Shock on the Job
First Aid for Electric Shock
Snake Bite Precautions and First Aid
First Aid Treatment for Snake Bite
Summary
Unit 4 - Material Handling and Storing
Introduction



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Advantages of Material Handling
Objectives of Material Handling
Principles of Material Handling
Negative Health Effects of Material Handling
Heavy Lifting
Pushing, Pulling and Carrying
Vehicular Activities
Staging and House Keeping
Methods of Loading and Unloading
Storing and Stacking of Construction Material
Summary
Unit 5 - Fundamentals of Electricity
Introduction to Electricity
Fundamental Properties of Electricity
Work, Power & Energy
Basic Terminologies used in Electricity
Types of Electricity
How to Identify a Conductor and an Insulator
Crimping
Soldering
Electrical Circuit
Earthing and Its Methods
Different Types of Wiring Systems
Circuit Protection Devices
Unit 6 - House Wiring & Lighting Systems
Introduction to Conduit Wiring
Checklist for Electrical Wiring
Symbols
Electrical Accessories
Personal Safety and Earthing
Various Types of Lamps
Unit 7 - Wall Chasing & Conduit Fixing
Install Conduits and Assist in LV Wiring at House Electrification Works
Concealed Wiring
Wall Chasing
Chasing Tools
Type and Size of Conduit



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Accessories and Conduit Joints
Protection against Dampness and Rust
Fixing of Conduits
Fabrication of Conduit
Pipe Threading
Installation of Conduit
Conduit Fixing
Filling Chases
Maintain Site Tidiness
Unit 8 - Plan & Organise Work to Meet Expected Outcome
Keep Immediate Work Area Clean & Tidy
Keep the Order of the Place
Self Discipline & Punctuality
Factors that Affect the Quality of Employees
Work in line with Organization's Policy & Procedures
Organisation's Standards of Appearance and Behaviour
Maintain Personal Cleanliness/Hygiene
Checking Work for Accuracy
Recording Solutions for Queries
Obtain Guidance from your Line Manager
Seeking Feedback from Seniors/Line managers
Understanding the Work Output Requirements
Ensure Work Meets the Agreed Requirements
Plan Activities as per Schedule and Sequence
Organize Work Output, Materials Used, Tools and Tackles Deployed
Use Resources in an Optimum Manner
Processes adopted to be in line with the Specified Standards and Instructions
Unit 9 - To Work Effectively in a Team
Communicating with Colleagues
Working Collaboratively with Colleagues
Following Proper Hierarchy and Work Culture
Honouring your Deadlines and Commitments Made to Colleagues
Delivering Quality Work on Time
Identifying and Solving Problems you have with Colleagues
Following Organization's Policies and Procedures for Conflict Resolution
Team Building / Coordinating Skills
Interpersonal Skill Development
Unit 10 - Cutting, Filling, Levelling & Compaction of Earth



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Introduction
Steps involved in Layout and Building Setting
Requirements for Layout Work
Necessary Precautions to be Taken for Layout Work
Excavation
Requirements to Start Excavation
Tools, Machineries and Material for Excavation
Excavation in Black Cotton Soil Shoring for Excavation
Excavation in Soft/Hard Murum
Excavation in Rock
Mass and Deep Excavation
Excavation in Flowing Water
Foundations
Precautions during Excavation and Foundation
Cutting and Filling the Earth <ul style="list-style-type: none">• Electrical Grounding• Operating the Hand Roller
Hazards below Ground Level
Causes of Hazards when Working at or below Ground Level
Specific Hazards of Excavations
Points to Remember when Working in Excavations
Points to Remember when Searching for Buried Services
Summary
Unit 11 - Erect and Dismantle 3.6 Meter Temporary Scaffold
Introduction
Material Used in scaffolding
Erection, Alteration and Dismantling of Scaffold
Rigging of Loads
Process of Erecting and Dismantling Scaffolds
General Precautions During Erection of Scaffolds
Mud Sill on the Slopping Ground
Considerations before using Scaffold
Hoisting of Materials
Fall Protection in Scaffold Erection
Duties of Scaffolding Erectors and Users of Scaffold
Safe Work Practices for Scaffolding Users



Unit 1 - Introduction to Construction Industry

Learning Objectives:

- Understand and learn about structure of the construction organization
- Understand and learn about types of electrical works at construction site
- Understand and learn about role & responsibilities of a helper electrician

Introduction to Construction Organization

In this unit we will look into objectives and structure of a construction organization.

