Telecom
Sector
Skill
Council

Participant Handbook

Sector
Telecom

Sub-Sector
Handset

Occupation
E-Waste Management

Reference ID: **TEL/Q2400, Version 4.0**
NSQF level 3

Telecom
E-Waste Handler

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> If we have to move India towards
> development then Skill Development
> should be our mission. "

Shri Narendra Modi
Prime Minister of India

Certificate

COMPLIANCE TO
QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARDS

is hereby issued by the

TELECOM SECTOR SKILL COUNCIL OF INDIA

for

SKILLING CONTENT: PARTICIPANT HANDBOOK

Complying to National Occupational Standards of
Job Role/ Qualification Pack: **'Telecom E-waste Handler'** QP No. **'TEL/Q2400, NSQF Level 3'**

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Acknowledgements

About this book

India is currently the world's second-largest telecommunications market with a subscriber base of 1.20 billion and has registered strong growth in the last decade and a half. The Industry has grown over twenty times in just ten years. Telecommunication has supported the socioeconomic development of India and has played a significant role in narrowing down the rural-urban digital divide to some extent. The exponential growth witnessed by the telecom sector in the past decade has led to the development of telecom equipment manufacturing and other supporting industries.

Over the years, the telecom industry has created millions of jobs in India. The sector contributes around 6.5% to the country's GDP and has given employment to more than four million jobs, of which approximately 2.2 million direct and 1.8 million are indirect employees. The overall employment opportunities in the telecom sector are expected to grow by 20% in the country, implying additional jobs in the upcoming years.

This Participant handbook is designed to impart theoretical and practical skill training to students for becoming Telecom E-Waste Handler in the Telecom Sector.

Telecom E-Waste Handler is responsible for collecting e-waste from retailers, repair shops and other unor-ganized stakeholders.

This Participant Handbook is based on E-Waste Handler Qualification Pack (TEL/Q2400) and includes the following National Occupational Standards (NOSs):

1. TEL/N2401 – Promoting proper Telecom E-waste Handling and Disposal
2. TEL/N9101 – Organise Work and Resources as per Health and Safety Standard
3. TEL/N9102 – Interact Effectively with Team Members and Customers

The Key Learning Outcomes and the skills gained by the participant are defined in their respective units.

Post this training, the participant will be able to manage the counter, promote and sell the products and respond to queries on products and services.

We hope this Participant Handbook will provide sound learning support to our young friends to build an attractive careers in the telecom industry.

Symbols Used

Key Learning Outcomes	Unit Objectives	Exercise	Tips	Notes	Activity	Summary

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Unit 1.1 - Introduction to the Telecom Industry in India

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Key Learning Outcomes

By the end of this module, the participants will be able to:

1. Outline the size and scope of the Telecom industry and its various sub-sectors.
2. Elaborate e-waste management
3. Discuss the various opportunities for Telecom E-waste Handler in the Telecom industry
4. List the role and responsibilities of a Telecom E-waste Handler
5. Analyse the organisational policies on incentives, delivery standards, personnel management and public relations (PR) pertinent to the job role
6. Discuss the importance of seeking help from experts during any stage of the main activity to avoid any escalation

UNIT 1.1: Introduction to the Telecom Industry in India

Unit Objectives ◎

By the end of this unit, the participants will be able to:

1. Discuss about the telecom industry and its various sub-sectors in India
2. Outline the growth of the mobile handset industry in India
3. List the top telecom product manufacturers in India
4. Identify the regularity authorities in the Telecom industry in India

1.1.1 Introduction to the Telecom Sector in India

The Indian telecom industry has been one of the fastest growing industries in the country, and this sector strives to tap almost every potential customer to render its services. Having a mobile has become the need of every person, and nowadays, everybody wants to enjoy these services.

Due to recent growth in the Information Technology (IT) industry, there has been a boom in the Indian telecom sector, leading to an increase in market size. Since there has been a high dependency of the Indian population on this sector, as several companies are operating in India and overseas, there have been frequent problems in the smooth functioning of this sector as customers' needs and desires are increasing day by day. This study will provide insight into the telecom sector and its steps to improve customer relationships.

With privatisation, liberalisation and globalisation after 1991, so many companies are operating in India; hence the market is quite competitive. With so much competition prevailing, companies are interested to know the customer's perception towards various mobile services to work on it and capture the market.

India is the world's second-largest telecommunications market. The total subscriber base, wireless subscriptions, and wired broadband subscriptions have grown consistently. Tele-density stood at 85.91%, as of December 2021, total broadband subscriptions grew to 792.1 million until December 2021, and the total subscriber base stood at 1.18 billion in December 2021.

India's telephone subscriber base expanded rapidly during the last few years. Due to rigid competition, some industry has recently witnessed major mergers as telecom companies are optimising and rationalising their operations.

Over the last seven years, the Telecom Tower industry in India has grown significantly by 65%. Mobile towers have increased from 400,000 in 2014 to 660,000 in 2021. This has resulted in the rapid growth of Mobile Base Transceiver Stations by 187% and increased from 800,000 in 2014 to 2.3 mn in 2021.

The Department of Telecom (DoT), GOI targets a combination of 100% broadband connectivity in the villages, 55% fibreization of mobile towers, average broadband speeds of 25 Mbps and 30 lakh km of optic fibre rollouts by December 2022. By December 2024, it looks at 70% fibreisation of towers, average broadband speeds of 50 Mbps and 50 lakh km of optic fibre rollouts at a pan-India level. It is also estimated that 5G technology will contribute approximately $450 bn to the Indian economy in the period 2023-2040.

Source: www.investindia.gov.in/sector/telecom

Telecom Industry at a Glance

1. Telecom services are the most important tool for socio-economic development today.
2. It is one of the prime support services needed for the rapid growth and modernisation of various sectors of the economy.
3. In recent years, the Indian telecom industry has witnessed phenomenal growth.
4. A conducive business environment, favourable demographic outlook, and the political stability enjoyed by the country have contributed to the industry's growth.
5. India achieved the distinction of being among the world's lowest call rates, the fastest sale of mobile phones, the cheapest mobile handset, and the most affordable colour phone.
6. The Indian telecommunication sector has undergone significant policy reforms, beginning with the National Telecom Policy (NTP) 1994, which was subsequently re-emphasised and carried forward under NTP 1999.

1.1.2 Various Sub-Sectors of the Telecom Industry

Telecommunication is a multi-dimensional industry. It is divided into the following subsectors:
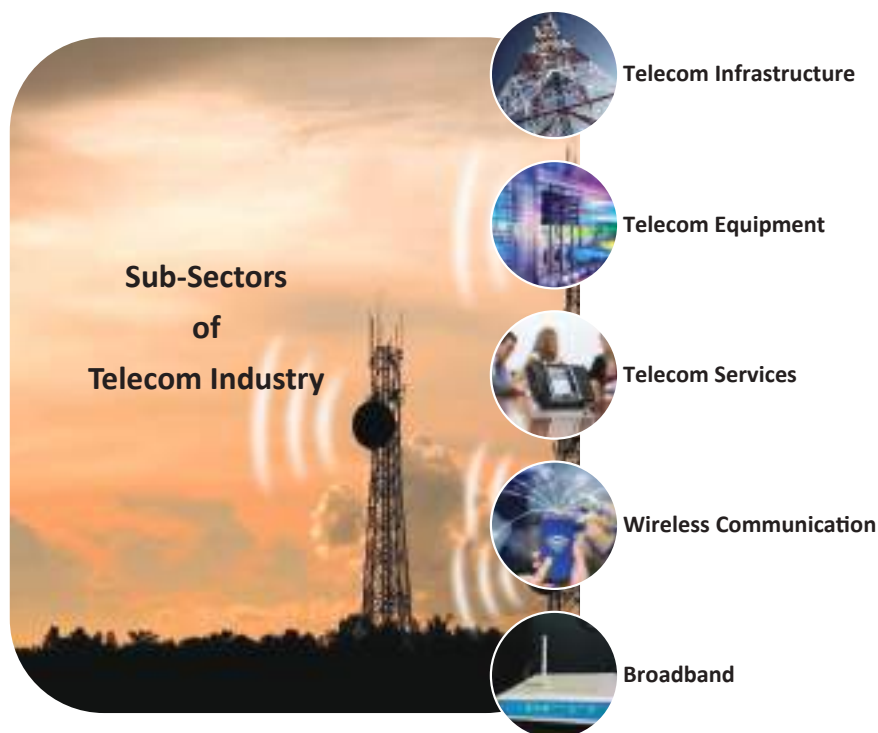

Sub-Sectors of Telecom Industry

- Telecom Infrastructure
- Telecom Equipment
- Telecom Services
- Wireless Communication
- Broadband

Fig. 1.1.1: Telecom Sub-Sectors

- **Telecom Infrastructure -** It is a physical medium through which all the data flows. This includes telephone wires, cables, microwaves, satellites, and mobile technology such as fifth-generation (5G) mobile networks.

- **Telecom Equipment** - It includes a wide range of communication technologies, from transmission lines and communication satellites to radios and answering machines. Examples of telecommunications equipment include switches, routers, voice-over-internet protocol (VoIP), and smartphones.

- **Telecom Services –** A service provided by a telecommunications provider or a specified set of user-information transfer capabilities provided to a group of users by a telecommunications system. It includes voice, data and other hosts of services.

- **Wireless Communication** - It involves transferring information without a physical connection between two or more points.
- **Broadband -** It is wide bandwidth data transmission which transports multiple signals at a wide range of frequencies and Internet traffic types, that enables messages to be sent simultaneously and used in fast internet connections.

The major segments within these sub-sectors include the following:

- Wireless communications
- Communications equipment
- Processing systems and products
- Long-distance carriers
- Domestic telecom services
- Foreign telecom services
- Diversified communication services

1.1.3 Indian Handset Market

India is the 2nd largest mobile handset market in the world. According to a recent study by Frost and Sullivan, the Indian mobile handset market is expected to continue to grow.

The Indian smartphone market surpassed the USA for the first time on an annual level, becoming the 2nd largest smartphone market globally, reaching 158 million shipments in 2019 with a 7% year-on-year growth, according to the latest research from Counterpoint's Market Monitor service. It is projected to be a threefold increase in the number of telecom participants, and the current number of sixty-eight mobile handsets players will go up above 200.

Another vital part of the survey is the increasing use of smartphones by the Indian consumer. The growing preference for high-end handsets and the desire to use new emerging web technologies could see the smartphone markets' revenues go very high.

Fig 1.1.2: Handset manufacturing unit in India

While the revenues in the urban areas are reaching a saturation point, many mobile manufacturers like Micromax, Karbonn, etc. have also started manufacturing phones for rural and semi-urban areas. The smartphone market is expected to grow tenfold in the coming year.

1.1.4 Top Handset Manufacturers in India

India is one of the largest smartphone markets in the world, and so are the number of players in the market. Xiaomi is leading the market at a 26.60% market share, even though its demand has recently decreased. Several 5G model launches and aggressive marketing promoted this Chinese brand to the top spot. Samsung recaptured the second spot with a 16.71% market share and is India's top-selling 5G smartphone brand. This South Korean tech giant also maintained its lead in the affordable premium segment.

Vivo, Realme and Oppo captured 15.74%, 12.79% and 11.42% of the market share, respectively and are among the fastest growing smartphone brands in the market. Apple stands next with 3.86% of the market share; however, it is one of the top-selling brands in the premium segment. OnePlus grew at a stunning rate to capture 3.76% of the market. Motorola, Huawei, Nokia, and others together capture the remaining 9.12% of the market share.
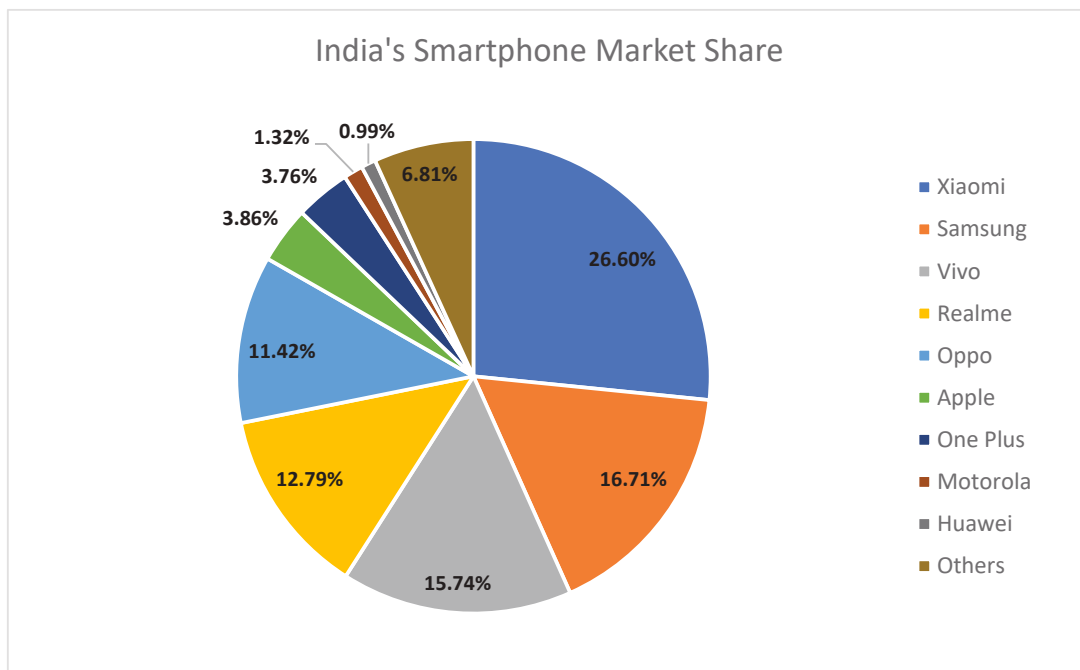
India's Smartphone Market Share

Fig. 1.1.3: Indian Smartphone Market Share

1.1.5 Regulatory Authorities in the Telecom Industry in India

Multiple regulatory authorities control the telecom sector in India. They are:

TRAI - Telephone Regulatory Authority of India

The Telecom Regulatory Authority of India, established in February 1997, regulates telecom services in India. Its scope includes fixing/revising tariffs for telecom services. The mission of TRAI is to create the environment needed for the growth of telecommunication at a pace that will empower India to play a major role in the emerging global information society.

One of the main objectives of TRAI is to provide a fair and transparent policy that facilitates fair competition. In January 2000, the Telecom Disputes Settlement and Appellate Tribunal (TDSAT) was set up to settle any dispute between a licensor and a licensee, between two or more service providers, between a service provider and a group of consumers, and to hear and dispose of appeals against any direction, decision or order of TRAI.

TDSAT - Telecom Disputes Settlement and Appellate Tribunal

It is a special body set up exclusively to judge any dispute between the DoT and a licensee, between two or more service providers, or between a service provider and a group of consumers. An appeal against TDSAT shall be filed before the Supreme Court of India within ninety days.

DoT

The Department of Telecommunications, abbreviated to DoT, is a department of the Ministry of Communications of the executive branch of the GOI.

The DoT promotes standardisation, research and development, private investment and international cooperation in matters relating to telecommunication services. It acts as a licensing body, formulates and enforces policies, allocates and administers resources such as spectrum and number, and coordinates matters in relation to telecommunication services in India.

UNIT 1.2: Introduction to E-Waste

Unit Objectives ◎

By the end of this unit, the participants will be able to:

1. Discuss about various types of waste
2. Recognise e-waste
3. Analyse the condition of e-waste generated in India
4. Identify telecom e-waste
5. List the health issues arising from e-waste
6. Discuss the importance of proper e-waste disposal

1.2.1 What is Waste?

Any unusable and unwanted materials which are regarded as a substance of no use are considered Waste. Garbage is mainly considered solid waste, including domestic waste, from schools, offices, etc., and industries and factories. Sources of waste can be classified as:
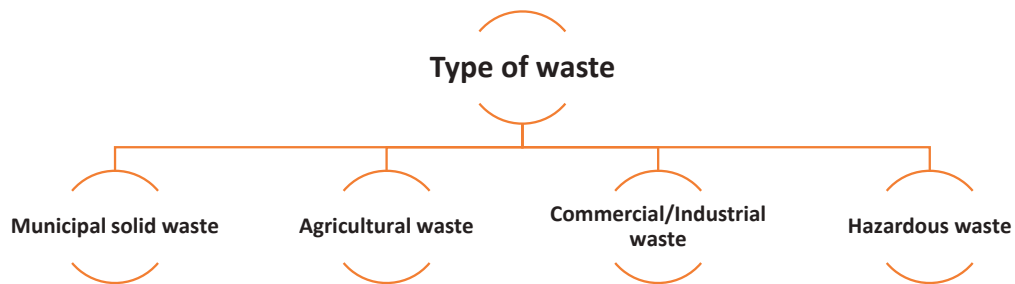
Type of waste

- Municipal solid waste
- Agricultural waste
- Commercial/Industrial waste
- Hazardous waste

Fig. 1.2.1: Type of Waste based on its source

Category of Wastes

Wastes are also divided into various categories:

Solid Waste
Any kind of garbage coming households, factories or hospitals come under waste. Except solid wastes are only solids or semi-solids. These solids/semi-solids can be dry or wet.

Wet Waste
Any dissolved liquid based waste or sludge coming from wastewater plants, households, etc come under wet waste.

Examples such as leftover curries, juices, rotten vegetables will come under wet waste

Dry Waste
Waste which isn't dissolved in any form or in liquid form come under dry wastes.

Examples such as plastics, bottles, etc will come under dry waste.

Fig. 1.2.2: Categories of Waste

Waste can also be classified based on degradability:

Basis For Comparison	Degradable Waste	Non-Degradable / Hazardous Waste
Meaning	Degradable waste can be broken down, in a reasonable amount of time, into its base compounds (carbon dioxide, water, methane or organic molecules) by micro-organisms, regardless of what those compounds may be.	Any material that can not be synthesised into carbon dioxide, methane gas, water or other organic molecule comes under non-biodegradable waste.
Examples	Dead animals and plants, their waste, rotten fruits, vegetables, flowers, paper, etc.	Chemicals, paints, metals, plastic, rubber, plastic, etc.
The rate of decomposition	Slow	Fast
Decomposed by	Bacteria, fungi, and other micro-organisms can decompose the material into the soil.	These substances do not degrade easily by natural agents.
Use	After degradation, the residue can be used to produce manure, biogas, fertilisers, compost, etc.	As their degradation rate is slow, separating and recycling are not easy and affordable.
Hazard	Bio-degradable substances are not harmful to the environment.	Non-Degradable substances are harmful to the environment.

Table 2.2.1: Degradable vs Non-Degradable Waste

1.2.2 Electronic Waste

Also known as e-waste, or e-scrap, it describes discarded electrical or electronic devices, components and leftover raw materials. Used electronics destined for refurbishment, re-use, resale, and salvage recycling through material recovery or disposal are also considered e-waste.

E-waste, called e-scrap, contains various toxic and hazardous materials and chemicals that are released into the environment if not disposed of properly. Electronics recycling is recovering material from old devices to use in new products.

Modern man's life is surrounded by so many electronic gadgets that we cannot imagine any activity of our day-to-day life that does not involve our electronic dependence. We wake up with an alarm on our mobile phone and end our day by setting the alarm for the next day on our phone or digital clock and voice command gadgets. Our

Fig. 1.2.3: E-waste

mobile phone, television, printer, copier, fax machine, stereo, projector, ATM, Cathode Ray Tube (CRT), Printed Circuit Board (PCB), LED, LCD, Card Payment Machine, calculator, Laptop, batteries, and the list is unending. But the lifespan and the duration of these gadgets are very short. Due to the limited durability, we sometimes surround ourselves with hazardous, degradable, and electronic waste.

Annually, computer devices account for nearly 70 per cent of e-waste, 12 per cent comes from the telecom sector, 8 per cent from medical equipment and 7 per cent from electric equipment.