The construction industry plays a key role in the development of a nation, as it provides one of the three basic needs of human life; “A House” to the society.

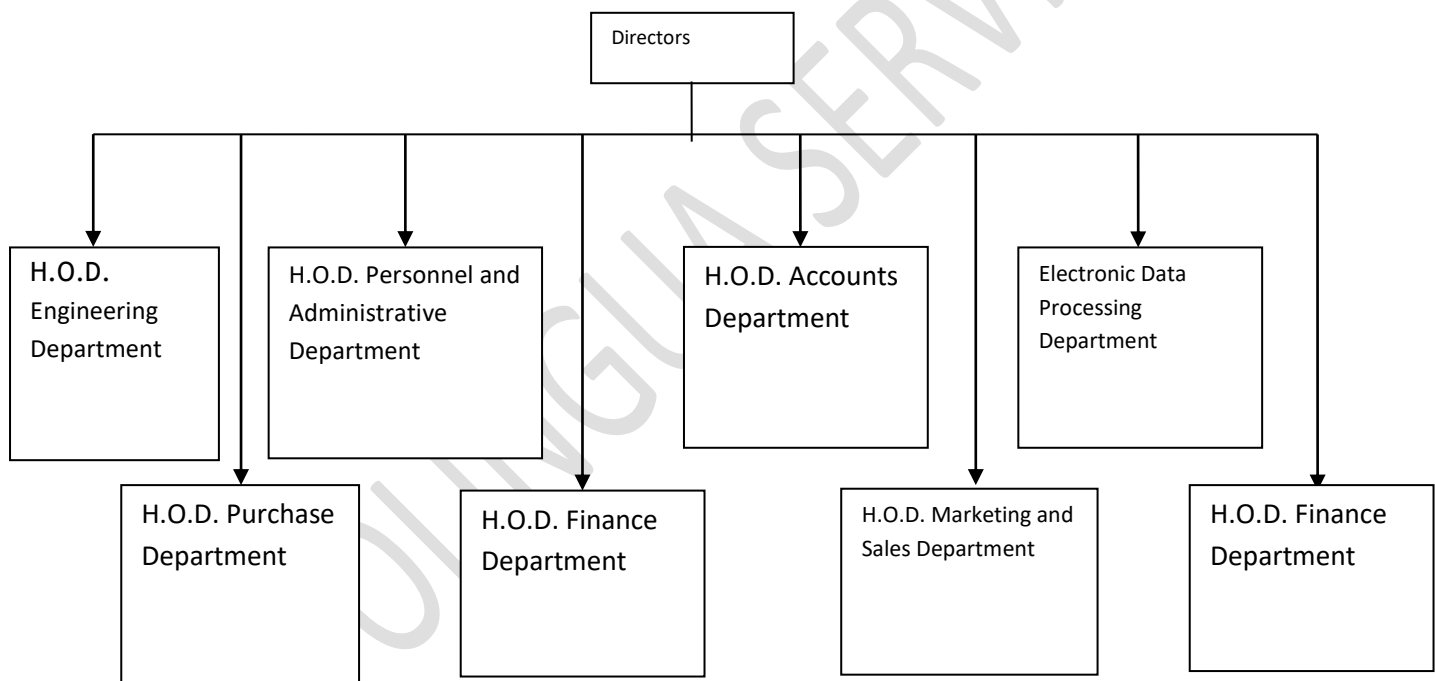
A construction organization may consist of an individual contractor or it may be a big construction organization. The scope of the work may be limited to constructing a small house or it may extend to the construction of a township of row bungalows, row houses and residential apartments.