The government, public, and private sector companies generate nearly 70 to 75 per cent of the e-waste in India, and the contribution of the individual household is only 15 to 16 per cent.
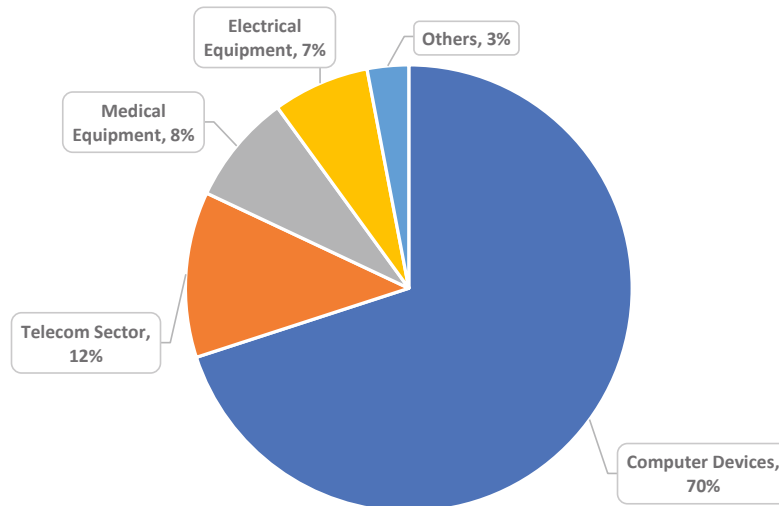

Fig. 1.2.4: E-waste generating sectors in India

1.2.3 Break-up of e-waste Generated in India

According to a report by the Central Pollution Control Board (CPCB), India generated 1,014,961 tonnes of e-waste in FY 2019-2020 – up 32% from FY 2018-2019.

Among the top ten cities in India, Mumbai ranks first in generating e-waste, followed by Delhi, Bangalore, Chennai, Kolkata, Ahmadabad, Hyderabad, Pune, Surat and Nagpur. The 65 cities generate more than 60% of the total e-waste, whereas 10 states generate 70% of the total e-waste.
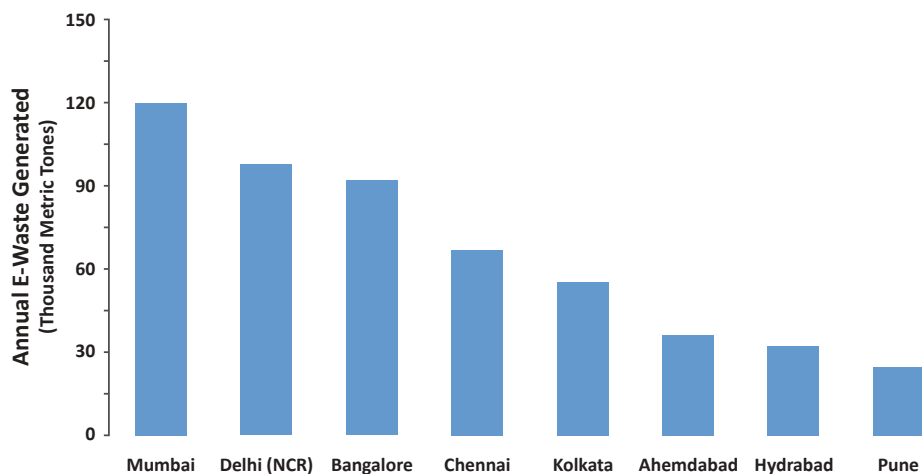

Fig. 1.2.5: Major e-waste producing states in India

Source: Source: www.ncbi.nlm.nih.gov/pmc/articles/PMC6236536
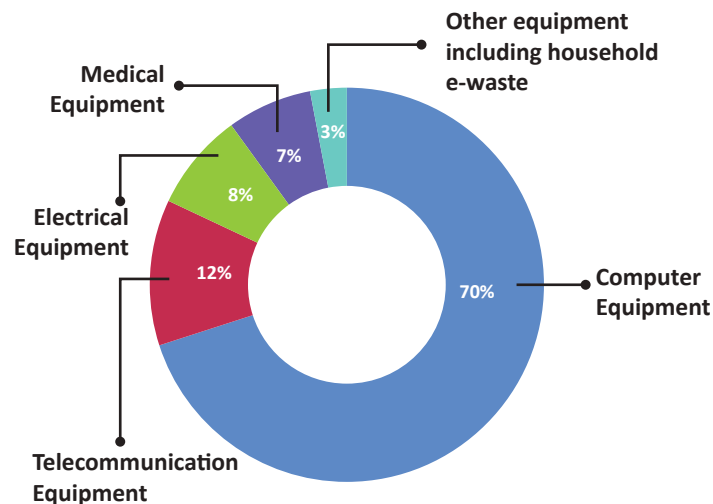
Fig. 1.2.6: Break-up of e-waste generated in India

1.2.4 E-Waste Awareness

Disposal of e-waste is an evolving global environmental and public health issue, as this waste has become the most rapidly growing segment of the formal municipal waste stream globally. E-waste or e-scrap is loosely discarded in most places.

In India, most electronic waste items are stored in households as people do not know how to discard them. This ever-increasing waste is a complex source of metals such as silver, gold, copper, and zinc that can be recovered and brought back into the production cycle.

Inappropriate dismantling and processing of e-waste render it hazardous to human health and the ecosystem. Therefore, the need for proper e-waste management has been realised. Reviewing the public health risks and strategies to combat this growing menace is necessary.

1.2.5 E-Waste Problems

E-waste poses a massive risk to humans, animals, and the environment. Due to heavy metals and highly toxic substances such as Mercury, Lead, Beryllium, and cadmium have become a significant threat to the environment, even in tiny quantities.

E-waste can be toxic and, most of the time, non-biodegradable and accumulates in the environment, soil, air, water and living things. For example, open-air burning and acid baths used to recover valuable materials from electronic components release toxic materials leaching into the environment.

The adverse health effects of these toxins on humans include brain, heart, liver, kidney and skeletal system damage. Toxins from e-waste can accumulate in our bodies and lead to DNA damage and cancer. Children are particularly vulnerable because they are still growing, and pregnant women exposed to e-waste can pass on increased health hazards to their children in the womb.

E-waste disposal can also cause climate change due to the chemicals released when it is burned. Discarded electronic devices contain materials like Copper (Cu), Aluminium (Al), and Iron (Fe), and when burned, these metals accumulate in the air.

Apart from the environmental and health issues, e-waste can also result in data theft. The computer's hard drive, or the smartphone's memory stick, contains confidential information, and this data can easily be retrieved if not disposed of incorrectly.

There are dozens of disposal methods, but most aren't perfect. Physical destruction or dismantling your electronic device is the only way to get it done. However, it should be done by a professional as modern laptops and smartphone batteries can explode if heavily damaged or dismantled incorrectly.

Different e-waste sources, their constituents, and health impacts:

1. Solder in Printed Circuit Boards (PCB), glass panels and gaskets in computer monitors.
    - Lead (Pb)

    Health effects are:

    - It causes damage to central and peripheral nervous systems, blood systems and kidneys damage.
    - Adverse effects on the brain development of children cause damage to the circulatory system and kidneys.

2. Chip Resistors and Semiconductors:
    - Cadmium

    Health effects are:

    - It causes an irreversible impact on human health as it accumulates in the kidneys and liver.
    - It also causes neural damage.

3. Relays and switches and Printed circuit boards
    - Mercury

    Health effects are:

    - It may cause chronic damage to the brain
    - It also causes respiratory and skin disorders due to bioaccumulation in fishes.

4. Galvanised steel plates and decorators or hardeners for steel housing.
    - Chromium

    Health effects are:

    - Causes Bronchitis

5. Cabling and computer housing
    - Plastic and PVC

    Health effects are:

    - Burning produces dioxin that causes reproductive and developmental problems.

6. Electronic equipment and circuit boards
    - Brominated flame retardants

    Health effects are:

    - Disrupt endocrine system functions

7. Front panels of CRTs
    - Barium, Phosphorus and heavy metals

    Health effects are:

    - Cause muscle weakness and damage to the heart, liver and spleen.

8. Copper wires, Printed circuit board tracks
    - Copper

    Health effects are:

    - Stomach cramps, nausea, liver damage or Wilson's disease.

9. Nickel-Cadmium Rechargeable batteries
    - Nickel

Health effects are:

- Allergy of the skin to nickel results in dermatitis, while allergy of the lung to nickel results in asthma.

10. Lithium-ion battery

- Lithium

Health effects are:

- Lithium can pass into breast milk and may harm breast-feeding babies.
- Inhaling of the substance cause pulmonary oedema.

11. Motherboard

- Beryllium

Health effects are:

- It is one of the potential causes of Lung cancer
- Inhalation of fumes and dust causes chronic beryllium disease or Berylliosis.

1.2.6 E-Waste Recycling in India

Only 22.7 per cent of the total 10,14,961.21 tonnes of e-waste generated in 2019-20 in India was collected and recycled or disposed of. This e-waste contained 21 types of Electrical and Electronic Equipment (EEE) notified under the 2016 E-Waste (Management) Rules.

In 2018-19, about 21.35 per cent of the total generated e-waste was handled, dismantled, and recycled in India, while in 2017-18, this percentage was only 9.79 per cent. The E-Waste (Management) Rules, 2016 gives the responsibility to producers to manage a system of e-waste collection, storage,

Fig. 1.2.7: E-waste recycling in the unorganised sector

transportation, and environment-friendly dismantling and recycling through Extended Producer Responsibility (EPR) authorisation. The rules also encourage the establishment of an efficient e-waste collection mechanism.

95 per cent of the e- Waste in India is recycled in the non-formal sector, and only 5 per cent of the volume is handled in the formal unit. India now has 178 registered e-waste recyclers, recognised by the state governments to process e-waste.

Fig. 1.2.8: E-waste recycling in the organised sector

1.2.7 Life cycle of E-waste

The "Four-Phase-Model" — from Electrical and Electronic Equipment (EEE) to Waste Electrical and Electronic Equipment (WEEE)

The material flow model covers four phases of EEE as well as end-of-life EEE (WEEE):

Phase I: Production and sales of EEE, including import, export, and input of equipment for re-use from repair of WEEE.

Phase II: Consumption of EEE, use of EEE in households, offices and industry.

Phase III: Collection of end-of-life EEE (WEEE), including transfer to treatment/disposal sites, import/export.

Phase IV: Treatment/disposal alternatives for WEEE, landfill, incineration, shredder, repair and disassembly, material and energy recovery, including the emitted material or substances.
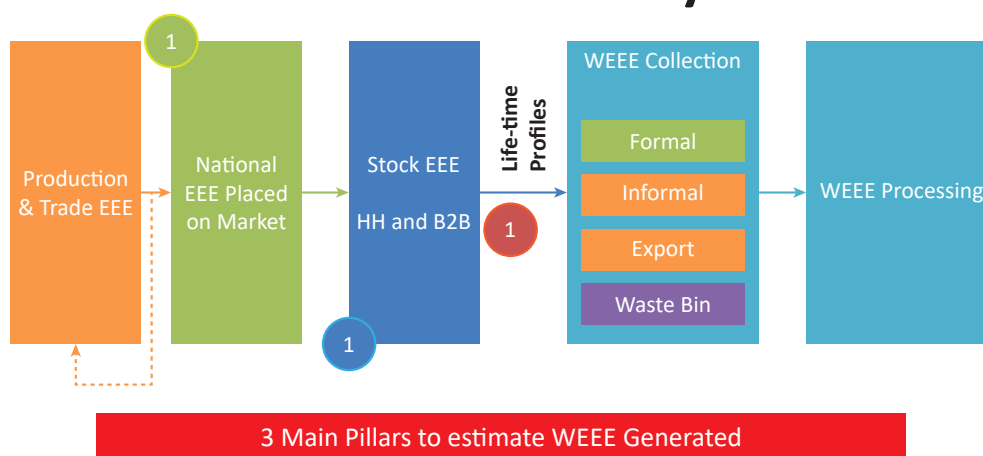
EEE & WEEE Life-Cycle

Fig. 1.2.9 Life Cycle of E-Waste

1.2.8 General Guidelines for Collection and Storage of E-Waste

After assessing the necessity of collecting e-waste, producers may devise an efficient collection mechanism which may include take-back through collection centres, dealers or directly through authorised recyclers.

For the collection of e-waste, producers can collaborate with professional agencies like Producer Responsibility Organisation (PRO)/e-waste exchange. The producer may also directly manage a system for collecting e-waste by involving relevant stakeholders such as consumers, bulk consumers, resident associations, the informal sector, retailers and dealers, etc.

The producers may announce their collection system, including details of their collection points, bins and collection vans linked to collection centres, take-back system, deposit refund scheme, e-waste exchange, retailers/dealers and PRO etc., to make the collection system effective and workable. If the take-back system is being provided, it should be accessible to all citizens anywhere in the country. It may be provided through retailers and dealers or service centres.

UNIT 1.3: Roles and Responsibilities of a Telecom E-Waste Handler

Unit Objectives ◎

By the end of this unit, the participants will be able to:

1. Identify the role and responsibilities of a telecom e-waste handler
2. List the key competencies of a telecom e-waste handler
3. Illustrate the career progression of a Telecom E-waste handler
4. Discuss about the organisational policies on incentives, delivery standards, personnel management and public relations (PR) pertinent to the job role
5. Explain the importance of seeking help from experts to avoid any escalation

1.3.1 Job Role of a Telecom E-Waste Handler

The major responsibilities of a Telecom E-waste handler include:

Fig. 1.3.1: Telecom e-waste handler

- Collecting e-waste from retailers, repair shops and other unorganised stakeholders.
- Promoting the importance of telecom e-waste management and disposal.
- Use effective waste management/recycling practices
- Handle e-waste with safety and standardised precautions
- Creating awareness about the ill effects of improper handling of e-waste.
- Transporting the collected e-waste to the central warehouse/recycling unit.
- Packaging the e-waste, labelling and maintaining the log.
- Maintain a safe, healthy and secure working environment

1.3.2 Key Competencies of E-waste Handler

Primary skills that a Telecom e-waste handler should have:

- Well-versed with the ill effects of improper recycling/treatment of e-waste
- Knowledge about toxic and hazardous waste
- Knowledge of safety procedures for transporting and packaging collected e-waste
- Well-versed with the product/type wise packaging
- Proficiency in weighing and labelling
- Knowledge of warehouse etiquettes and firefighting to avoid damage to the stored e-waste

Personality Traits:

A telecom e-waste handler should pose the following personality traits:

• Good communication skills
• Ability to convince
• Prioritise and execute tasks result-oriented
• Time management
• Strong interpersonal skills

Working hours

• Working hours are 8 to 9 hours daily for 5 to 6 days a week. This may vary from company to company
• The shift system is not available

1.3.3 Career Opportunities

E-waste management is one of the emerging sectors in India with immense career opportunities. The below picture shows the vertical career progression of a Telecom E-Waste Handler.
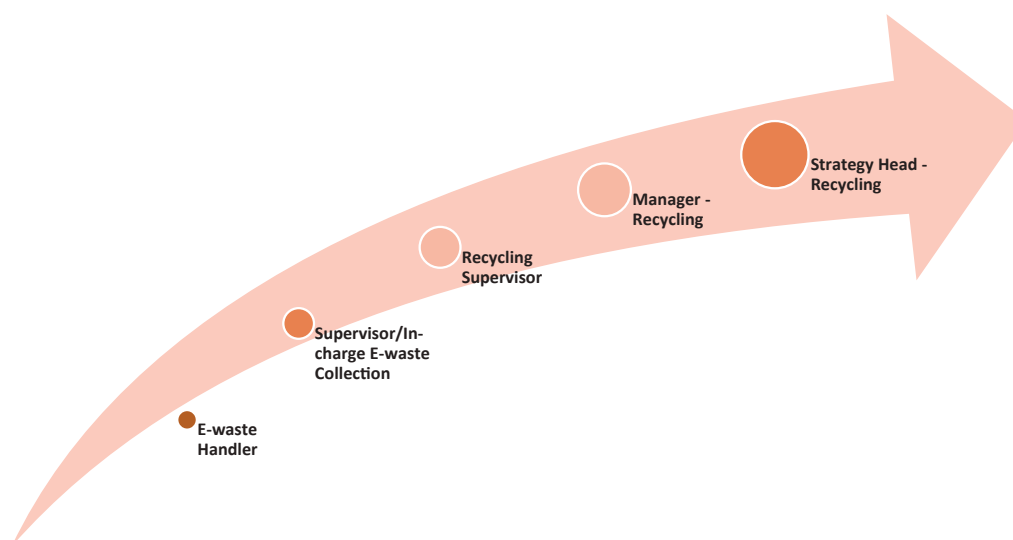

Strategy Head - Recycling

Manager - Recycling

Recycling Supervisor

Supervisor/In-charge E-waste Collection

E-waste Handler

Fig.1.3.2: Career path of E-waste handler

1.3.4 Organisational Policies on Incentives and Delivery Standards

Incentive Policy

An incentive policy aims to encourage employee production. An incentive policy is any system adopted to motivate the behaviour of people. An organisation can implement an incentive policy to help it reach its objectives or goals. Incentive plans may range from variable pay added to a base rate of pay, prizes for accomplishing specific outcomes or recognition ceremonies to congratulate employees for exhibiting desired behaviours.

Incentives take many different forms and vary from company to company. Smaller organisations might have an informal incentive program, which might be as simple as a manager giving an employee a

gift card to thank them for putting in extra hours on a task. In larger organisations, there may be a formalised reward system through which employees can earn rewards in cash or kind.

For an e-waste handler, the incentive plans may take several forms:

1. A bonus in addition to the fixed payment for exerting more significant effort and exceeding standardised production
2. If the employee completes the work in less than the standard time set, they are paid an incentive for their effort
3. Another system where an employee is incentivised based on the tonnage of e-waste handled/ processed in a day/month

Delivery Standards

A telecom e-waste handler must display a solid delivery standard and believe in the skills they hold to perform the assigned task. Some elements of a strong delivery standard are:

- Knowing your job
- Maintaining positive attitude
- Creatively solving problems
- Quick response
- Adhering to the timeline
- Displaying professionalism

1.3.5 Personnel Management and Public Relations

Personnel Management

It is defined as obtaining, using and maintaining a satisfied workforce. It is an integral part of management concerning employees at work and their relationships within the organisation.

An individual can administer and coordinate a group of individuals to perform a task. Personnel management involves teamwork, communication, objective setting and performance appraisals.

Fig.1.3.3: Personnel management as a management function

Public Relations

Public relations (PR) is managing and circulating information from an individual or an organisation to the public to affect public perception.

PR helps to shape what is known about the offerings, implants trust and credibility about the company and builds relationships on your company's behalf.

PR by a telecom e-waste handler can also educate the prospects, customers, vendors, and investors about what the organisation do, how well they do it, and what lies in the future.

1.3.6 Seeking Help from Experts

It is always advisable to take help from an expert when the situation is out of your control.

Inappropriate handling of sensitive situations may attract unnecessary escalations. You can even make costly mistakes or risk your and others' lives out of naivety.

People who have developed expertise in particular areas are, by definition, able to think effectively about problems in those areas.

Steps to approach an expert for help:

• Be formal
• Introduce yourself briefly
• Ask questions that are clearly defined and specific to your exact circumstance
• Be courteous throughout the conversation
• Acknowledge the help

Summary

1. Outline of telecom sector in India
2. Sub-Sectors of the telecom industry
3. Indian handset market
4. Regulatory authorities in the Telecom Industry in India
5. Category of wastes
6. Electronic waste
7. E-waste contributors in India
8. Problems arising due to e-waste
9. Recycling of e-waste
10. Roles and responsibilities of an e-waste handler
11. Career progression of an e-waste handler
12. Organisational policies on incentives, delivery standards, personnel management and public relations relevant to the job role
13. Steps to approach experts for help

Exercise

Multiple-choice Question

1. _____ is a sub-sector of the telecom industry.

   a) Telecom infra   b) Telecom equipment

   c) Telecom services   d) All of the above

2. India is the_____ largest mobile handset manufacturer in the world.

   a) Second   b) Third

   c) Forth   d) Fifth

3. PCB in content to telecom e-waste stands for:

   a) Plastic Covered Board   b) Printed Circuit Board

   c) Polymer Carbon Board   d) Poly Carbonate Board

4. Which city in India ranks one in generating e-waste?

   a) Mumbai   b) Delhi

   c) Chennai   d) Hyderabad

5. WEEE stands for_____

   a) Waste Electrical and Elementary Equipment

   b) Waste Electrostatic and Electronic Equipment

   c) Waste Electrical and Electronic Equipment

   d) None of the above

Descriptive Question

1. Explain the types of incentive programs for e-waste handlers offered by the telecom companies.
2. Elaborate the significance of e-waste awareness.
3. Differentiate between degradable and non-degradable waste.
4. Explain the significance of TRAI in the Indian telecom sector.
5. Discuss about the various sub-sectors of the telecom industry.

Notes

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Scan the QR codes or click on the link to watch the related videos

youtu.be/Cag-bcbivtM

Introduction to the Telecom Sector in India

youtu.be/mcHW-EBh4Iw

Indian Handset Market

youtu.be/0O8UoLcYYbI

Top Handset Manufacturers in India

youtu.be/VeoHhkjV6qo

Regulatory Authorities in the Telecom Industry in India

youtu.be/pb0O_gR7fQo

What is Waste?

youtu.be/dq7bBZUFR14

Electronic Waste

youtu.be/dl-DEBygfRg

Break-up of e-waste Generated in India

youtu.be/aHaySL8EL6g

E-Waste Awareness

youtu.be/bEw34DyFBS4

E-Waste Problems

youtu.be/blUf9WRHt7w

E-Waste Recycling in India

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General Guidelines for Collection and Storage of E-Waste

2. Handling E-Waste Properly

Unit 2.1 - Need for Proper E-Waste Disposal

Unit 2.2 - E-waste Collection and Treatment from Telecom Sites

Unit 2.3 - Collection, Transportation & Storage of E-waste

Unit 2.4 - Warehouse Etiquettes

Unit 2.5 Organisational Safety and Hygiene Practices

TEL/N2401

Key Learning Outcomes

By the end of this module, the participants will be able to:

1. Demonstrate how to promote proper telecom e-waste management and disposal
2. Employ suitable techniques for handling e-waste with precautions
3. Implement different methods for basic separation/segregation of the components after collecting the telecom e-waste
4. Demonstrate how to dispose off hazardous e-waste as per standard processes specified.
5. Discuss the need for following warehouse etiquette while operating/working in the Warehouse.
6. Elucidate the significance of adhering to organisational norms for personal hygiene, workplace hygiene and sanitation practices
7. Implement appropriate firefighting techniques in case of an emergency in the Warehouse while managing or handling e-waste.

UNIT 2.1: Need for Proper E-Waste Disposal

Unit Objectives 🎯

By the end of this unit, the participants will be able to:

1. Explain the hazardous effects of improper disposal of telecom e-waste
2. Discuss the best practices to be followed for proper disposal of telecom e-waste with the stakeholders.
3. Employ various methods for surveying concerned people and stakeholders to check their understanding of telecom e-waste disposal.

2.1.1 Effects of Improper Disposal of Telecom E-Waste

Today, an average person owns three to four electronic devices. When these devices become obsolete, they are often disposed of with regular garbage. When electronic devices are not properly recycled, there have hazardous effects. Some of them are discussed below:

- **Impact on the Soil:** After you throw out e-waste, it often ends as a landfill. E-waste can take several years to decompose. During that time, it has a long-lasting damaging effect on the environment. As electronic components break down, they release toxic chemicals into the soil, contaminating plants and trees and reducing the soil quality. Some of the substances include lead from circuit boards and lithium from batteries. These toxic elements are also capable of making their way into human and animal food chains.

Fig. 2.1.1: Soil degradation

- **Ground Water Contamination:** Inappropriate disposal of e-waste can lead to toxins, including mercury, lead, cadmium, etc., contaminating the groundwater.

  Groundwater travels to streams, ponds, and lakes, water sources for animals, plants, and humans. Contaminated water risks compromising the food chain and can contribute to numerous health risks, including reproductive and developmental problems, cancer, immune system damage, infertility, etc.

Fig. 2.1.2: Groundwater contamination

- **Air Pollution:** When e-waste is not recycled, it's often burned in incinerators. Burning electronics may seem like an excellent solution to eliminate e-waste, but it's hazardous.

  Electronics are composed of metals, plastics and glass, which produce harmful emissions when burnt. Such emissions don't just pose a direct threat to animals and humans. They also result in an increased rate of ozone depletion and greenhouse gasses, contributing to global warming and climate change.

Fig. 2.1.3: Air pollution caused by burning e-waste

- **Marine Pollution:** The ocean is another likely dumping area if your trash doesn't find itself in landfills or face the furnace.

  Millions of tons of trash, including e-waste, go into the ocean yearly. Since electronics are non-biodegradable, marine dumping is the worst idea. The result of marine disposal can be deadly for marine life, disturb biodiversity, and harms the ecosystem. In some cases, the presence of e-waste and associated toxins can damage ecosystems to the point where recovery is questionable, if not impossible.

Fig. 2.1.4: Marrine pollution

2.1.2 E-Waste Recycling

Proper e-waste disposal and recycling are necessary. Many NGOs and support groups help spread awareness through community participation, door-to-door dialogue, and education about e-waste management, which turns the plan of e-waste recycling into action.

Importance of e-waste recycling:

- **Electronics Recycling Conserves Natural Resources:** Many materials can be recovered from old and discarded electronics. These recovered materials can be used to make new products, thus reducing the need for new minerals.
- **Electronics Recycling Supports the Community:** Donating old electronics plays a vital role in refurbished products such as computers and mobile phones, which can greatly help low-income families, schools, and not-for-profit organisations. It also helps individuals access technology they could not have afforded otherwise.
- **Electronics Recycling Creates Employment Locally:** Considering that a major part of electronic equipment is recyclable, electronics recycling can play a significant role in creating new employment opportunities as new firms dealing with electronics recycling will evolve, and existing firms will look to employ more workforce to recover recyclable materials.
- **Electronics Recycling Helps Protect Public Health and the Environment:** Many electronic devices have toxic materials such as lead and mercury, which can harm the environment if disposed of in trashcans. Re-using and recycling electronics safely helps keep toxic materials from harming humans or the environment.

- **Solid Waste Management:** The growth in the electronics industry, combined with a short product life cycle and increased consumption, has led to a rapid escalation in solid waste generation. Huge quantities of untreated e-waste are burnt or dumped in very harmful landfills.

2.1.3 Stakeholders in E-Waste Collection

E-waste is generated in every sphere of life, whether in our homes, offices, hospitals, schools, or business places. There are a number of stakeholders associated with the process of generation of E-waste. Often in the case of personal computers, TVs, etc., the consumers discard their old items for the sake of the latest version, features and options to meet their present needs. In India, the EEE may find more than one user, as the first user may resale or give the used EEE to their relative or friend for further use in case of domestic use. Some of the important stakeholders in relation to E-waste in India are shown in the Figure given below.
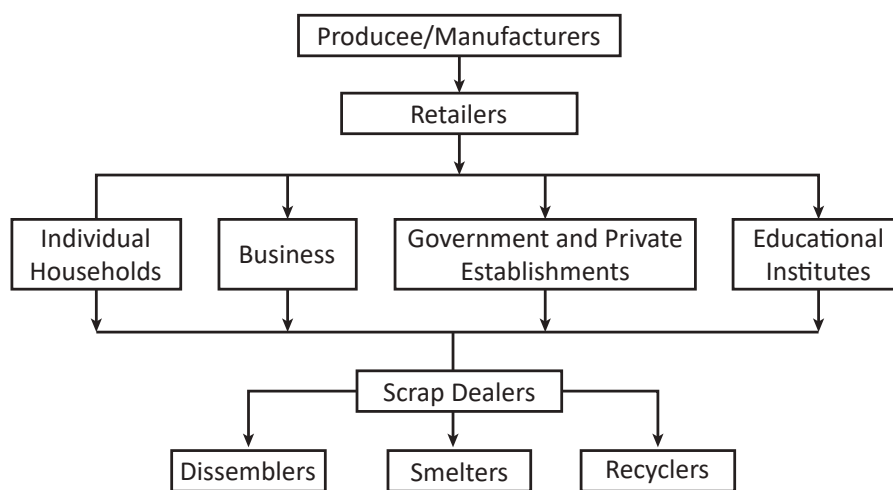
Fig. 2.1.4: Different stakeholders involved in the E-waste flow

There are three levels of E-waste generation hierarchy in India which give rise to three types of stakeholders involved in the generation of E-waste. All the stakeholders in India operate at three levels of the E-waste or WEEE generation hierarchy described below:

1. **First level: Preliminary E-waste generators**

   Preliminary E-waste generator comes from formally organised markets like manufacturers, importers, offices and organised markets. E-waste from domestic consumers comes either in exchange schemes or as a discarded item. Therefore, the major stakeholders are scrap dealers/ dismantlers who purchase E-waste from the first level in bulk quantities. These stakeholders have a limited capacity for dismantling and are involved in trading E-waste with "secondary E-waste generators". The market between the first and second levels is semi-formal, that is, part formal, while the market between the second and third levels is completely informal.

2. **Second level: Secondary E-waste generators**

   Secondary E-waste generators have limited financial capacity and are involved in item/component-wise dismantling process and segregation, for example, dismantling of CRT, PCB, plastic and glass from E-waste.

3. **Third level: Tertiary E-waste generators**

    "Tertiary level stakeholders" are the major stakeholders between the second and third level and are metal extractors, plastic extractors and electronic item extractors. They use hazardous extraction processes. Uncontrolled emissions are discharged into air and water during recycling, while the remaining WEEE/ E-waste fractions after recycling are dumped in open dump sites.

    Some major stakeholders identified along the flow include importers, producers/ manufacturers, retailers (businesses/ government/others), consumers (individual households, businesses, government and

Fig. 2.1.5: E-waste management

others), traders, scrap dealers, dissemblers/dismantlers, smelters and recyclers. Along the flow, subsequently, E-waste gets generated at every level. In the context of India, the last three stakeholders in the E-waste trade value chain consisting of E-waste processing, production/end products and a part of E-waste generation fall entirely in the informal sector. The remaining stakeholders fall partially or wholly in the formal sector. However, the scenario is changing with the evolution of formal E-waste recycling units in the country.
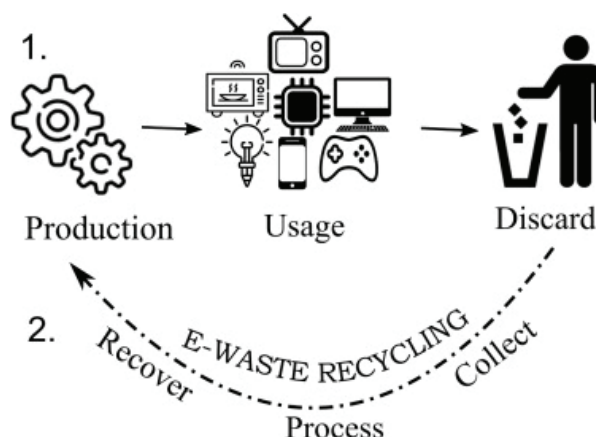
The various stakeholders involved in E-waste generation are listed below:

1. **Manufacturers and Retailers**

    The E-waste generated by the manufacturers and retailers includes the products that fail quality tests. It also includes the products under the guarantee period as replacement items. Whenever such replacement happens, the replaced product ends up as E-waste. The peripheral electronic and electrical items produced during the manufacturing of EEE add up as the E-waste stream produced by the manufacturer or retailer. For example, in the case of computers, E-waste generated from this sector comprises defective IC chips, motherboards, CRTs, and other peripheral items produced during production.

2. **Imports**

    The import of E-waste by some developing countries like China and India is a major concern. As a developing country, India has become one of the major destinations for e-waste exports from developed nations. Huge quantities of E-waste like monitors, printers, keyboards, CPUs, typewriters, projectors, mobile phones, PVC wires, etc. are imported from India from OECD countries in charitable or reusable items.

3. **IT Industries**

    Industries that provide IT services exclusively depend on the working of ICT; hence, many ICT equipment are in functions in these industries. Hardware is frequently replaced in this sector because of the introduction of newer and modified versioned software every few months as the company always prefers the latest version. Most of the time, old hardware is not compatible with new software. The average life of computers in the IT giants was found to be four to five years. Hence, it could be concluded that the generation of E-waste in this sector is enormous.

    India is fast emerging as an IT hub of the world. Looking at India's potential to grow as an IT hub, many global IT giants have established their branches in the country. Many of such giants are still coming to the country. Cities like Bangalore, Pune and Hyderabad are promising IT hubs within the country. Bangalore has even acquired the name the "Silicon Valley" of India. With the advent of IT

industries, the pile of E-waste is growing at an alarming rate. However, the management of E-waste in the country is undeveloped. No proper management measures are considered to address the ever-increasing volume of Ewaste. India has the potential soon to become the "Ewaste hub" of the world.

4. **Public and private sector, government departments, corporate and business establishments**

The business sector (government departments, public or private sector, MNC offices, etc.) was the earliest user of IT and IT products. Today, they account for a sizable amount of total installed Information & Communication Technology (ICT) equipment. Today, the banks need to compulsorily set up a large number of computers in their branches. Similar to the IT sector, the incompatibility of old systems to cater for the present needs and requirements prompts them to pass the obsolete electrical and electronic equipment to dismantlers/recyclers, who pick up these items based on auction or other standard business practices.

5. **Educational Institutes**

Starting from the primary to the university level, the use of Information & Communication Technology (ICT) equipment is universal in schools across the globe. The use of computers in this sector is uprising at a rapid pace.

6. **Individual households**

Individual households contribute the least to the E-waste generation, being only 20% of the overall market. However, it is on an increasing trend today. In the middle to high-income group societies, the amount of E-waste generated is rising rapidly. People are attracted to the EEEs with new and modified features. With the attractive and smart discount and exchange offers in the major Indian cities, people are purchasing more EEEs. Moreover, a persistent view of Ewaste as a commodity causes reluctance among people to dispose of E-waste immediately.

7. **Traders/scrap dealers/dissemblers/dismantlers**

These are very important agents in relation to E-waste. Most of the stakeholders here operate as a part of the informal sector; hence, the amount of E-waste processed by them is extremely tricky to measure. These stakeholders are responsible for the treatment of E-waste received from other stakeholders like importers, producers or manufacturers, retailers, consumers like individual households, businesses, government, etc. Scrap dealers or "kawari wala" in India are responsible for collecting the E-waste. Immediately after securing Ewaste from various sources, scrap dealers decide which item to be dismantled and which to retain for resale. This decision is based on the resale of second-hand products. The not-to-be-resold WEEE/ E-waste items/components find their way to the storehouses for dismantling.

Rather than generating E-waste, these stakeholders are responsible for recycling and treating the existing Ewaste generated by other stakeholders. E-waste generated by these stakeholders includes all the peripheral electronic and electrical components produced during dissembling and dismantling activities.

8. **Recyclers/smelters**

Recycling activity is a major concern for developing countries, including India, as most of such activities are carried out in the informal sector with a lot of potential for environmental and occupational health hazards. Usually, these stakeholders are not concentrated in a single place but spread over different areas, each handling a different recycling aspect. The general practices observed in the case of recycling in developing countries are open roasting, smelting and acid bath in the informal sector to recover different metals.

These stakeholders play an important role in managing the E-waste and have a negligible role in the generation of Ewaste; whatever E-waste is generated includes peripheral electronic and electrical components produced during the recycling operations.

2.1.4 Responsibilities of the Producer

- Collection of e-waste generated during manufacturing of electrical and electronic equipment and directing the same for recycling or proper disposal.

- Collection of e-waste generated from the discarded products is in line with the Extended Producer Responsibility (EPR) to ensure that such wastes are directed to registered refurbishers, dismantlers or recyclers.

- Setting up take back system or collection centres collectively or individually for all electrical and electronic equipment at the end of their life.

- Financing and organising a system to meet the costs involved in the environment-friendly e-waste management, generated from the end of life of its products and historical waste available on the date these rules come into force. Such a financing system shall be transparent, and the producer may establish such a financial system individually or by joining a collective scheme.

- Providing contact details such as an address, helpline number and e-mail of distributors and authorised collection centres to consumers or bulk consumers to facilitate the return of used electrical and electronic equipment.

- Creating awareness through advertisements, publications, posters, or by any other means and information booklets accompanying the equipment about the following:

  o information on hazardous constituents in e-waste

  o information on accidental breakage, hazards of improper handling, damage and improper recycling of e-waste

  o instructions for accidental breakage, handling the equipment after its use, along with the Dos and Don'ts ;

  o symbols on the products to prevent e-waste from being dropped in garbage bins containing waste destined for disposal;

- Obtaining authorisation from the concerned State Pollution Control Board or Pollution Control Committee.

- Maintaining records of the handled e-waste should be available for scrutiny by the appropriate authority.

2.1.5 Responsibilities Assigned to Various Stakeholders for Disposal of Telecom E-Waste

Manufacturer Responsibility

Manufacturers will be responsible for collecting e-waste generated while manufacturing any electrical and electronic equipment and channelising it for disposal or recycling.

Manufacturers will have to ensure that no damage is caused to the environment during the storage and transportation of e-waste.

Manufacturers will maintain records of the e-waste generated, recycled or disposed of in prescribed forms and make such records available for scrutiny by the concerned authorities.

Producers Responsibility

The electrical and electronic equipment producer is responsible for implementing the Extended Producers Responsibility (EPR). The mechanism to channel e-waste from 'end-of-life' products includes collecting the e-waste from their service centres and taking them to an authorised recycler or dismantler.

Extended Producer Responsibility

The EPR is a policy under which producers are given a significant financial or physical responsibility for the recycling or disposal of post-consumer products. The producer's responsibility is to collect e-waste from the market through collection centres, dealers, buy-back arrangements, Deposit Refund System, exchange schemes, etc., whether directly or through authorised agencies and direct the items collected to authorised recyclers.

Consumer Support with regards to EPR

Producers are supposed to provide contact details such as an address, e-mail address, and toll-free helpline numbers to the consumers or bulk consumers through their website and product user documentation. This is done to facilitate the return of end-of-life electrical and electronic equipment, creating awareness through media, advertisements, publications, posters, or by any other means of communication and product user documentation accompanying the equipment.

What stops people from e-waste recycling?

Reason	Solutionution
Don't know if e-waste could be recycled	Spread awareness that Electronics like TVs, laptops, computers and accessories can be recycled
Think that they have to pay for it	Awareness regarding free e-waste collection services
Worried about losing personal data	Tell them that it is easy to securely delete the data.
Don't know where to recycle e-waste	Awareness about e-waste collection services

Table 2.1.1: Why people don't recycle

2.1.6 Promotion of E-Waste Recycling

Although India is a developing nation, it is the 5th biggest producer of e-waste. There is increased attention from policymakers, industries, and consumers for safe and convenient e-waste recycling. According to a report, "almost 75% of old electronics continues to be stored in households due to lack of recycling options and awareness".

The program aims to create effective awareness at various levels of society to reduce the harmful impact of e-waste on the environment and health due to polluting methods used by the informal sector.

Awareness to stakeholders:

• Create awareness among the public about e-waste and encourage people to Reduce, Re-use and Recycle e-waste to make it a part of the Swachh Bharat initiative. For those who support this initiative by donating e-waste, a certificate of appreciation will be awarded to the highest e-waste donors.

• Spreading awareness about the various regulations associated with the ministry of environment, Forest, and climate change Ministry of Environment, Forest and Climate Change (MoEFCC) is primarily responsible for regulations regarding e-waste. The Central Pollution Control Board (CPCB) and State Pollution Control Board (SPCB) provides implementation procedures for the rule set by the MoEFCC, including 2011; e-waste Management Rules, e-waste Management and Handling Rules, 2016 and amendment to the e-waste Management Rules, 2018.

- Appeal to the stakeholders for e-waste segregation at the source, like dry and wet waste segregation.
- Consumers should have easy access to recycling opportunities, depending on their location. According to the electronics recycling hierarchy, the best choice is to donate computer equipment that can be refurbished or re-used, provided personal information is deleted from devices.
- Other recycling opportunities include authorised electronics recycler locations, electronics recycling events, or take-back programs. Additionally, other programs are to be available to help consumers with the recycling of cell phones and batteries.
- The e-waste handler should have interactive sessions with the people to spread awareness about the e-waste and the consequences of its improper disposal and recycling so that the unauthorised and hazardous disposal of the e-waste can be minimised.
- In order to achieve the targets, one should conduct promotional activities of general interests to elevate the understanding of the people in general and the stakeholders' mismanagement of e-waste and its impacts on the environment and human life.
- These promotional activities should also be used to highlight the short-term and long-term benefits of proper e-waste management. The E-waste handler should design promotional activities to involve most of the stakeholders of e-waste by being well informed about the people and locations they are dealing with for a result-oriented outcome.

Promotion of Best Practices for e-waste Disposal

- **Find an e-waste Recycling Drop-Off location:** Recycle your e-waste: One can easily search online for websites that help find a local e-waste management solution. Many websites provide drop-off locations nearby.

Fig. 2.1.5: E-waste drop-off box

- **Return electronics to the manufacturer**

  Find take-back programs: Many electronic manufacturers like Dell, Philips, LG, Samsung, Nokia, and Sony offer take-back solutions that collect cell phones, TVs, appliances and computers. These programs help collect tons of e-waste, dumped in a landfill earlier but now used to develop new electronics.

- **Extend the life of your electronics**

  Buy less: Decreasing the e-waste generation by protecting the electronics and gadgets using a cover or screen protector for mobile phones, laptops etc., increase their lifespan. Making strategic purchases and utilising the current electronics to their full potential before donating/discarding.

- **Donate used electronics to prevent e-waste**

  Donating: Donating electronics is very effective in its utilisation and reduces e-waste generation. It is also cost-effective for underprivileged students and individuals.

Why is awareness required?