Structure of the Construction Organization

The building construction organization is a centralized type of organization. Here, individual departments such as engineering, finance, purchase, sales etc. with their Head of the Departments (H.O.D.) report directly to management.

Normally, a construction organization consists of the following departments:

- 1) Engineering department
- 2) Purchase department
- 3) Finance department
- 4) Personnel and Administrative department
- 5) Marketing and Sales department
- 6) Accounts department
- 7) Legal department
- 8) Electronic Data Processing department



Structure of the Construction Organization

Types of Electrical Works at Construction Site

Electrical works at construction site involve the following:

- Laying of cables/ wires from power source to desired equipments
- Installation and maintenance of common electrical equipments and machineries at construction sites
- Installation and maintenance of LV wiring and electrical fixtures at industrial, residential and commercial buildings



Note: All the activities must be carried out as per organizational HSE norms conforming to relevant electrical standard operating procedures, guidelines or specifications applicability.

Role & Responsibilities of a Helper Electrician

Construction electricians assemble, install, and wire the electrical systems in new homes and buildings. Light, heat, power, air-conditioning, and refrigeration operate through electrical systems. Electricians usually install the wiring after the building is partially built. They follow blueprints and wiring diagrams. They also install electronic equipment and signal communication systems.

When electricians wire new homes or buildings, they first run conduit, which is metal tubing or pipe, inside walls and ceilings. They must cut the conduit to the proper length. Once the conduit is in place, electricians pull the wires through the tubing. To complete the circuit, they attach these wires to switches and outlets. Then they solder or screw wires to the fuse box, circuit breakers, or transformers. For safety reasons, electricians must follow state, country, and municipal codes in wiring.

Role and responsibilities of an helper electrician working at an electrical site include:

- Measure, cut, and bend wire and conduit, using measuring instruments and hand tools
- Trace out short circuits in wiring, using test meter
- Strip insulation from wire ends, using wire stripping pliers, and attach wires to terminals for subsequent soldering.
- Examine electrical units for loose connections and broken insulation and tighten connections, using hand tools.
- Construct controllers and panels, using power drills, drill presses, taps, saws and punches.
- Drill holes and pull or push wiring through openings, using hand and power tools.
- Clean work area and wash parts.
- Maintain tools, vehicles, and equipment and keep parts and supplies in order.
- Transport tools, materials, equipment, and supplies to work site by hand, hand truck, or heavy, motorized truck.
- Thread conduit ends, connect couplings, and fabricate and secure conduit support brackets, using hand tools.
- Prepare a list of requisition materials, using warehouse requisition or release forms.
- String transmission lines or cables through ducts or conduits, under the ground, through equipment, or to towers.
- Perform semi-skilled and unskilled laboring duties related to the installation, maintenance and repair of a wide variety of electrical systems and equipment.
- Solder electrical connections, using soldering iron.
- Dig trenches or holes for installation of conduit or supports.
- Trim trees and clear undergrowth along right-of-way.
- Raise, lower, or position equipment, tools, and materials, using hoist, scaffolding.
- Break up concrete, using air hammer, to facilitate installation, construction, or repair of equipment.



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- Operate cutting torches and welding equipment, while working with conduit and metal components to construct devices associated with electrical functions.
- Paint a variety of objects related to electrical functions.

Exercise

Answer the Following Questions

1. What is meant by a construction organization?

2. List out the departments that come under a construction organization?

3. What types of electrical works are carried out at construction site?

4. What are the norms to be followed for carrying out electrical works at construction site?

5. What are the role and responsibilities of a helper electrician?

Space for Self Notes



Unit 2 - Select & Use Hand, Power Tools & Electrical Devices

Learning Objectives:

- Understand and learn about selection and use of hand, measuring, cutting & chasing tools
- Understand and learn about selection and use of power tools
- Understand and learn about use of testing tools

Electrical Tools & Equipment

An Electrician should use equipments which will provide protection against shocking because most of the time a line man/an electrician will be working with the live wire. To detect an error and rectify the fault element without getting a shock, safety should be considered as a primary thing by an electrician. So some tools were specially designed for electricians only which are mentioned below:

Types of Tools

- **Basic Hand Tools** - used at construction site consist of combination pliers, screw driver set, line tester, nose pliers, ball pane, cross pin, sledge hammers, electric knife, etc.