- Gadgets and electronics are an indispensable part of daily life. With the increasing number of users and gadgets, it becomes vital to address the waste management and resource utilisation of recyclable materials.
- The health hazards and environmental pollution can't be neglected as they adversely impact human life.
- Earlier, due to the lack of research, the harmful effects of improper e-waste disposal were not known, but after discovering the facts, it is crucial to take serious and strategic steps toward e-waste management.
- Many valuable materials can be recycled and used again, reducing the production cost, so cost-effective latest technologies can be provided to consumers.

2.1.7 Do's & Dont's for E-Waste

Do's:

- Always look for instructions on the catalogue with your product for end-of-life equipment handling.
- Ensure that only Authorised Recyclers repair and handle your electronic products.
- Always call our E-waste Authorised Collection Centres to dispose of the products that have reached end-of-life.
- Always drop the used electronic products, batteries and accessories at your nearest Authorised E-Waste Collection Centres when they reach the end of their serviceable life.
- Always disconnect the battery from the product before disposing of.

Don'ts:

- Do not dismantle the electronic products on your own. It can be dangerous.
- Do not throw electronic products in bins with "Do not Dispose" signage.
- Do not give e-waste to informal (Kabbadi wala) and unorganised sectors like Local Scrap Dealers/ Rag Pickers, etc.
- Do not dispose of electronic products in public garbage bins along with municipal waste that reaches landfills.

UNIT 2.2: E-waste Collection and Treatment from Telecom Sites

Unit Objectives ◎

By the end of this unit, the participants will be able to:

1. Illustrate the process for proper management of e-waste collection from telecom sites.
2. Implement different methods for basic separation/segregation of the components after collecting the telecom e-waste
3. Demonstrate how to issue e-waste collection receipt/certificate to stakeholders after collecting e-waste from them

2.2.1 Collection and Processing of E-waste from Telecom Site

To ensure eco-friendly handling of e-waste, the GOI set up the E-waste (Management and Handling) Rules, 2012. These rules apply to every producer, consumer and bulk consumer involved in the manufacture, sale, purchase and processing of Electrical and Electronic Equipment (EEE), as well as collection centre, recycler and dismantler of e-waste.

These rules hold these stakeholders responsible for complying with the mentioned guidelines, and failure to do so results in severe penalties for non-compliant entities.

In this unity, we will discuss identifying, collecting and segregating e-waste from the telecom site.
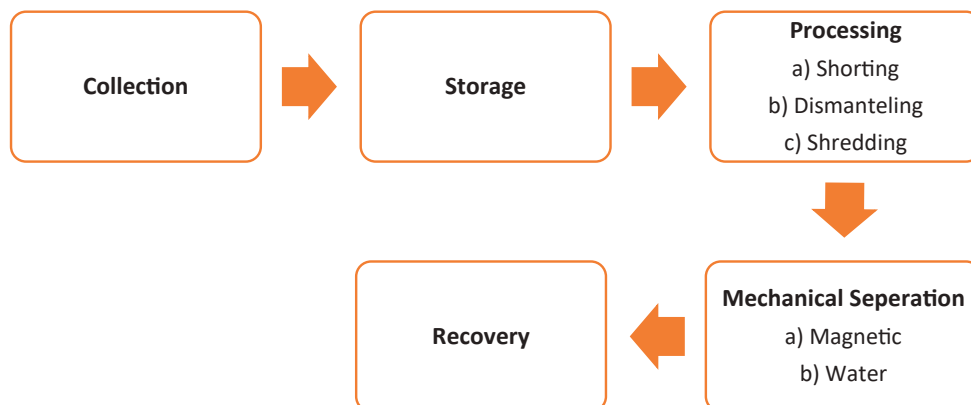
E-waste recycling process flowchart:

Fig. 2.2.1: E-waste recycling process

The Telecommunication industry is an essential sector of growth in any country. With the rapid development of technology, manufacturers now produce superior telecom devices, smarter mobile phones, and new computing devices at a growing rate. People enjoy what technology brings to them, surfing the Internet on their smartphones and watching high-definition movies on their tablets at home. As more and more electronic products are manufactured to fulfil people's needs worldwide, more resources are being used to produce these items. Hence, the rapid growth of computing and telecom equipment is driving the ever-increasing production of e-waste.

Identifying and Segregating Telecom E-waste

• The telecom e-waste largely consists of the following:

• Printed circuit boards (PCBs)

• Chip and ICs

• Hard drives

• Ink and Toner Cartridges

• Cathode Ray Tubes (CRT)

• Flat screen monitors

• Compact Fluorescent Lamp (CFL)

• Batteries

• Capacitors and Transformers

• Plastic casings/body (ABS, HIPS, PC, PP, PVC, Nylons, Epoxy, Phenolic, Polyesters)

• Cables and wires

• Metal frames

• Ceramic insulations

• Photovoltaic panels

2.2.2 Steps of Handing Telecom E-waste

Step One: Collection

The first step in the recycling process is the collection of scrap from the telecom site. The mixed scrap is then taken to specialised electronics recyclers.

The scrap is separated by type at this process stage, which is why many telecom sites will have different bins/boxes for different items. This step is significant for e-waste containing batteries, which require special treatment and can be very damaging if mixed with other waste.

Fig. 2.2.2: Collection of E-waste

Step Two: Storage

Safe and secure storage is crucial while handling e-waste. For instance, the glass screens of Cathode Ray Tubes (CRT) monitors have a high level of lead metal, which needs to be secured else it might contaminate the surrounding.

Fig. 2.2.3: Storage of e-waste

Step Three: Processing - Sorting, Dismantling, Shredding

At this stage, the e-waste goes through manual sorting, where various items (such as batteries and bulbs) are removed for their own processing. Some items may be manually dismantled for components, re-use, or recovering valuable materials at this stage.

The scrap is then shredded into small pieces using E-waste Shredder Machine, allowing for accurate materials sorting. Most electronic equipment consists of metals, glass and plastic; breaking them down into small pieces means they can be separated mechanically.

Fig. 2.2.4: Manual Sorting of e-waste

Fig. 2.2.5: Shredding of e-waste using shredder machine

Step Four: Mechanical Separation

The mechanical separation consists of a series of processes. The two key steps are:

• **Magnetic Separation:** The shredded e-waste is then passed under a giant magnet, which can pull ferrous metals (Iron containing) such as stainless steel from the mix of waste. In some plants, a magnetic separator conveyor is used for the same. In addition, an eddy current may also be used, separating the non-ferrous metals. These materials can then be diverted to separate recycling plants for smelting. Other materials such as circuit boards and metal-embedded plastic are also separated at this stage.

Fig. 2.2.6: Magnetic separator conveyor belt

• **Water Separation:** With a solid waste stream consisting mainly of plastic and glass, water is used to separate the materials, further purifying the separation of different plastics and hand-sorting contaminants.

Step Five: Recovery

The segregated materials are prepared for sale and re-use. Some materials, such as plastic or steel, join another recycling stream, and others may be processed onsite and sold along with other usable components separated in the early stages.

2.2.3 Providing Certificates to Stakeholders after Collecting E-waste

The stakeholders, like educational institutes, medical facilities, government and private organisations etc., need to be provided with collection receipts/certificates which depict the amount of e-waste collected, different categories of items and the number of items collected.

There are many reasons for which it is important:

• It is important to recognise the efforts of stakeholders toward e-waste recycling.
• It also serves as proof for the stakeholders, which can be shown as a part of the extended stakeholder responsibility.
• It helps the e-waste collector keep track of the collection drives and the e-waste collected.
• It is also helpful while conducting surveys for different usage patterns, active participation etc.

Fig. 2.2.11: Certificate of e-waste collection

UNIT 2.3: Collection, Transportation & Storage of E-waste

Unit Objectives 🎯

By the end of this unit, the participants will be able to:

1. Discuss about the procedures for packaging during transportation and storage of e-waste to avoid leaks/spillages
2. List the warehouse etiquette
3. Identify various containers for storage and transport of e-waste
4. Follow the standard norms for storage of identified containers at the Warehouse
5. Demonstrate the process of recording the e-waste collected per visit
6. Demonstrate how to dispose hazardous e-waste as per standard processes specified

2.3.1 Safe Transportation of the E-Waste

Transportation of e-waste

The e-waste generated at a particular site often requires transport to an approved treatment, storage, or disposal facility. Governmental agencies give transport special attention as a potential threat to public safety and the environment.

In addition to the rare accidental spill, hazardous e-waste has, in the past, been intentionally abandoned at random locations, in practice called "midnight dumping." Such incidents have been greatly curtailed by laws requiring proper labelling, transport, and tracking of all e-wastes.

Transport vehicles

E-waste is generally transported by truck over public highways. Highway cargo is the most common because road vehicles can access most industrial sites and approved treatment, storage, or disposal facility. E-wastes can be transported in large cargo trucks made of steel and aluminium alloy, with capacities of 10 to 25 tons.

In case of a leakage or accidental spill of e-waste during its transport, the transporter must take prompt and appropriate actions, including notifying local authorities. An area may have to be sealed to contain the e-wastes, and efforts must be undertaken to remove the wastes and reduce environmental and public health hazards.

Fig. 2.3.1: Cargo trucks used for transporting e-waste

E-waste transporters are individuals or entities that move the waste from one site to another by highway, rail or water. E-waste transporters play an integral role in the e-waste management system by delivering hazardous waste from its point of generation to its ultimate destination.

Hazardous e-waste should be packed separately in air-tight closed containers. This secures the surroundings from spilling harmful toxins and keeps the environment safe while transporting.

Proper securing measures must be employed for massive or palletised shipments. The banding types can include nylon, steel, polyester (PET), and polypropylene. Metal is more suited for heavier solid items, whereas highly durable nylon and PET are recommended for boxes and lighter items.

Fig. 2.3.2: Securing cargo during transportation

Verify waste is compatible with container type. Inspect to verify that the bungs are sealed tightly, the ring gasket is secure, and the vent cap is closed. Inspect to ensure the absence of creases, ridges, excess rust, dents or crumples.

Pallet Box

A pallet box is a unit load's structural foundation, allowing handling, storage and shipping efficiencies. Goods or shipping containers are generally placed on a pallet secured with strapping, stretch wrap or shrink-wrap and shipped.

Generally, three types of pallets are used for e-waste handling:

Wooden	• Strong and suitable for heavy items • Reusable • Widely available & less expensive than plastic • Ensure the pallet has a bottom bracing to increase stability
Plastic	• Light weight • 100% recyclable • Single-use only • Not suitable for very heavy items • Low cost
Cardboard	• Light weight • 100% recyclable • Single-use only • Not suitable for heavy items and in humid environments • Comparatively cheap

Metal	• Strong and suitable for heavy items • 100% recyclable • Reusable • Readily available and recommended for heavy items • High cost

Table 2.3.1: Different types of pallets used during E-waste transportation

Different ways of stacking pallets are:

• Column Stack
• Interlocking Stack
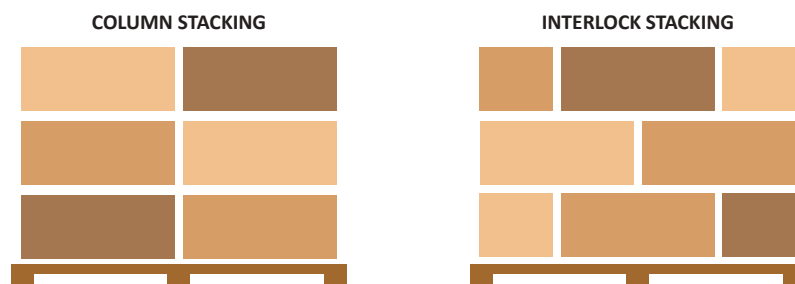• Pyramid Stack
• Overhang Stack

Fig. 2.3.3: Column and Interlock Stacking

Essentials of Good Packaging

Large or palletised pieces must be suitable for transportation where goods are handled through trucks. Mentioned below are the four key handling requirements that you should consider when packing e-waste:

• **Stackable:** Ensure your piece is packaged to enable it to be stacked or have items stacked upon it.
• **Forkable:** A forklift will handle larger pieces; the pieces must be loaded to a pallet or a fork-movable base to ensure safe and damage-free handling.
• **Tilting:** Ensure your item is secure and stable on a pallet and within the packaging. Goods will tilt during loading and unloading.
• **Shock & Vibration:** Vibrations and minor shocks can occur while under mechanical handling. Ensure your items are sufficiently packaged.

2.3.2 Storage of e-waste

The storage of the e-waste waiting to be recycled weighs tons. Metal boxes and stillages are made of solid mesh, so they protect the transported goods and enable stacking, i.e. stacking pallets or containers on top of each other. This helps in optimal utilisation of space. The major advantage of using metal pallet collars for storage transport is their durability, and metal is usually much stronger than plastic and other materials.

Fig. 2.3.4: Metal boxes used for storing e-waste

The Wire Mesh Containers, on the other hand, help to maximise the storage space thanks to their folding function. You can use the metal mesh containers for long-term storage and transfer of your stock of recovered products. Because these containers are made of metal mesh, you can always easily check the contents of the container without opening it.

Fig. 2.3.5: Wire Mesh Containers used for storing e-waste

Every manufacturer, producer, bulk consumer, dealer, collection centre, refurbisher, dismantler, and recycler may store the e-waste for a period not exceeding 180 days and shall maintain a record of collection, sale, transfer, and storage of the e-wastes and make these records available for inspection.

2.3.3 Discussion with All Identified Stakeholders for Further Collection of E-Wastes

Discussions with the stakeholders regarding strategies for further e-waste collection and management are important to spread awareness and keep the collection process organised and hassle-free.

Meetings at regular intervals shall be organised with various groups of stakeholders. There they should be informed regarding the regulations of e-waste collection and exchange ideas related to ease of e-waste disposal.

- **Residential stakeholders:** In households and residential areas, every 6months, a meeting should be organised to increase awareness of proper e-waste disposal. Along with the door-to-door collection, an e-waste collection unit can also be established in the residential area with the help of their association.

- **Government and Private stakeholders:** Regular discussions with these stakeholders are vital as they are the highest producers of e-waste. Their participation and contribution play the most important role in effective e-waste management. The organisations and units not currently following proper e-waste disposal methods should be encouraged to do so through these discussions. For the ones who are contributors to proper e-waste disposal, more steps should be taken towards making e-waste disposal easily accessible to them and more convenient for the e-waste collector.

- **Businesses:** They are also major e-waste generators whose contribution can substantially add to the e-waste collection. During discussions for further collection, their inputs should be taken into consideration, and the collection should be arranged accordingly. The environmental and economic benefits should also be discussed.

- **Educational institutes:** These are important due to the increasing use of electronics in educational institutes and increasing e-waste generation. The discussions should be conducted with the teachers and student associations to organise the e-waste collection drive with maximum participation effectively.

2.3.4 Disposal of Hazardous E-Waste

Disposal is any operation which is not recovery, even where the operation has the reclamation of substances or energy as a secondary consequence. Further, it is the process where waste is not subject to further closed-loop recycling management. Landfilling and incineration without energy recovery are typical examples of disposal operations.

The last option for hazardous e-waste management is to treat and/or dispose of the waste in an environmentally safe manner. Depending upon the type of waste and its characteristics, land disposal or thermal destruction through incineration can be adopted.

UNIT 2.4: Warehouse Etiquettes

Unit Objectives 🎯

By the end of this unit, the participants will be able to:

1. Explain the warehouse etiquette while operating/working in the Warehouse.
2. Perform steps for weighing and labelling the e-waste as per the standard operating procedure.
3. Demonstrate the different labelling methods for different products

2.4.1 Weighing Methods of Segregated E-Waste

The e-waste should be measured uniformly for accurate pricing. The scraps are sorted into different groups and can be easily placed on the scale and weighed, and platform scales are used for small collections of scraps.

Types of scrap metal scales:

Fig. 2.4.1 Truck Scales

Truck Scales: Some scrap yards have truck scales that weigh the vehicle when it arrives and leaves. This method is most common for ferrous (steel/iron) materials for tons of materials.

Fig. 2.4.2 Floor Scales

Floor Scales Other scrap yards have smaller free-standing scales, usually inside or in bays, that will weigh the materials. They usually use containers, racks, and dumpsters for weighing.

Fig. 2.4.3 Mobile Scales

Portable Scales These are often common in cities and optimal for individual use. Following are examples of portable scales:

Fig. 2.4.4: Hand-lifted weighing scale

2.4.1 Weighing Methods of Segregated E-Waste

Labelling e-waste is very useful for convenient storage, transportation, and recycling. The e-waste can be divided into many categories and labelled accordingly. Labelling helps organise loads of e-waste and makes it more convenient for the e-waste collector to access them and keep everything safe. Below are the points which should be considered while labelling different types of e-waste containers:

It is vital to ensure that any container used to accumulate hazardous waste is properly labelled to meet regulatory guidelines and assure the safety of people.

There are various types of e-waste like major and small appliances, computers and telecommunication, lighting device, electrical and electronic, monitoring devices, medical devices etc. They should be sorted into various categories and labelled accordingly. This is also helpful while recycling, as similar categories, can be treated together.

- The label should be attached in a visible place and clearly display information. In case of very small equipment, it should be kept inside a zip-lock bag, and the bag should then be labelled.
- Labels must be placed on the container and be visible for inspection.
- Writings on the 'Hazardous Waste Label' must be readable. It is recommended that entries should be made with a permanent marker. Do not use ballpoint pens, or pencils, with water-soluble ink for filling the hazardous waste Labels.
- The hazardous waste label should be fastened to an area of the container that is easily visible for inspection and emergency response purposes.

Fig. 2.4.5: Hazardous Waste Label

- A "Waste Electronics" Label must be affixed to the pallet on a least two sides or for containers on one side.
- Electronic Wastes must not be placed in general refuse containers or roll-off boxes.
- Promptly report any spill, release or breakage of E-Waste.

Fig. 2.4.5: Labels for different types of e-waste

UNIT 2.5 Organisational Safety and Hygiene Practices

Unit Objectives ◎

By the end of this unit, the participants will be able to:

1. Discuss about the organisational norms for personal hygiene, workplace hygiene and sanitation practices.
2. Use proper PPE during the e-waste collection and segregation process.
3. Identify different types of fire and appropriate fire extinguishers for each of them.
4. Demonstrate firefighting techniques in case of emergency in the Warehouse.

2.5.1 Health and Safety Measures

Managing health and safety successfully depends upon the team's commitment and cooperation. Everyone at the workplace needs to understand the importance of health and safety and their role in making the workplace safer.

As an E-waste handler, you should:

• Set your health & safety objectives and plan to achieve them.
• Decide who is responsible for getting things done.
• Give the person the skills and required resources to do the job
• Regularly check that you are meeting your objectives
• Implement the basic health and safety measures
• Ensure proper hygiene
• Implement proper sanitation practices in the Warehouse

2.5.2 Maintain Personal Hygiene

E-waste handlers should have a general sense of hygiene and appreciation for cleanliness for the benefit of themselves and the team members. The cleanliness habits and practices which they should employ are:

• The staff members should be encouraged to wash their hands after cleaning activities and before making food in the kitchen
• Hand sanitisers should always be made available to the staff members
• A regular and thorough cleaning should take place in areas such as the kitchen and washroom
• Ensure that the staff members maintain basic personal hygiene at work like they should come clean-shaven, neatly tied hair for women and neat and clean uniform

Personal hygiene is a very important part of grooming standards and ensures the overall quality of services. Some of the steps, which could be undertaken to maintain personal hygiene, are:

Wash your hands with soap and water before and after handling food	Bath regularly
Brush your teeth twice a day	Cut fingernails and toe nails
Wear clean cloth	Clean hair with shampoo

Table 2.5.1: Personal Hygiene

Correct procedure of washing hands

Washing hand is an important part of personal hygiene maintenance. Few simple, easy, and effective steps of handwashing as practised by professional's offices as:

Steps of washing hands	
1. Wash your hands before and after handling food and cleaning toilets	2. Use of liquid soaps to wash hands

Steps of washing hands

3. Rub your hands vigorously for 20 seconds

4. Rinse well

5. Use a sterile towel to pat your hands dry

Fig. 2.5.1: Steps for washing hands

2.5.3 Workplace Hygiene

E-waste handlers should maintain the work area in a clean and tidy condition. Cleaning and maintenance play a vital role in upholding the hygiene of the Warehouse.

Cleaning, Sanitising and Disinfecting

Some people think that disinfecting is the same thing as cleaning or sanitising, but they are different:

- **Cleaning** removes dust, dirt, crumbs, and germs from surfaces or objects. While cleaning, you are likely to use soap (or detergent) and water to clean the surfaces and objects physically, and this may not necessarily kill all the disease-causing germs.

Fig. 2.5.2: Cleaning

- **Disinfecting** uses chemicals called disinfectants to kill germs from surfaces and objects. Common disinfectants are Hydrogen peroxide, Formaldehyde, Alcohol solutions, Chlorine and chlorine compounds. Disinfecting does not necessarily clean dirty surfaces; however, a mixture of cleaning agents and disinfectants is used to clean and remove germs simultaneously.
  - could be done by cleaning, disinfecting, or both. Sanitising means lowering the number of germs to a safe level, depending on public health standards or requirements at a workplace, school, etc.

Fig. 2.5.3: Sanitisation

2.5.4 Personal Protective Equipment (PPE) while Telecom Handling E-waste

Personal protective equipment (PPE) is protective clothing that consists of head protectors, masks, heavy shoes, and other equipment designed ergonomically to shield the user from possible injuries or infection. The threats mitigated by the protective equipment include physical, electrical, heat, chemicals, biohazards, and airborne particulate matter. The e-waste handler should be trained to use the PPE required for each specific task.

Components of PPE kit:

- Safety Helmets
- Ear Protection
- Respirators and dust masks
- Safety Coveralls
- Safety footwear
- Safety Eye protection
- Safety gloves

Safety Helmets

- Safety helmets protect the worker's head from injury caused by falling or flying objects.
- They come in various types depending on the task performed and the risk involved.

Fig. 2.5.4: Safety helmet

Ear Plug

- Ear plugs are meant to protect the worker's ears from damage due to excessive noise levels at the workplace.
- They should be worn while performing a task where noise levels are above normal.

Fig. 2.5.5: Ear plug

Respirators/Dust masks

- Respirators/dust masks protect employees from inhaling harmful substances that may threaten their health, making them unproductive.
- Others protect the workers from inhaling dust/fumes that might cause severe respiratory problems.
- They come in various types and designs depending on the task being performed and the degree of the safety risk involved.

Fig. 2.5.6: Dust mask

Safety Coveralls

- In e-waste management, coveralls are meant to:
- Protect the e-waste handler from hazardous chemicals that are present in the waste.

Fig. 2.5.7: Safety Coveralls

Safety boots

- Safety boots protect employees from foot injury due to sharp objects piercing through the soles or falling objects.
- They have reinforced soles and toe caps to enhance the safety of the worker's feet.
- Depending on the task and risks, they come in various types and designs.

Fig. 2.5.8: Safety boots

Eye protection

• Protect the eyes from sharp objects that might lead to severe injury and loss of eyesight.

• Protect from harmful chemicals from spilling into the eyes.

• Safety goggles come in various shapes, types and designs to suit different tasks and the risks involved.

Fig. 2.5.9: Safety goggles

Safety gloves

• In e-waste management operations, hand gloves are essential to protect the worker's hand from injury during the collecting, sorting and loading/unloading process.

• It also protects the hands from coming in contact with harmful chemicals

• Latex or rubber gloves are suitable for e-waste management operations.

• Leather gloves are used when handling sharp objects such as metal waste, glass, etc.

Fig. 2.5.10: Safety Gloves

2.5.4 Causes of accidents while Handling E-Waste

The accidents associated with the e-waste management sector are linked to various processes such as collection, packaging, transportation, and related tasks. In general, the risks for the health and safety of the workers can be related to:

• **Occupational factors:** Exposure to occupational hazards in terms of waste management is defined by the properties of the waste, the management task (collection, packing and transport), and the applied procedures and technologies. Handling is a broad category, including work-related injuries due to sprains, strains, carrying, pushing and pulling loads, lifting, etc.

• **Health factors:** The health risks to the e-waste collector directly involved are caused by many factors that include the following:

   o The nature of the e-waste such as toxic, allergic, and infectious substances, and its composition like gases, dust, leachates, and sharps).

   o The handling of waste (e.g. lifting, equipment vibrations, and accidents).

• **Chemical factors:** The health impacts of chemical agents in e-waste are:

   o The danger of blood and skin infections resulting from direct contact with toxic chemicals

- o Remains of hazardous chemicals in recyclable containers and their gaseous emissions pose hazards in the e-waste handling
- o Electronic and electrical appliances such as cell phones, radios, computers, televisions, digital satellite decoders, and fluorescent tubes may pose a danger as these contain toxic substances such as mercury, lead, and cadmium
- o Scrap batteries have the potential to corrode clothes, causing blisters, and fire outbreaks due to the presence of acid
- o Injuries caused by rusting metals have the potential to cause tetanus

- **Ergonomic factors:** An ergonomic hazard is a physical environmental factor that harms the musculoskeletal system. Ergonomic hazards include repetitive movement, manual handling, workplace design, uncomfortable workstation height and poor body positioning. Ergonomic hazards in the e-waste handling result due to:

- o Carrying or lifting heavy weight
- o Working with bending back or neck, working in a sustained standing, upright position
- o Repetitive movement and work, e.g. Sorting waste at a high work rhythm
- o Applying high force while handling heavy containers

Fig. 2.5.11: Correct and Incorrect Lifting Techniques

- o Exposure to excessive noise for an extended period
- **Biological factors:** Biological factors associated with e-waste handling include:
  - o Diseases resulting from flies and mosquitoes breeding in e-waste
  - o Cuts or puncture wounds from broken glass, metal edges, or needles
  - o Long-term occupational exposure to contaminated air can include allergic responses such as chronic bronchitis, asthma, and hay fever
  - o Dermal and blood infections from direct contact with waste and from infected wounds

2.5.5 General Health Issues and Safety Precautions at the workplace

The e-waste handler should be well aware of all the hazards posed during e-waste handling. He/She must be highly aware of all the dangers resulting from the ignorance and mishandling of e-waste. He/She should know the equipment that he has to use during the operations. While handling e-waste, the use of inappropriate containers, improper transportation, careless lifting, stacking and not using proper PPE can cause risks to the e-waste collector, which include:

- Slips, trips, and falls can happen during collecting and transporting e-wastes.
- Workers can be stuck or injured by the machine or the e-waste dump. There can be traffic accidents when transportation of e-waste. Machines with moving parts, such as conveyors and rolling machines, can also cause crush accidents, leading to amputations, crushed fingers or hands.
- Unexpected machine startup can cause injury or death, which can happen during machine installation, maintenance, or repair.
- Severe injuries can occur when dismantling e-wastes that have sharp edges.

- Working near loud noises from drilling, hammering, and other tools that can make a great noise leads to a hearing problem or permanent hearing loss.
- Burning e-waste emits toxic chemicals into the air. If inhaled or ingested by workers at recycling sites, this can lead to illness from poisonous chemicals.

Harmful chemicals in e-waste can lead to severe health hazards that are sometimes fatal. These toxins can enter our body through inhalation, skin absorption, or ingestion. After that, humans risk developing any of the conditions mentioned above. Following the safety measures and using personal protective equipment can prevent health issues.

2.5.6 Safety Guidelines for Collecting E-Waste

While collecting e-waste, it is important to follow the safety guidelines and regulations regarding contact with e-waste. E-waste usually contains flammable and toxic materials, and careless handling can result in accidents. Safety while e-waste collection is of major priority; also, e-waste handlers' interaction with e-waste is regular daily, and negligence can be harmful to one and the environment.
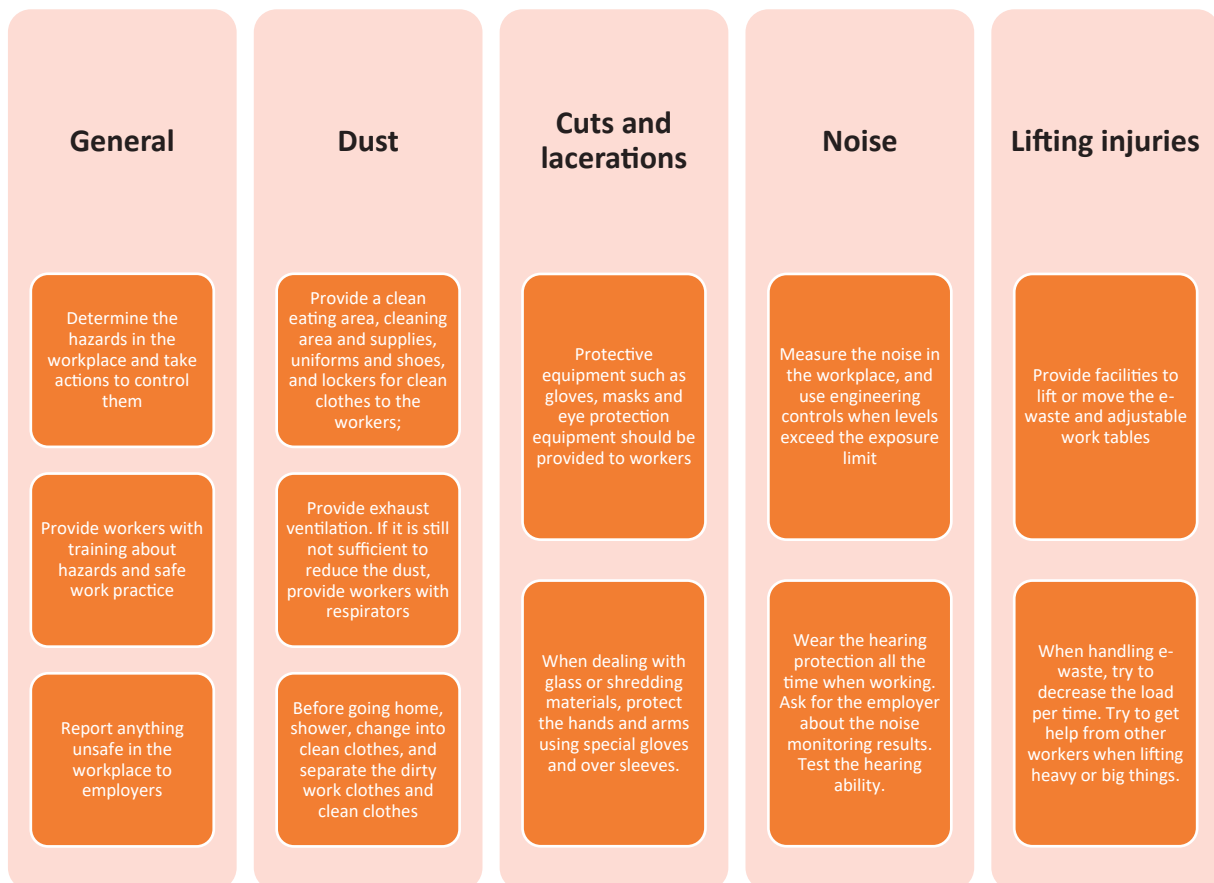
General	Dust	Cuts and lacerations	Noise	Lifting injuries
Determine the hazards in the workplace and take actions to control them	Provide a clean eating area, cleaning area and supplies, uniforms and shoes, and lockers for clean clothes to the workers;	Protective equipment such as gloves, masks and eye protection equipment should be provided to workers	Measure the noise in the workplace, and use engineering controls when levels exceed the exposure limit	Provide facilities to lift or move the e-waste and adjustable work tables
Provide workers with training about hazards and safe work practice	Provide exhaust ventilation. If it is still not sufficient to reduce the dust, provide workers with respirators			
Report anything unsafe in the workplace to employers	Before going home, shower, change into clean clothes, and separate the dirty work clothes and clean clothes	When dealing with glass or shredding materials, protect the hands and arms using special gloves and over sleeves.	Wear the hearing protection all the time when working. Ask for the employer about the noise monitoring results. Test the hearing ability.	When handling e-waste, try to decrease the load per time. Try to get help from other workers when lifting heavy or big things.

Fig. 2.5.12: Safety guidelines for collecting e-waste

2.5.7 Fire Safety

Warehouses are vulnerable to fire due to the presence of highly inflammable scrap. The major cause of fire-related property damage is **arson** – the criminal act of deliberately setting fire to property. The second major cause of fires is problems with **electricity and lighting**, and heating equipment kept near **combustible materials** is also one of the significant contributors. Many warehouse fires are caused by **irresponsible handling of smoking substances** like cigarettes, cigars and lighters.

Prevent Electrical Hazards at Work

• Only licensed electricians should install, repair and dismantle warehouse wiring

• Constantly plugging into a GFCI (Ground Fault Circuit Interrupter)

• Checking each extension cord before use

• Conducting a thorough check for electrical wiring

• Inspecting power tools regularly

• Checking insulated tools for damage

• Never modifying electrical plugs

• Keeping extension cords in a safe place

• Ensuring that all electrical components stay dry

• Using the right extension cord for the job

Fig. 2.5.13: A common GFCI (Ground Fault Circuit Interrupter)

How to Prevent Fire at Work?

The knowledge about the following is essential and critical for preventing or fighting a fire outbreak at work:

• Types of fuel

• Types of Fire

• Fire Alarms

• Types of firefighting equipment

• Firefighting procedure

Type of fuel

```
┌──────────────┐                          ┌──────────────┐
│ According to  │                          │ According to  │
│   source      │                          │ physical state│
└──────┬───────┘                          └──────┬───────┘
   ┌───┴────┐                      ┌────────────┼────────────┐
┌──────┐ ┌──────────┐          ┌────────┐  ┌──────────┐  ┌───────────┐
│Natural│ │Artificial│          │ Solid  │  │ Liquid   │  │ Gaseous   │
│ Fuels │ │  Fuels   │          │ Fuels  │  │ Fuels    │  │ Fuels     │
└──────┘ └──────────┘          └────────┘  └──────────┘  └───────────┘
```

Fig. 2.5.14: Classification of fuel

Types of fire

Before we move forward and study fire prevention and the safety equipment required for the same, we need to understand the different types of fire. This information is critical as it can help you choose the appropriate means to extinguish the fire.
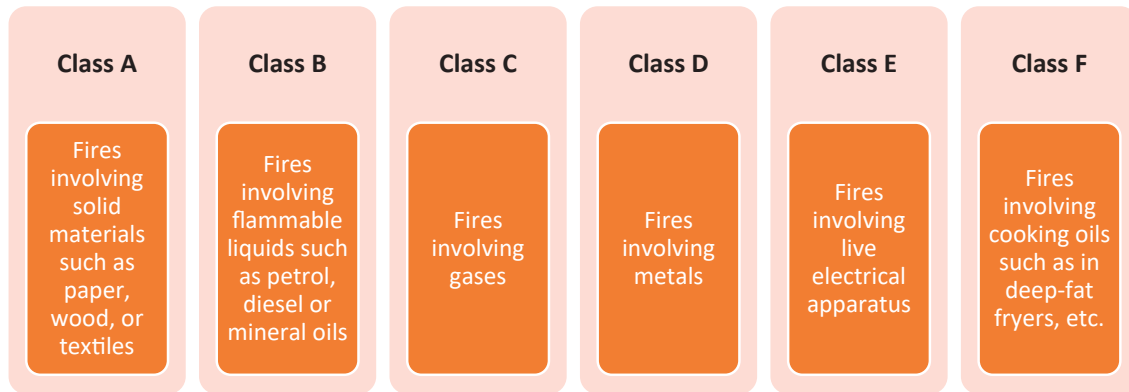
Class A	Class B	Class C	Class D	Class E	Class F
Fires involving solid materials such as paper, wood, or textiles	Fires involving flammable liquids such as petrol, diesel or mineral oils	Fires involving gases	Fires involving metals	Fires involving live electrical apparatus	Fires involving cooking oils such as in deep-fat fryers, etc.

Fig. 2.5.15: Classification of fire

Fire Alarms

A fire alarm is a device used to raise and alert and warn people via audio-visual appliances during fire outbreaks, smoke, carbon monoxide and similar emergencies. A fire alarm can either be automatic or manual.

Fig. 2.5.16: Fire alarm

Types of firefighting equipment

• Water extinguisher
• Foam extinguisher
• Powder extinguisher
• Carbon dioxide (CO_2) extinguishers
• Wet chemical extinguishers
• Fire blankets

Fire extinguishers are designed to eject firefighting media on the fire from a safe distance. These are small, portable instruments, generally 5 and 9 litres containing extinguishing media of various types.

• Water (Stored pressure) Type- Water-type extinguisher has water under pressure of approx 150 lbs/Sq in, in the container at ejected with a CO_2 cartridge and nozzle to direct the water under pressure to the seat of the fire

• Foam extinguisher- Chemical Foam, Mechanical Foam with CO_2 cartridge to expel the foam when operated

- A dry chemical powder (DCP) extinguisher also uses a CO_2 cartridge to expel the contents with force when the extinguisher is operated. Here again, the DCP is stored under pressure
- All three above have a CO_2 cartridge, a cap assembly, a safety pin, and a nozzle. DCP type also has a pressure gauge to show the pressure. At times, the water type will also have a pressure gauge.
- A CO_2 extinguisher generally comprises CO_2 cylinders of various sizes with a bibcock for releasing the gas, a discharge tube and an applicator to direct the gas to the fire's seat.

Identification of Fire Extinguishers

Type	Colour Code	Use on Fire Classes
Water	Solid red	A
Foam	Red with a blue band	A B
Dry chemical (powder)	Red with a white band	A B C E
Carbon dioxide	Red with a black band	(A) B E

Table 2.5.2: Identification of Fire Extinguishers

Firefighting Procedure

The fire alarm must be initiated, and an alert must be raised. A safe evacuation path must be identified before dealing with the fire. A suitable class of fire extinguishers must be chosen. The PASS technique must be adopted for extinguishing the fire. Immediate evacuation must be initiated if the extinguisher is exhausted and the fire still exists.

PASS technique of using a fire extinguisher:

Fig. 2.5.17: PASS technique of using a fire extinguisher

2.5.8 Reporting Safety Hazard

It is a significant role of any employee to report any Safety hazard to a superior whenever it is observed. In case of any observation, while working that you think might create a safety hazard, it should be discussed with a supervisor before starting actual work.

An employee should comply with all the safety protocols of the organisation, and they should fill out all forms or documents related to health and safety. An Employee should take care of safety issues which may arise during work while planning for any project.

Safety Hazard Report		
Report		
Date: _____	Report No. _____	
Reported by: _____	Recorded by: _____	
Reporter Contact Info: _____		
Recorder Contact Info: _____		
Hazard		
Location: _____		
Equipment: _____		
Malfunction: _____		
Expiration: _____	Date: _____	
Safety Code Violation: _____		
Description of Hazard: _____		
Corrective Action		
Supervisor: _____		
Safety Officer: _____		
Recommended Action: _____		
Required Cost: _____	Budget: _____	
Action Taken: _____		
Actual Cost: _____	Date Implemented: _____	

_____   _____
Signature   **Date**

Fig. 2.5.18: Safety hazard report form

2.5.9 Security Policies and Procedures in an Organisation

Employers or unions can conduct an overall safety audit of the workplace with the assistance of the security department. Some general workplace safety procedures that need to be adopted by an establishment to make the place safe are listed below:

• Individuals who are not employees nor clients of the organisation must present identification proof to the security before entering the Warehouse

• Employee information should be kept secured under password protected software to prevent easy access and exploitation

• Thorough background checks should be conducted before employing someone

• The entire Warehouse should be under CCTV surveillance to monitor any kind of unauthorised

Summary

- Impact of improper disposal of telecom e-waste on the environment
  - Soil pollution
  - Groundwater contamination
  - Air pollution
  - Marine pollution
- Importance of e-waste recycling
- Stakeholders in E-Waste Collection
- Stakeholders in E-Waste Collection
- Collection and Processing of E-waste from Telecom Site
- Steps of Handing Telecom E-waste
- Transportation of the E-Waste
- Disposal of Hazardous E-Waste
- Weighing Methods of Segregated E-Waste
- Health and Safety Measures and Workplace Hygiene
- Personal Protective Equipment (PPE) while Telecom Handling E-waste
- Fire hazards and Firefighting Procedure

Exercise

Multiple-choice Question

1. _____ is the Fires involving flammable liquids such as petrol, diesel or mineral oils.
   a) Class A   b) Class B
   c) Class C   d) Class D

2. Dry chemical fire extinguishers are used for _____ fire.
   a) Class A   b) Class B
   c) Class C   d) All of the above

3. The major advantage of using metal pallet collars over plastic for storage transport is their _____.
   a) Durability   b) Cost-effectiveness
   c) Colour   d) None of the above

4. Which of the following is the component of e-waste?
   a) Cathode Ray Tubes   b) Batteries
   c) Cables and wires   d) All of the above

5. Which of the following environmental issues are caused due to air pollution?

   a) Depletion of the ozone layer   b) Global warming

   c) Climate change   d) All of the above

Descriptive

1. Explain the impact of improper disposal of telecom e-waste on groundwater.
2. List the stakeholders in e-waste collection.
3. Elaborate the e-waste recycling process.
4. Explain the labelling method fore-waste
5. Differentiate between cleaning, disinfection and sanitisation.