- **Measuring Tools** - Measuring Tools consist of measuring tape, analog meters, digital meters, wire gauge, tri-square, etc.



- **Cutting & Chasing Tools:** Hand Saw, Tennon Saw, Knife, Chisels & Drilling Tools





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- **Power Tools:** These tools consist of drilling machine, chasing machine, cutting machine, demolition machine, etc.



Testing Tools: Testing tools consist of test lamp, digital multimeter, clamp meter, line tester 500v, test lamp, etc.



1. Tester

It is a type of screwdriver with the ability to detect power in the socket/ wire. To do that, we have to TAP the tester inside the socket and touch the TOP. If the light glows, it indicates that a voltage is present on a circuit.



2. Cutting pliers, Nose Plier & Sleeve Remover



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These are the cutting tools used to cut the wire and to remove the sleeve without damaging the conductor material.



3. Insulation Tape

- An Insulation tape is an electric tape used to insulate manual joint. A wide variety of electrical tapes are available; some for highly specialized purposes. Electricians generally use only black tape for insulation purposes.
- The other colours are used to indicate the voltage level and phase of the wire. (In fact, the colour tape is referred to as "phasing tape".) This is done on large wire which is available only in black insulation.
- When the wires are phased, a ring of tape is placed on each end near the termination so that the purpose of the wire is obvious.





4. Hand Gloves

- A glove is a garment covering the whole hand. Gloves have separate sheaths or openings for each finger and the thumb; if there is an opening but no covering sheath for each finger they are called "fingerless gloves".
- Fingerless gloves with one large opening rather than individual openings for each finger are sometimes called gauntlets.
- Gloves which cover the entire hand or fist but do not have separate finger openings or sheaths are called mittens.
- Mittens are warmer than gloves, made of the same material because fingers maintain their warmth better when they are in contact with each other. It reduces the surface area and reduces the heat loss.



Instructions

- Check Voltage in socket using tester
- Use cutting tools to remove sleeve of a wire without damaging strands of different size wires

to Use Tools:

Other Equipments

- Show all other equipments separately and explain how to handle them.

Multi meter

- A multi meter or a multi tester, also known as a VOM (Volt-Ohm meter), is an electronic measuring instrument that combines several measurement functions in one unit.



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- A typical multi meter would include basic features such as the ability to measure voltage, current, and resistance. Analogue multi meters use a micro ammeter whose pointer moves over a scale calibrated for all the different measurements that can be made.
- Digital multi meters (DMM, DVOM) display the measured value in numerals, and may also display a bar of a length proportional to the quantity being measured.
- Digital multi meters are now far more common than analogue ones, but analogue multi meters are still preferable in some cases, for example when monitoring a rapidly-varying value.
- A multi meter can be a hand-held device useful for basic fault finding and field service work, or a bench instrument which can measure to a very high degree of accuracy.
- They can be used to troubleshoot electrical problems in a wide array of industrial and household devices such as electronic equipment, motor controls, domestic appliances, power supplies, and wiring systems.
- It mainly used to measure Current, Voltage & Resistance.



Instructions to Use Multi Meter

- It should always be in voltage mode when connected in parallel to check voltage
- Should be in Current mode while connected in series
- Should be in resistance mode which checking closed circuit and its resistance.
- If not, Multi meter will blow.

Exercise

Answer the Following Questions

1. List out various hand tools used by an electrician?



2. List out various cutting & chasing used by an electrician?

3. List out various measuring tools used by an electrician?

4. List out various power tools used by electrician?

5. What are testing tools? Give examples.

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