Notes

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Scan the QR codes or click on the link to watch the related videos

www.youtube.com/
watch?v=zB1nML5GMxw

Effects of Improper Disposal of
Telecom E-Waste

youtu.be/blUf9WRHt7w

E-Waste Recycling

youtu.be/6i96r8LGUXU

Responsibilities Assigned to
Various Stakeholders for Disposal
of Telecom E-Waste

www.youtube.com/
watch?v=aUwFXDLOFO0

Collection and Processing of
E-waste from Telecom Site

www.youtube.com/
watch?v=a1Co8a8GuT4

Providing Certificates to
Stakeholders after Collecting
E-waste

www.youtube.com/
watch?v=nWd-H7XqmsM

How should e-waste be
processed?

www.youtube.com/
watch?v=vb9QFjkEmAU

Health and Safety Measures

www.youtube.com/
watch?v=ljzAe-SQtzk

Maintain Personal Hygiene

www.youtube.com/
watch?v=QEB7wE-YFXg

Personal Protective Equipment
(PPE) while Telecom Handling
E-waste

www.youtube.com/
watch?v=ntEVHTqsq6A

Causes of accidents while
Handling E-Waste

www.youtube.com/
watch?v=1k19eXJ3dH4

Safety Guidelines for Collecting
E-Waste

www.youtube.com/
watch?v=UlKS_A7Xg1E

Fire Safety

3. Plan Work Effectively, Optimize Resources and Implement Safety Practices

TEL/N9101

Key Learning Outcomes

By the end of this module, the participants will be able to:

1. Explain about the work place health and safety
2. Differentiate various health hazards
3. Demonstrate various first aid techniques
4. Importance of safety at workplace
5. Understand Basic hygiene Practices and hand washing techniques
6. Explain the need for social distancing
7. Understand the reporting of hazards at workplace
8. Explain e-waste and process of disposing them
9. Explain Greening of jobs

UNIT 3.1: Workplace Health & Safety

Unit Objectives 🎯

By the end of this unit, the participants will be able to:

1. Understand about workplace health and safety
2. Explain tips to design a safe workplace
3. Explain precautions to be taken at a workplace

3.1.1 Safety: Tips to Design a Safe Workplace

Every organization is obligated to ensure that the workplace follows the highest possible safety protocol. When setting up a business some tips to remember:

- Use ergonomically designed furniture and equipment to avoid stooping and twisting
- Provide mechanical aids to avoid lifting or carrying heavy objects
- Have protective equipment on hand for hazardous jobs
- Ensure presence of emergency exits and they are easily accessible
- Set down health codes and ensure they are implemented
- Follow the practice of regular safety inspections in and around the workplace
- Get expert advice on workplace safety and follow it
- Get regular inspection of electrical wiring and also the electrical switches and gadgets
- Install fire extinguishers and fire alarms.

3.1.2 Non-Negotiable Employee Safety Habits

Every employee is obligated to follow all safety protocols put in place by the organization.

All employees must make it a habit to:

- Immediately report unsafe conditions to the supervisor
- Recognize and report safety hazards that could lead to slips, trips and falls
- Report all injuries and accidents to the supervisor
- Wear the correct protective equipment when required
- Learn how to correctly use equipment provided for safety purposes
- Be aware of and avoid actions that could endanger other people
- Always be alert
- Educate the employees about the first/emergency exits on the floor, and also where the fire extinguishers are kept.

Tips 🔍

- Be aware of what emergency number to call at the time of a workplace emergency
- Practice evacuation drills regularly to avoid chaotic evacuations

UNIT 3.2: Different types of Health Hazards

Unit Objectives 🎯

By the end of this unit, the participants will be able to:

1. Understand the health hazards
2. Demonstrate First Aid Techniques

3.2.1 First Aid

Illness, injuries, and pain are part of human life. This can happen anyway. Every individual is prone to illness and injuries at any time and anywhere.

In case of any of these, some kind of immediate medical attention or treatment is needed to reduce the discomfort, pain, and deterioration of the condition. The medical attention that is given at the first instance before seeking professional medical help is called "First Aid". First aid is the immediate and temporary treatment given to the victim of an accident or sudden illness while awaiting the arrival of "Medical Aid". First Aid means providing the initial treatment and life support for people with an injury or illness. However, First Aid has its limitations and does not take the place of professional medical treatment. Proper early assistance given by First Aider helps in saving the life of a patient.

Illness and injuries can happen anywhere, be at home, the workplace, or in the market place. Whatever safety measures we adopt, we are all prone to illness sometime or the other.

Some common injuries and their rescue techniques:

3.2.2 First Aid Techniques

- Direct pressure must be applied to the cut or wound with a clean cloth, tissue, or piece of gauze, until bleeding stops.
- If blood soaks through the material, it is highly recommended not to remove it.
- More cloth or gauze must be put on top of it, and pressure must be continued.
- If the wound is on the arm or leg, the limb must be raised above the heart to help slow the bleeding.
- Hands must be washed again after giving first aid and before cleaning and dressing the wound.
- A tourniquet must not be applied unless the bleeding is severe and not stopped with direct pressure.

Fig. 3.2.1: Apply pressure

Clean cut or wound

- The wound must be cleaned with soap and lukewarm water.
- To prevent irritation and burning sensation, the soap solution must be rinsed out of the wound.
- Hydrogen peroxide or iodine must not be used to clean or treat the wound since they are corrosive and can damage live tissues.

Fig. 3.2.2: Clean cut or wound

Protect the wound

- Antiseptic cream or solution must be applied to the wound to reduce the risk of infection.
- Then the wound must be gently covered with a sterile bandage.
- Till the wound heals, the bandage must be changed (dressed) daily to keep the wound clean and dry.

Fig. 3.2.3: Protect the wound

Call the Emergency Helpline if:

- The bleeding is severe and deep
- You suspect Internal Bleeding
- Abdominal or Chest wound exists
- Bleeding continues even after 10 minutes of firm and steady pressure

For Burns:

- Immediately put the burnt area under cold water for a minimum of 10 minutes
- If the burned area is covered, take clean scissors, cut and remove the fabric covering the area
- In case clothing is stuck to the burned area, leave it as it is
- Before sterile dressing application, remove jewellery (if any)
- It is better to leave the burned area open
- Do not apply any medication or ointment
- Breaking a blister – it is an absolute no-no!

Fig. 3.2.4: Put Burnt Area under Water

For Broken Bones and Fractures

• **Protruding bone must be left alone**
   o If a bone has broken through the skin, it must not be pushed back into place.
   o The area must be covered with a clean bandage and immediate medical attention must be sought.

• **Bleeding must be stopped**
   o Steady and direct pressure must be applied with a clean piece of cloth for 15 minutes and the wound must be elevated.
   o If a blood soaks through, one must apply another cloth over the first and seek immediate medical attention.

• **Swelling must be controlled**
   o The RICE (Rest, Ice, Compression and Elevation) therapy must be applied to control and reduce swelling.
   o Rest the injured part by having the person stay off of it.
   o Ice must be applied on the area with the help of an ice pack or by wrapping the ice in a clean cloth. Ice must not be directly placed against the skin.

For Heart Attack/Stroke

• Think FAST. Face: is there weakness on one side of the face? Arms: can they raise both arms? Speech: is their speech easily understood? Time: to call Emergency helpline
• Immediately call medical/ambulance helpline or get someone else to do it
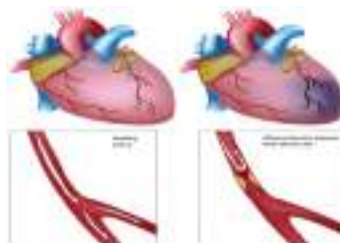
Fig 3.2.5: Anatomy of Heart Attack

For Head Injury

• Ask the victim to rest and apply a cold compress to the injury (e.g. ice bag)
• If the victim becomes drowsy or vomits, call Medical helpline or get someone else to do it

Steps of using breathing apparatus:

Check the parts of the breathing apparatus thoroughly.

Check the bypass knob (red). Close it if you see it open. After this, press the reset button (area above bypass nob – black)

Inspect the facemask to see that it is undamaged.

Lift the cylinder ensuring that on the top the cylinder valve should be present.

The back plate of the cylinder should face the wearer.

Wear the breathing apparatus on the shoulder like a bag pack and by the neck strap, hang the facemask.

After wearing the breathing apparatus tighten shoulder straps and fasten the waist belt

The cylinder valve should be opened slowly to inspect the pressure gauge.

Make sure that 80% of the cylinder is full.

Wear the mask slowly by resting your chin in the resting cusp and pull the head strap slowly over your head.

Pull the head straps for a snug but comfortable fit.

Breath in and normally to see if you can breathe normally or not.

Now insert a finger sidewise of the facemask for easy outward airflow.

Slowly close the cylinder valve without leaving the knob.

Be steady for 10 minutes and hold your breath or extremely slow to listen to any wheezing sound.

Also, check the pressure gauge for any dip in the pressure.

Normally Breathe to vent system

Listen for a whistle alarm while observing the pressure gauge at 55 bar (+/-5 bar)

Table: 3.2.1: Steps of using breathing apparatus

Briefing and Guidance for Fire Fighters

There are basically three methods with the help of which people can be rescued from a building engulfed in a blazing fire. To ensure on-site reception, here are two of the important steps that we will discuss now. These come under the best safe lifting and carrying practices.

Conventional Technique: This is a good method if there is an open area close by. The first rescuers will make the victim sit reach under their armpits and finally, grab their wrist. The other rescuer will cross the ankle (victim), pull up that person's legs on his shoulder. Finally, on the count of 3, both will lift the person up and move out.

Fig. 3.2.6: Fast Strap

Fast Strap: In case the victim is completely incapable of moving out of the fire zone. The rescuers should follow this method. One of the rescuers will place their knee between victim's shoulder and head. Pin the loop of webbing to the ground with the help of the knee. This acts as an anchor. With the non- dominant hand hold the other end of the webbing and make a loop. With steady hands, pull the victim's hand in from the loop, tie it securely and finally clip the webbing loops.

Fig. 3.2.7: Fast Strap

Essentials for Smooth Evacuation: The following are essential to have a smooth evacuation during an outbreak:

• Clear passageways to all escape routes

• Signage indicating escape routes should be clearly marked

• Enough exits and routes should be present to allow a large number of people to be evacuated quickly

• Emergency doors that open easily

• Emergency lighting where needed

• Training for all employees to know and use the escape routes

• A safe meeting point or assembly area for staff

• Instructions on not using the Elevator during a fire

Special Evacuation Requirements For Specially Abled Persons

• **The Visually Impaired**
   o Announce the type of emergency
   o Offer your arm for help

• **With Impaired Hearing**
   o Turn lights on/off to gain the person's attention, or indicate directions with gestures, or write a note with evacuation directions

• **People with Prosthetic Limbs, Crutches, Canes, Walkers**
   o Evacuate these individuals as injured persons.
   o Assist and accompany to evacuation site if possible.
   o Use a sturdy chair, or a wheeled one, to move the person to an enclosed stairwell
   o Notify emergency crew of their location

3.2.3 Importance of Fire Safety Drills

Fire drills are indispensable in any workplace or public building for rehearsing what to do in the event of a fire. They are also a lawful obligation under the Fire Safety Order of 2005 and all workers in a company must partake. Here's how to get the most out of your fire practice.

Why have fire drills?

There are numerous reasons why fire drills are vital; first of all, fire drills are a chance to practice evacuation techniques to make sure all staff are acquainted with them. The staff will vacate the building quickly and therefore in a real life situation panic will be decreased, as everyone will know what they need to do. Fire drills are also beneficial for testing escape methods to assess their efficiency.

During fire drills, checks can also be carried out on alarm systems to make certain they are working properly and that emergency exits are passable. Overall fire drills help increase safety, so that you will be best equipped if a real fire does happen.

How often?

Ideally there should be two fire drills a year, although this may vary according to the workplace and after checking the firm's risk assessment. If there are people who work in shifts, suitable preparations should be made to ensure all staff partake in at least one fire drill per year and to educate them as to how to handle the situation.

Should you inform staff beforehand?

There are arguments for and against making people conscious of fire drills before they take place. Some people contend that not notifying staff gives an element of surprise, so that people take drills more sincerely. However, this can also have the reverse effect in a real fire, as on overhearing the alarm people may reason that it's only a drill.

The benefit of notifying all staff of fire drills in advance is that initially, they will not panic, which circumvents potential injuries that could be instigated in a rush to exit a building. Furthermore, if the alarm sounds, lacking a prior warning, there will be no uncertainty as to if it is a drill or not and people will act correctly. In public places such as shopping centres, it is prudent to make members of the public alert when a drill is about to happen.

Fig. 3.2.8: Fire exit signage

UNIT 3.3: Importance of Safe Working Practices

Unit Objectives 🎯

By the end of this unit, the participants will be able to:

1. Explain Basic Hygiene Practices
2. Understand the importance of Social Distancing
3. Demonstrate the safe working practices

3.3.1 Basic Hygiene Practices

We are living in an environment with millions of germs and viruses. And our body can be a breeding space for these microbial organisms. They grow and multiply and cause many diseases which sometimes can prove to be fatal for the human beings. These disease-causing mi-crobial organisms kill over 17 million people every year. Some simple hacks and little changes of basic personal hygiene habits can bring amazing changes to all of us. We can prevent contracting these diseases if we follow these hygiene practices every day.

Personal Hygiene

Personal hygiene is all about managing your body hy-giene, essentially caring for your well-being incorporat-ing some physical hygiene habits. Also, there are mental health benefits as well, as they affect each other im-mensely.

What are good personal hygiene habits?

Good personal hygiene includes but not limited to-

• Take regular shower
• Maintain oral hygiene
• Wash your hands frequently
• Wash your genitals
• Keep your clothes and surrounding dry and clean

These habits should be practiced on a regular basis, at home, at work, basically where you are!

That's the whole idea of preventing your body system collapse over a tiny mi-crobe!

Personal Hygiene Practices at Home

Your home should be the most comfortable and conven-ient for you to keep up your personal hygiene level to a standard, yet, we find ourselves procrastinating over hygiene issues when we are at home. Even though some of these tasks barely take a minute.

1. Take Regular shower

Do not wait up to feel the dried sweat in your body to feel the urge to take shower, make it a routine, you have the choice to either take them before you head to work or after the long day or even before you head to sleep, whichever one suits your routine. Make sure to rinse your body thoroughly, especially the genitals and underarms as they produce more sweat and are more prone to fungal activities.

2. Wash your hands frequently

We use our hands to do our most physical acts, from picking up the keys, browsing through our phones, cooking or eating to attending our pets. While we agree and accept the importance of washing hands before eating and after visiting the toilet, it is also important to wash our hands with soap or sanitizer every now and then. The pandemic covid-19 which crippled the life all over the world has taught us an important lesson that sanitizing our hands regularly is the only way we can avoid transmission of the disease. Use alcohol based sanitizer to wash hands well to prevent the spread of communicable diseases.

Fig. 3.3.1: 7 steps for Handwashing

3. Maintain oral hygiene practices

It is very important to take care of the teeth and gum, to prevent tooth decay and bad odour. Just brushing them twice a day is not enough, but using fluoride toothpaste and brushing properly is very essential. And wash it well with water to remove any food particles that is stuck in the gap in between the teeth. It is advised to wash the teeth everyday twice to maintain healthy teeth and gum.

4. Nails and hairs hygiene

The cleanliness of nails and hair is also very important. They store dirt and grease. And even the microbes could be in there stuck and spreading. If the nail is not clean they can cause severe food poisoning, as we use our hands to eat food. Trim the nails once in a fortnight and wash hair at least twice a week with a shampoo to keep them healthy

5. Nose and ears hygiene

Wherever we are most likely to breathe in some pollutants, and most of the particles are bound to be stuck in the nasal hair. So, rinse the nose and ear with warm water once you return from outside.

6. Wear fresh and clean clothes

Changing into neat and clean clothes will prevent many infectious diseases. It will also give the mental effect immediately and it will boost the mind. Wash clothes with a good detergent every day and dry it in the sun. This will ward off any microbes attached to the clothes. If possible, Dettol can be used while rinsing which is an anti-disinfectant.

7. **Food hygiene**

    You can get severely sick from food-borne diseases, as most of your foods are raw, purchased from outside, they risk being cross-contaminated with harmful microbes. Food hygiene is basical-ly the idea of better storage, handling, and preparation of food to prevent contamination and to prevent food poisoning.

3.3.2 Importance of Social Distancing

Preventing communicable diseases:

All these above practices will help us to prevent communicable diseases. These diseases are highly infectious and contagious and spread through air, urine, feaces, saliva, skin (through touch) and using same towels and utensils.

Social Distancing and isolation, Self-Quarantine:

Ever since the spread of the pandemic covid-19, several health organisations have been insisting on following social distancing and isolation. Communicable diseases mainly spread through coming close to the infected individual and through physical touch. If a person is infected with diseases like normal flu or cold and spread it to others, the symptoms and may remain with the infected person for a day or two. The virus may be destroyed by taking an antibiotic. But in severe cases like corona virus the infection is severe and can prove fatal to the affected people. To prevent the spread of the virus, the entire world adopted lockdown, social distancing and compulsory face mask. And the infected person has to be in self isolation and quarantine till the time the symptoms are over. This was the advisory from the World Health Organisation, and the entire world followed it to prevent the rapid spread of the virus. The same can be applicable to all types of communicable diseases that are spread mainly through air and touch.

As communities reopen and people are more often in public after the pandemic, the term "physical distanc-ing" (instead of social distancing) is being used to rein-force the need to stay at least 6 feet from others, as well as wearing face masks. Historically, social distanc-ing was also used interchangeably to indicate physical distancing which is defined below. However, social dis-tancing is a strategy distinct from the physical distanc-ing behavior.

What is self-quarantine?

Self quarantine was imposed on people who have been exposed to the new covid-19 and who are at risk for getting infected with the virus were recommended to practice self-quarantine. Health experts advised the self-quarantine for 14 days or two weeks. Two weeks provides enough time for them to know whether or not they will become ill and be contagious to other people.

Self-quarantine was also recommended for people who have recently returned from traveling to a part of the country or the world where COVID-19 was spreading rapidly, or if a person has knowingly been exposed to an infected person.

Self-quarantine involves:

•   Using standard hygiene and washing hands frequently
•   Not sharing things like towels and utensils
•   Staying at home
•   Not having visitors
•   Staying at least 6 feet away from other people in your household

Once your quarantine period has ended, if the symptoms are not there, then the person may return to normal routine as per doctor's advice.

What is isolation?

Anybody who is infected with a contagious disease needs to practice isolation in order to prevent the spread of the germs to their near and dear ones. This became very popular and was strictly adhered to during the covid-19 pandemic. People who were confirmed to have COVID-19, isolation was mandatory. Isolation is a health care term that means keeping people who are in-fected with a contagious illness away from those who are not infected. Isolation can take place at home or at a hospital or care facility. Special personal protective equipment will be used to care for these patients in health care settings. They are attended by well trained nurses and specialised doctors. And these people have to be in the PPE kits all through their presence in the hospital.

Fig. 3.3.2: Complete PPE Kit

Disposing off the PPE Kits

The PPE kits are worn by health workers and doctors who are attending to patients with highly infectious diseases and who are kept is isolation in order to arrest the spread. They have to wear it every time they go near the patient and have to remove it once their duty is over. Most of the PPE components are used for single use, however the face mask and goggles can be reused provided they are sanitised properly. The PPE kits have to be disposed off safely as they might have contaminants stuck to them and they may infect the healthy person if they are not discarded properly. The health workers may be all the more vulnerable to contact the disease.

3.3.3 Safe Workplace Practices

Every company has the provision of first aid box. As you have already read about the types of injuries that technicians can receive in their field of work, it is imperative for the companies to have appropriate first aid accessories.

The basic first aid supplies and accessories that a first aid box should have are:

Supplies and Accessories in the First Aid Box

Splint

Elastic wraps

Latex gloves

Adhesive tape

Tweezers

Blanket

Scissors

Wound cleaning agent

Triangular bandages

Gauze roller bandage

Adhesive bandages

Gauze pads

Antiseptic cleansing wipes

Burn cream or gel

Eyewash liquid

CPR Kit

Chemical hazards are caused by toxic materials, which are poisonous. And being poisonous in nature, they can either be fatal or cause serious damages in case the preventive actions are not taken on time. Now, the exposure to chemicals can be in 3 forms.

They can be:

• Inhaled (entering the body through nose)
• Directly in contact with skin
• Ingested (consumed)

The symptoms, in this case, will be:

• Seizures
• Partial or complete loss of responsiveness
• Burning sensation
• Stomach Cramping with bouts of excruciating pain
• Nausea
• Vomiting (and in times with blood-stains)

Now, where there are problem, their solutions come side by side. In such situations, the person giving first aid requires to be calm and take certain preventative actions.

Some of the essential actions are:

• Using insulated equipment
• Wearing protective clothing, goggles, masks, shoes and gloves
• Ensuring the place has enough ample ventilation

Remedial action

• The foremost thing that one should do is to provide immediate first aid. However, it is to be remembered that the victim should not be given any kind of fluid (water, milk) until doctors from Poison control unit gives a green signal.
• Aside from this, there are a few things a person can perform to the victim of toxic material exposure.
• Remove the victim from the toxic zone or vicinity
• Call for an ambulance

- Remove contaminated clothing
- Splash water in the eyes
- If ingested, do not try to make the victim puke (vomit)
- Wash their mouth with water

Fig. 3.3.3: CPR

- In case the victim's breathing has stopped, give CPR (Cardiopulmonary resuscitation)
- In case of burning due to toxic material, apply burn gel or water gel on that area.
- Avoid any cream based or oil based lotion or ointment
- Even though giving first aid is the right thing to do in the first place, it is also important to report the incident to their supervisor.

UNIT 3.4: Reporting Safety Hazards

Unit Objectives ⌖

By the end of this unit, the participants will be able to:

1. Discuss the process of reporting in case of emergency (safety hazards)
2. Understand methods of reporting hazards

3.4.1 Methods of Reporting Safety Hazards

Every organization, from every industry, has a standard reporting protocol, comprising the details of people in the reporting hierarchy as well as the guidelines to be followed to report emergencies. However, the structure of this reporting hierarchy varies between organizations, but the basic purpose behind the reporting procedure remains same.

The general highlights of the Organizational Reporting Protocol, commonly known as the 6Cs, are:

- Communicate First
  - The first source of information during emergency is the preferred source.
  - Crises situations are time-bound and hence it is important to communicate promptly.
- Communicate Rightly
  - Distortion of information due to panic must be avoided.
  - Proper, accurate information must be provided to concerned authorities and this can save lives.
- Communicate Credibly
  - Integrity and truthfulness must never be forgotten during emergencies.
- Communicate empathetically
  - One must wear the shoes of the victims while communicating emergencies.
- Communicate to instigate appropriate action
  - Communicating to the right authorities help in taking the necessary action.
- Communicate to promote respect
  - Communicating with the victims with respect help in earning their trust and thus eases the disaster management process.

Hazards and potential risks / threats can be identified and then reported to supervisors or other authorized persons in the following ways:

While identifying and reporting a hazard / potential threat / potential risk, one must describe the following:

Fig. 3.4.1: Describing hazard matrix

Part A: To be completed by the Worker Details Required:

- Name of Worker
- Designation
- Date of filling up the form
- Time of incident / accident
- Supervisor / Manager Name
- Work Location / Address
- Description of the hazard / what happened (Includes area, task, equipment, tools and people involved)
- Possible solutions to prevent recurrence (Suggestions)

Part B: To be completed by the Supervisor / Manager Details Required:

- Results of Investigation (Comment on if the hazard is severe enough to cause an injury and mention the causes of the incident / accident)

Part C: To be completed by the Supervisor / Manager Details Required:

- Actions taken / Measures adopted (Identify and devise actions to prevent further injury, illness and casualty)

Action	Responsibility	Completion Date

Any job role and any occupation in this world have some hazards, in varying severity, associated with it. These are called Occupational Hazards. Occupational Hazard can be defined as "a risk accepted as a consequence of a particular occupation". According to the Collins English Dictionary, it is defined as "something unpleasant that one may suffer or experience as a result of doing his or her job". Occupational Hazards are caused by the following:

Hazard Report Form	
Name:	Date:
Location:	
Tool/Equipment:	
Description of the hazard:	
Suggested correction action:	
Signature:	
Supercisor's remarks:	
Corrective Action taken:	
Sinature of Supervisor:	Date:

Fig 3.4.2: Sample form of reporting hazards

UNIT 3.5: Waste Management

Unit Objectives ◎

By the end of this unit, the participants will be able to:

1. Understand what is e-waste
2. Understand the concept of waste management
3. Explain the process of recycling of e-waste

3.5.1 Introduction to E-Waste

Electrical and electronic products are all around us. We can't imagine a world without these gadgets. Our life is indispensable without electricity and electronic devices. Growth in the IT and communication sectors has increased the usage of electronic equipment immensely. Frequent change on the technological features of electronic products is forcing consumers to discard their old electronic products very quickly, which, in turn, adds to e-waste to the solid waste pool. What this translates to is mountainous masses of electrical and electronic waste which has a high potential to pollute the environment. This growing menace of e-waste calls for a greater focus on recycling e-waste and better e-waste management.

E-waste means electrical and electronic equipment, whole or in part discarded as waste by the consumer or bulk consumer as well as rejects from manufacturing, refurbishment, and repair processes. E-waste usually is made up of usable and non-usable material. Some of the waste if left unattended will be destructive to the environment. E-waste is made up of hazardous substances like lead, mercury, toxic material, and gases.

There are many companies these days who are engaged in the collection, handling, and disposal of this e-waste in a safer and more secure place to protect the environment.

3.5.2 What is E-Waste?

The amount of e-wastes comprising computers and computer parts, electronic devices, mobile phones, entertainment electronics, refrigerators, microwaves, TV, fridges, and industrial electronics that are obsolete or that have become unserviceable is growing. All these electronic devices contain plastics, ceramics, glass, and metals such as copper, lead, beryllium, cadmium, and mercury and all these metals are harmful to humans, animals, and the earth. Improper disposal only leads to poisoning the Earth and water and therefore all life forms. Our effort is meant to preserve the environment and prevent pollution by proper handling of e-waste. While it will take a lot of effort to educate people to dispose of such wastes in the right way, we are doing our part by providing a channel to collect e-wastes and dispose off them in a sustainably safe manner. We convert waste to usable resources.

The electronic industry is not only the world's largest industry but also a fast-growing manufacturing industry. It has been instrumental in the socio-economic and technological growth of the developing society of India.

At the same time, it poses a major threat in the form of e-waste or electronics waste which is causing harmful effects on the whole nation. e-waste is creating a new challenge to the already suffering Solid waste management, which is already a critical task in India.

3.5.3 Electronic Goods/gadgets are Classified Under Three Major Heads

White goods: Household appliances,
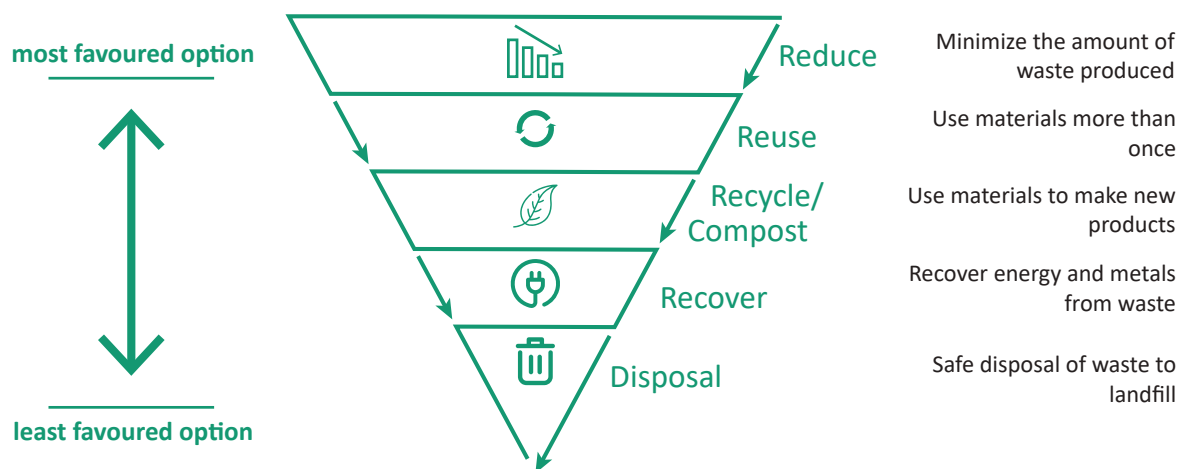
Brown goods: TVs, camcorders, cameras etc.,

Grey goods: Computers, printers, fax machines, scanners etc.

The complete process is carried out as per the government guidelines.

3.5.4 E-waste Management Process

• Collection of e-waste from all the electronic stores, manufacturing companies, etc.
• Transport of e-waste to the disposal units
• Segregation of e-waste at the disposal unit
• Manual dismantling of e-waste to segregate components into various types such as metal, plastics and ceramics
• Convert into raw material (recycle and reuse)
• Supply recovered raw material to processors and electrical/electronic industries
• Dispatch hazardous e-waste for safe disposal

Waste management is carried out to ensure that all types of waste and garbage are collected, transported, and disposed of properly. It also includes recycling waste so that it can be used again.

most favoured option

least favoured option

Reduce — Minimize the amount of waste produced

Reuse — Use materials more than once

Recycle/Compost — Use materials to make new products

Recover — Recover energy and metals from waste

Disposal — Safe disposal of waste to landfill

3.5.5 Recyclable and Non-Recyclable Waste

Recyclable waste is renewable or can be reused. This means that the waste product is converted into new products or raw material, like paper, corrugated cardboard (OCC), glass, plastics containers and bags, hard plastic, metal, wood products, e-waste, textile, etc

Recycling not only conserves important areas in our landfills but also assists decrease greenhouse gas emissions.

Contrary to this, Non-recyclable waste cannot be recycled and cause a major threat to the environment.

The following items cannot be recycled:

Shredded paper, aerosol cans, paper coffee cups, milk and juice cans, used baby diapers, and bottle caps.

Recycling is one of the best ways to have a favorable influence on the world where we live.

Recycling will greatly help us to save both the environment and us from pollution. If we take immediate action, we can control this, as the quantity of waste we are accumulating is increasing all the time.

3.5.6 Colour Codes of Waste Collecting Bins

Waste collecting bins colour code

India's urban population of 429 million citizens produce a whopping 62 million tonnes of garbage every year. Out of this, 5.6 million tonnes is the plastic waste, 0.17 million tonnes is the biomedical waste, 7.90 million tonnes is hazardous waste and 15 lakh tonnes is e-waste.

According to an estimate, 40% of municipal waste in the city is 'wet' waste, which can easily be composted and used as manure. Nearly 30% of the municipal waste comprises of plastic and metal, which can be sent to an authorized dealer for recycling, and about 20% of it is e-waste, from which precious metals can be taken apart and recycled. However, out of the total municipal waste collected, 94% is dumped on land and only 5% is composted. To gather the garbage two color bin system was suggested. Green bin for wet waste and blue for dry waste. However, there is a drawback in that system. People do through the sanitary napkins and children's diaper along with wet waste causing the contamination of things. Hence the government has come up with three colored garbage collection bins.

1. **Green Bin**

   The green coloured bin is used to dump biodegradable waste. This bin could be used to dispose off wet/organic material including cooked food/leftover food, vegetable/fruit peels, egg shell, rotten eggs, chicken/fish bones, tea bags/coffee grinds, coconut shells and garden waste including fallen leaves/twigs or the puja flowers/garlands will all go into the green bin.

2. **Blue bin**

   The blue coloured bin is used for segregating dry or recyclable left over. This category includes waste like plastic covers, bottles, boxes, cups, toffee wrappers, soap or chocolate wrapper and paper waste including magazines, newspapers, tetra packs, cardboard cartons, pizza boxes or paper cups/plates will have to be thrown into the white bin. Metallic items like tins/cans foil paper and containers and even the dry waste including cosmetics, hair, rubber/thermocol (polystyrene), old mops/dusters/sponges.

3. **Black bin**

   Black bin, make up for the third category, which is used for domestic hazardous waste like sanitary napkins, diapers, blades, bandages, CFL, tube light, printer cartridges, broken thermometer, batteries, button cells, expired medicine etc.

3.5.7 Waste Disposal Methods

- Incineration: Combusting waste in a controlled manner to minimize incombustible matter like waste gas and ash.
- Waste Compaction: Waste materials are compacted in blocks and are further sent away for recycling.
- Landfill: Waste that can't be recycled or reused can be thinly spread out in the low-lying areas of the city.
- Composting: Decay of organic material over time by microorganisms.
- Biogas Generation: With the help of fungi, bacteria, and microbes, biodegradable waste is converted to biogas in bio-degradation plants.
- Vermicomposting: Transforming the organic waste into nutrient-rich manure by degradation through worms.

3.5.8 Sources of Waste

1. **Construction waste –** waste coming from construction or demolition of buildings.
2. **Commercial waste-** waste from commercial enterprises
3. **Household waste-** garbage from households is either organic or inorganic
4. **Medical or clinical waste -** wastes from the medical facilities- like used needles and syringes, surgical wastes, blood, wound dressing
5. **Agricultural waste-** Waste generated by agricultural activities that include empty pesticide containers, old silage packages, obsolete medicines, used tires, extra milk, cocoa pods, wheat husks, chemical fertilizers, etc.
6. **Industrial waste-** The waste from manufacturing and processing industries like cement plants, chemical plants, textile, and power plants
7. **Electronic waste-** The defective, non-working electronic appliances are referred to as electronic waste. These are also called e-waste. Some e-waste (such as televisions) contains lead, mercury, and cadmium, which are harmful to humans and the environment
8. **Mining waste-** chemical gases emitted in mine blasting pollutes the environment. And the mining activity greatly alters the environment and nature.
9. **Chemical waste-** waste from the chemical substance is called chemical waste.
10. **Radioactive waste-** radioactive waste includes nuclear reactors, extraction of radioactive materials, and atomic explosions.

3.5.9 Source of Pollution

All these above-mentioned waste also adds to environmental pollution.

The contaminants that cause detrimental change to the environment are called pollution. It is one of the most serious problems faced by humanity and other life forms on our planet. The earth's physical and biological components have been affected to such an extent that normal environmental processes could not be carried out properly.

3.5.10 Types of Pollution

Types of Pollution	Detail/Pollutants involved
Air pollution	• Solid particles and gases mixed in the air cause air pollution • Pollutants: emissions from the car, factories emitting chemical dust, and pollen
Water pollution	• Water gets polluted when toxic substances enter water bodies such as lakes, rivers, oceans, and so on. They get dissolved in it and cause it unfit for consumption. • Pollutants that contaminate the water are discharges of untreated sewage, and chemical contaminants, release of waste and contaminants into surface
Soil pollution	• It is the presence of toxic chemicals (pollutants or contaminants) in soil, in high enough concentrations to pose a risk to human health and/or the ecosystem • Sources of soil pollution include metals, inorganic ions, and salts (e.g. phosphates, carbonates, sulfates, nitrates),
Noise pollution	• Noise pollution happens when the sound coming from planes, industry or other sources reaches harmful levels • Underwater noise pollution coming from ships has been shown to upset whales' navigation systems and kill other species that depend on the natural underwater world
Light pollution	• Light pollution is the excess amount of light in the night sky. • Light pollution, also called photo pollution, is almost always found in urban areas. • Light pollution can disrupt ecosystems by confusing the distinction between night and day.

UNIT 3.6: Organizations' Focus on the Greening of jobs

Unit Objectives 🎯

By the end of this unit, the participants will be able to:

1. Understand the concept of ESG
2. Explain the different factors of ESG

3.6.1 What is ESG?

The ESG is the short form of environmental, social, and governance. ESG guidelines are used to evaluate businesses on how well they control emissions, governance, human rights, and other factors of their business.

Several companies audit these companies for ESG compliance. They will let the companies know how well the ESG policies are implemented in their company hat let companies know how well their ESG policy is working.

Every business enterprise is deeply intertwined with Environmental, Social, and Governance (ESG) issues. ESG has been looked at seriously by the corporate, government establishments and stakeholders.

ESG is important as it creates high value, drives long-term returns, and global stakeholders are paying attention to the topic.

ESG is said to have created high value, and focuses on long-term returns, and stakeholders are focusing more on this concept.

3.6.2 Factors of ESG

Several factors are used to determine how well a business is doing in maintaining its ESG policies. For creating the ESG Policy, thorough knowledge of these factors are critical.

The factors are divided into three categories; environmental, social, and governance. Knowing about these factors come a long way in designing the effective ESG policy.

Environmental

Environmental factors relate to a business's impact on the environment. Examples include:

• Usage of renewable energy
• Effective waste management
• Policies for protecting and preserving the environment

Social

Social factors relate to the people of the organization. How they are treated in the organization is what it focuses on. The major entities are the stakeholders, employees, and customers. Examples include:

• diversity and inclusion
• proper work conditions and labor standards
• relationships with the community

Governance

Governance factors relate to the company policies for effectively running it. They include:

• tax strategies
• structure of the company
• relationship with stakeholders
• payments to the employees and CEO

Every factor is important and matters a lot to the overall rating of the company in ESG compliance. Ignoring one aspect in favor of another can affect the rating and in turn the reputation of the company.

The companies make a clear communication about these policies to all the employees, and to the public, they should mention what their various activities are that will protect the environment, people, and the governing factors.

Summary

- Every organization is obligated to ensure that the workplace follows the highest possible safety protocol.
- Every employee is obligated to follow all safety protocols put in place by the organization
- The medical attention that is given at the first instance before seeking professional medical help is called "First Aid".
- Every company has the provision of first aid box.
- Chemical hazards are caused by toxic materials, which are poisonous.
- Any job role and any occupation in this world have some hazards, in varying severity, associated with it. These are called Occupational Hazards.
- Time management is the process of organizing your time, and deciding how to allocate your time between different activities.
- Giving committed service to customers every time and on time is very crucial for the success of the brand.
- An escalation matrix is made up of several levels of contact based on the specific problem at hand.
- Key Performance Indicators or KPI is used to evaluate the success of an employee in meeting objectives for performance.
- Managing emotions in the workplace is very important. We cannot overreact under emotional stress.
- The one-on-one, face-to-face communication with each member of the team will give the manager the chance to read their emotions and the expression on their face.
- E-waste means electrical and electronic equipment, whole or in part discarded as waste by the consumer or bulk consumer as well as rejects from manufacturing, refurbishment, and repair processes.
- Recycling is one of the best ways to have a favourable influence on the world where we live.
- The ESG is the short form of environmental, social, and governance. ESG guidelines are used to evaluate businesses on how well they control emissions, governance, human rights, and other factors of their business.

Exercise

Multiple-choice Questions

1. The medical attention that is given at the first instance before seeking professional medical help is called _____.
   a. First Aid
   b. Hospitalisation
   c. CPR
   d. None of the above

2. A wound must be cleaned with soap and _____ water.
   a. Cold
   b. Luke warm
   c. Hot
   d. None of the above

3. _____ cream or solution must be applied to the wound to reduce the risk of infection.
   a. Antiseptic
   b. Moisturing
   c. Ice
   d. None of the above

4. _____ are caused by toxic materials, which are poisonous.
   a. Chemical hazards
   b. Physical hazards
   c. Ergonomic hazards
   d. Noen of the above

5. CPR is _____.
   a. Cardio Pulmonary Resuscitation
   b. Cardio Pulmonary Restriction
   c. Central Pulmonary Resuscitation
   d. Cardio Pulsive Resuscitation

Answer the following:

1. What is ESG?
2. What are the special evacuation requirements for specially abled persons.
3. Explain the first aid steps for burns.
4. Explain the benefits of time management.
5. What is Maslow's Hierarchy of Needs?

Notes 📝

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Scan the QR codes or click on the link to watch the related videos

youtu.be/GrxevjEvk_s

First Aid at Work Place

https://youtu.be/IsgLivAD2FE

How to properly wash your hands

https://youtu.be/qzdLmL4Er9E

How to give CPR to an Adult, a Child or an infant

youtu.be/ccAZ9nCZSLc

Escalation Matrix PowerPoint Presentation Slides

youtu.be/dq7bBZUFR14

E-Waste Recycling and Management

4. Communication and Interpersonal Skills

Unit 4.1 - Interaction with Supervisor, Peers and Customers

TEL/N9102

Key Learning Outcomes 💡

By the end of this module, the participants will be able to:

1. Understand what is communication and the importance of communication in the workplace
2. Understand effective communication and communicate effectively for success
3. Discuss types of communication -verbal and non-verbal
4. Communicate at workplace
5. Communicate effectively with superiors
6. Communicate effectively with colleagues and customers using different modes viz face-to face, telephonic and email communication
7. Understand the hurdles for effective communication
8. Conduct professionally at work place
9. Respect differences in gender and ability
10. Communicate effectively with person with disabilities
11. Respect for disable people

UNIT 4.1: Interaction with Supervisor, Peers and Customers

Unit Objectives

By the end of this unit, the participants will be able to:

1. Understand the importance of communication
2. Understand types of communication

4.1.1 Why is Communication Important?

• Communication Skills are more important than ever, for all fields of endeavor.

• Whatever the role a person is holding in the organization, having a firm grasp of effective communication will undoubtedly be a key role in the individual's as well as the organization's success

• Oftentimes, people with excellent technical skills don't get promoted to higher roles because of their inability to communicate effectively

• Hence one fundamental skill everybody should be proficient along with the technical skill is Communication Skills

• Effective communication help us to build rapport with the customer both internal and external and help us resolve issues and conflicts easily and quickly.

4.1.2 What is Communication?

• Communication is the process of sending and receiving information among people.

• It is imparting or exchanging of information by speaking, writing, or using some other medium

• The purpose of communication is to convey your thoughts and opinions to others.

• Communication is said to be successful only when both the sender and the receiver perceive it in the same way.

• In your personal and professional life, you would be communicating with the following people-

   o Colleagues
   o Customers
   o Friends
   o Parents
   o Relatives

4.1.3 Effective Communication

Effective communication is the process of delivering messages to a target audience in a way that guarantees satisfactory reception and understanding. If the communication is effective, both the sender and the receiver will share the same information at the end of the process. Effective communication is about more than just exchanging information. It's about understanding the emotion and intentions behind the information

4.1.4 Effective Communication for Success

Effective Communication is critical to a business's success. From top to bottom, among colleagues, from subordinates to superiors, and from the organization to the outside, several messages are delivered daily. All the people must communicate these messages properly. Content, language, remarks, tone of voice, and non-verbal communication are elements that affect the effectiveness of messages

Clear and effective communication will

- Increase customer satisfaction
- Bring more business to the company
- Increase productivity among team members

4.1.5 Types of Communication

Communication has been divided into two types:-

- Verbal Communication
- Non-Verbal Communication

Verbal communication takes place when people exchange words with each other, either spoken or written. It includes the choice and use of words and language to convey a message. Examples of verbal communication are face-to-face conversation, telephonic conversation, and a speech or presentation.

| Speech | Face to face communication | Phone conversation | Voice chat over internet | Newspapers, e-mails, etc. |

Speech has certain characteristics which will affect the message that is being spoken:

- Volume – loud speech may sound bossy, very quiet speech cannot be heard.
- Tone – use warm tones without sounding over-friendly. Cool tones are very unwelcoming.
- Pace – fast speech is not easy to follow. Speak at a reasonable pace so that the other person has a chance to understand.

Correct body language also plays an important role in effective communication. For example, a warm smile accompanying 'Have a nice day' or looking directly at the person who is being spoken to give a positive image of the organisation.

Non –Verbal Communication

Non-verbal communication includes the overall body language of a person. There are two kinds of non-verbal communication:

1. **Signs and symbols:** for example pictures, or notices, or signboards, or even photographs,   sketches and paintings. Here are some examples of different signs and symbols:

2. **Gestures and expressions:** hand signs, facial expressions, body postures or body language that can help to convey a message. You can learn to communicate better with others if you learn to recognise some of these.

   Facial expressions - A smile or a frown

   Gestures - movements of hands and body to help explain or emphasize the verbal message

   Body posture - how we stand or sit. Maintain a good posture. When you are talking to a colleague or guest, remember to stand up straight, look professional and be positive. Do not slouch, lean against something or fidget with equipment or your hands.

   Orientation - whether we face the other person or turn away

   Eye contact - whether we look at the other person and for how long

   Proximity - the distance we are from a person

   Head nods - for encouragement, indication of agreement or disagreement

   Appearance - dress and grooming

   Non-verbal aspects of speech - tone and pitch of voice

These non-verbal clues are important as they can be used to improve the quality of communication. They can be used to reinforce any verbal communication; for example, leaning forward and looking at the person you are speaking to and smiling naturally. Your expressions, posture and appearance must be appropriate and should tell the guest that you are professional, competent and willing to help.

4.1.6 Communication at Workplace

In every situation, while interacting with people, we make use of both verbal and Non-Verbal Communication. It is the key to the success of any organization. Be it communication with customers, supervisors, or peers. In today's scenario having technical skills alone is not enough to get the work done, but communication skill is also equally important. Completing the task must require the support of the whole team, and without proper communication, it cannot happen. Effective Communication helps managers to perform their jobs and responsibilities and it serves as a foundation for planning.

4.1.7 Communication with Supervisors

Effective and open communication within a team will build a common purpose among team members that will allow them to reach their goals. Team leaders know that group communication enhances organizational efficiency. The team members should always follow the communication guidelines. Some of the points to remember while interacting with supervisors:

1. Be aware of the communication guidelines of the organization.
2. Understand and interpret clearly, the work requirements from the supervisor.
3. Keep the supervisor informed about the progress of the task assigned.
4. Participate in all the discussions which call for decision-making, and provide facts and figures
5. Give/ accept suggestions during the discussions.
6. Accept the feedback positively and work towards rectifying errors if any. Make sure the same mistakes are not repeated.

4.1.8 Communication with Colleagues & Customers

- The main responsibility is to handle customers' concerns
- Interaction with colleagues/peers is also equally essential and it enhances productivity in the workplace.
- Be polite in speaking to your peers at the office.
- Value other people's time as much as you value your own.
- Before you begin discussing something, ask your coworker if it is the right time to talk, and give a true picture of how much time you expect to take. Always start the conversation
- Communication with colleagues/customers can be through face-to-face, telephonic, or email.
- Keeping a few points in mind while communicating will make the interaction pleasant and fruitful.

4.1.9 Face-to-face Communication

This is an important medium of oral communication, wherein two or more persons talk to each other and see each other physically. This form of communication is direct or straight. Things to remember while you are communicating face to face

1. Adjust the tone of voice, don't be too loud
2. Make eye contact
3. Use appropriate language
4. Maintain adequate distance
5. Acknowledge, nod during interaction
6. Use appropriate non-verbal gestures to communicate with persons with disabilities

Benefits of face-to-face communication

•   Instant feedback
•   Information conveyed clearly
•   Build rapport

4.1.10 Telephonic Communication

Another widely adopted mode of communication is through the telephone. This is the person-to-person conversation where nobody sees others but hears each other and interacts instantly. Nowadays mobile phones are becoming more popular along with landlines as a mechanical media of oral communication.

The following suggestions are recommended to follow while making telephone calls-

1. Make the call at the appropriate time
2. Provide details about your identity like name, company, department, etc.
3. Discuss the purpose of the call
4. Think about the tone of your voice
5. Listen carefully
6. Speak clearly
7. If you don't understand something, ask
8. Use please, thank you, sorry wherever necessary
9. Follow the organization's policies and procedures while interacting on the telephone.

4.1.11 Email Communication

Email or Electronic mail is a method of exchanging messages using electronic media. The official or business communication between colleagues or inter-department communication usually happens through email. The advantage of email is you can send communication to many people at the same time.

Points to remember in email communication

1. Be clear and concise
2. Keep the content short and to the point

3. Avoid using jargon and short forms
4. Re-read the message, before sending it for grammar and spelling mistakes
5. The subject line should describe the main mail content
6. Use readable font size (don't keep it too small)
7. Add signature at the bottom of the mail body
8. Check the attachments for viruses before sending

4.1.13 Importance of Timely Completion of Tasks

Time is a major factor that evaluates the success or failure of a project. Even when the whole team has done a wonderful job and produced high-quality results, with half the cost allotted to the project, everything will be a waste if it was not delivered on time. Any deviation from the timeline will call for a penalty and sometimes may result in losing the project and eventually the customer. so adhering to the timeline is important when it comes to any organization who are into products and services.

Benefits of adhering to timelines:

1. Increased and improved customer satisfaction
2. Increased productivity and efficiency of the individual
3. Team feels motivated
4. Sense of adhering to the SLA's and Standard Operating Procedures
5. Shows the commitment toward the work and the organization
6. Good word of mouth from the customers

4.1.14 Standard Operating Procedure

A Standard Operating Procedure (SOP) is a standardized process that outlines a set of detailed instructions to help workers perform complex tasks properly and safely. The main objective of standard operating procedures is to develop an effective quality system and comply with industry- specific regulations and standards. Failure to follow SOPs can cause significant errors in operations and services.

For a mobile repairing center, the SOP defines the different process of operations, namely handling customer, repairs, sales and interaction among the staff within the repair center.

SOP also clearly defines the responsibility of each and every designated person in the organisation and what is expected from them. It further defines what the various levels of engineers will handle with respect to the handsets coming for repair.

The escalation matrix specifies how the different levels escalate the issue to the next level and adhere to the timelines for repair and communication to the customer.

SOP is created keeping in mind the customer satisfaction as a main motive.

Each and every person in the organisation is expected to read the SOP thoroughly and work accordingly. Because every customer when they go for purchasing a product, one of the main things they see is the post-sales Support. If they find the brands deliver good service support then they don't mind even spending few extra moneys.

4.1.15 Escalation Matrix

Escalation matrix is made up of several levels of contact based on the specific problem at hand. This is being followed by all who are working on that product and have to adhere to the service guidelines. And the problem has to be closed at a minimum turnaround time, and for any reason the repair is taking time proper reason has to be mentioned and notified to all the people concerned including the customer.

4.1.16 Escalation Mechanism

Customer service is a very important aspect of a typical service industry. Giving committed service to customers every time and on time is very crucial for the success of the brand. In recent times, customers do research on how the after-sales support of a product is, and based on that rating they will decide which brand to buy. If the customer service is not good, they will not go for that product even though the product is very good. Hence customer service is a second important aspect of a product and services organization.

For electrical home appliances, the customer logs a complaint and the service engineer is sent to the site for looking into the problem and repairing.

For electronic devices like mobile phones and tablets, the customer is expected to take the product to their service center to get it checked and repaired.

The resolution time matters a lot, as mobile phones have become an indispensable device for people. Their business cannot function without that. Hence too much downtime is also not good. Once at the service center, the technicians at L1 level look for the problem and try to resolve it. If it's beyond their area of resolution the same is escalated to the next level. Every organization has Standard Operating Procedures clearly state the workflow for the repair of the smart phones. Every individual working there must be aware of the same and adhere to the deadline for faster service and enriched customer satisfaction.

4.1.17 Escalation through CRM

Customer Relationship Management is a software, through which most of these companies who are into customer service, manage their customers. The customer details are entered in the system and also the services which are logged against a particular customer. This is the automated system, which takes a particular action after a period of time. For example, if a service request is assigned to an engineer for rectifying a problem of a client, and if the engineer does not update the status of the service in the system within a specified period of time, the problem is automatically escalated to the next level for resolution. Then the new engineer who is responsible for resolving pick it and try to find a solution. This system helps to maintain a track of a particular problem and the current status which will help the organization in effectively managing the customer queries. The complete escalation route is mentioned in the SOP and the same is implemented through the CRM software. This eases the manual escalation procedure which is time consuming and slow.

4.1.18 Escalation Issues at Work

Whether an issue arises among team members or with customers, sometimes the severity of the circumstance requires an escalation to manage-ment. Understanding how to approach an escala-tion can help you better find a solution when con-flicts arise. We explore what it means to escalate an issue in the workplace and provide tips for how to do so successfully.

What does it mean to escalate an issue at work?

Escalating an issue in the workplace is the process of bypassing those involved by contacting upper/ senior management. It involves raising awareness of the context to the right people in order to resolve a chal-lenging situation. Typically, escalation occurs when there is an issue that the current staff working on the problem can't resolve and requires assistance from those with more authority and resources

When should you escalate an issue at work?

Deciding when to escalate an issue depends on the amount of risk it can bring to the company. Because escalating an issue can lead to difficult meetings and cause disruptions in work, you should reserve them for issues that truly require escalation. You can often avoid escalating an issue by solving the problem with the individual first.

However, some issues require support from those with higher authority. Consider escalating an issue at work when:

• You have already tried other strategies but that did not work.
• Resolving may incur additional cost to the company or the customer, while rectifying the
• problem.
• Because of the non-availability of certain parts the repair work is taking longer than usual.
• The engineer broke another part while repairing a part. So escala-tion is required to get the approval to replace the broken part by the company.

4.1.19 Hurdles for Effective Communication

Following are factors contribute to communication not being effective.

Stress and out-of-control emotion. When you are stressed or emotionally disturbed, you're more likely to misread other people and send confusing non-verbal signals. Calm down before continuing the conversation.

Lack of focus. You can't communicate effectively when you're multitasking. If you're checking your phone, planning what you're going to say next, or daydreaming, you're almost certain to miss nonverbal cues in the conversation. To communicate effectively, you need to avoid distractions and stay focused.

Inconsistent body language. Nonverbal communication should support what is being said, not contradict it. If you say one thing, but your body language says something else, your listener will likely feel that you're being dishonest. For example, you can't say "yes" while shaking your head no.

Negative body language. If you disagree with or dislike what's being said, you might use negative body language to ignore the other person's message, such as crossing your arms, avoiding eye contact, or tapping your feet. You don't have to agree with, or even like what's being said, but to communicate effectively and not put the other person on the defensive, it's important to avoid sending negative signals.

4.1.20 Professional Conduct

There are six basic rules to be followed for professional conduct:

- **Be on time:** Being late impedes a company's operations and demonstrates a lack of consideration of the time concerns of others. If you are constantly late for work, meetings, or are always late with your reports and other tasks; it demonstrates to others that you are probably not executive material because you disregard the value of time.
- **Be discreet:** Keep company secrets such as new product designs, sales figures or any other confidences to yourself.
- **Be courteous, pleasant, and positive:** No matter how demanding your clients, customers, co-workers or employees might be; always remain upbeat and positive. Projecting a positive company image has the same effect.
- **Be concerned with others, not just yourself:** Finding out a customer or client's point of view naturally helps you get ahead in any industry. Concern for others should include your superiors, co-workers and subordinates as well.
- **Dress appropriately:** Dress to be comfortable in your environment. Dressing poorly or too casually does not convey a good image, neither does overdressing, which breeds suspicion and mistrust, and will be seen as inappropriate.
- **Use proper written and spoken language:** People who can express themselves clearly are at an advantage. This goes beyond using good grammar, proper spelling, and appropriate diction in all your communications; you should also speak and write to the point.

4.1.21 Respect Gender Differences

In any business, be it a small company to a big corporate, the workforce is a mix of both genders. The ratio of men vs. women varies from 70:30 or 60:40. Studies show that business teams with an equal gender mix perform significantly better than male-dominated teams when it comes to both sales and profits. No two women or men are alike and yet at the same time there are some work related traits that are gender specific. Both men and women approach their work in a different way and deal with many hurdles that come their way. Since they all share the same workspace every organization has devised a policy as to how they treat the opposite gender at the workplace and what are the implications of any abuses

Some of the points to remember while interacting with female colleagues

1. Treat them with respect
2. Support them in case they approach you
3. Value their opinion and suggestions
4. Involve and include the opposite gender in all the discussions

4.1.22 Communication with Disabled Person

A disability is any condition that makes it more difficult for a person to do certain tasks or interact with the people around them (socially or materially). These conditions, or defects, may be cognitive, developmental, intellectual, mental, physical, sensory, or a combination of multiple conditions. Defects may be present from birth or can be acquired during a person's lifetime. Often, disabled people are excluded from full participation in any activity."

But things are changing; every organization has allotted some percentage of employees from this section of the society. They are also allowed to exhibit their skills in a few jobs which they can perform without putting their life at risk

General tips for communication with disabled people

1. Speak to them as you would speak to anyone else in a soft and low tone.
2. Respect the person first, not their disability. For example, use the term 'a person with disability' rather than 'a disabled person'.
3. Do not use phrases such as 'suffers from' and 'crippled' rather the phrase should be 'people who use a wheelchair' rather than 'wheelchair bound.
4. Don't drag or push a person's wheelchair, and don't move their crutches or walking stick without their permission. It has to be in their personal space.
5. When talking to a person who is in a wheelchair, try to sit in such a way you could reach their eye level. This would not strain them much, to lift their head and talk.

4.1.23 Communicating with People with a Hearing Impairment

Keep these points in mind while interacting with people with a hearing problem

1. Draw the person's attention before you speak. Give a gentle tap on their shoulder, a wave of some other visual signal to the person's attention
2. Stand in front of the person and maintain eye contact
3. Don't cover the mouth while talking. They can figure out what is being said by just looking at the lip movement
4. Speak at a normal pace don't speak fast or slow
5. Choose the words wisely
6. Use short sentence
7. Be gentle while speaking don't raise the tone

4.1.24 Respect People with Disability

Learn the proper way to act and speak around someone with a disability.

1. Do not use offensive or derogatory words like 'handicapped', 'crippled', and retarded etc.
2. Don't criticize or blame them. Don't shout at them or use abusive language
3. Talk slowly with a low tone. Pause while talking
4. Avoid excessive whispering, joking and laughing unnecessarily
5. Assuming things about them or their situation.
6. Don't make jokes about their condition or be sarcastic
7. Don't look down upon them because of their disability
8. Appreciate them for their efforts and work, and motivate them to perform better

4.1.25 Safety at Workplace for People with Disability

Disabilities of all types affect employees and can pose various mental or physical challenges. In many situations, a disability may impact the amount of time it takes for an employee to complete a task or get from one part of a facility to another. Some disabilities may be known while others remain unknown to an employer.

Health and safety legislation should not prevent disabled people from finding or staying in employment so it should not be used as an excuse to justify discrimination against them.

Disabled people and those with health conditions, including mental health conditions, should be given the opportunity to both get into and stay in work.

Responsibilities of an employer towards disabled people

The employer is responsible for the health, safety and welfare of all of their employees, whether they have a disability or not.

Disability is not always obvious so one might not realise a worker is disabled or they might choose not to tell you, particularly if their disability has no impact on their ability to do their job.

Workers do not have to tell anybody unless they have a disability that could foreseeably affect the safety of themselves or anyone else connected to their work. If they do not reveal and there are no obvious indicators of any disability, then the organization are not under any obligation to make workplace adjustments.

Periodically, consult with the employees (whether directly or through their representatives) on issues relating to health and safety. These discussions reflect good safety practice because employees have day-to-day understanding of the job, so they are likely to have good ideas on keeping themselves and others safe.

4.1.26 Workplace Adaptations for People with Disability

Few changes in the workplace to make it a safe place for the disable people will go a long way in the employee satisfaction for an organisation.

Workplace Adaptations

Workplace should be easily accessible for these people with special needs. One major compliance concern deals with accessibility. For example, if workplaces have been adjusted or created more accessible entrances and exits to their facilities, allowing more independence for persons in wheelchairs, would be a great idea. Other subtle changes may include the width of bathroom stalls, hand rails inside the stalls and long ramps instead of stairs. The path of travel that employees take should never be obstructed; there should be no barriers to prevent someone from getting to safety in an emergency.

Workstations easily can be adapted to follow this universal design. Many companies now use slide- out keyboard trays and monitors on swinging arms to allow employees to adjust to their needs.

Desks can accommodate wheelchairs in place of regular chairs, and general work spaces can be lowered to allow easier access. The main goal is to remove all barriers and allow everyone to concentrate more on completing their tasks.

The biggest challenge with universal design is accommodating the multitude of challenges that different disabilities present. Not all disabilities are the same, and not all will present the same challenges for employees. Some employees may have issues with their right hand while others have issues with their left. For some, it may involve not being able to stand or sit. Some may need low lighting, while others need bright lighting. Designing a facility to accommodate all is always going to be a challenge.

Complying with government guidelines can be more difficult in regards to employees with disabilities. This difficulty lies with ensuring that employees are aware of all hazards in the workplace. Multiple disabilities will create multiple reasons that may keep employees from recognizing hazards. Employees with impaired vision, for example, must have other means of identifying hazards. This may be remedied with audible alarms or touch-activated devices that warn employees not to go in an area. Other employees may have difficulties reading and may benefit from shapes or colors to further identify hazardous areas. For workers who lack hearing ability, employers can utilize signs to demonstrate hazards or use flashing strobes to identify when employees need to evacuate an area and head to safety.

Every organization has to make few adaptations in order to make it a better place to work even for people with disabilities. It should provide an environment where they feel they are safe and can carry out their work rather than worrying about their safety.

Summary

- Communication Skills are more important than ever, for all fields of endeavour. Oftentimes, people with excellent technical skills don't get promoted to higher roles because of their inability to communicate effectively
- Communication is the process of sending and receiving information among people.
- Effective communication is the process of delivering messages to a target audience in a way that guarantees satisfactory reception and understanding.
- Communication has been divided into two types – Verbal ad Non Verbal
- Verbal communication takes place when people exchange words with each other, either spoken or written.
- Non-verbal communication includes the overall body language of a person.
- Email or Electronic mail is a method of exchanging messages using electronic media.
- Telephone communication is the person-to-person conversation where nobody sees others but hears each other and interacts instantly.
- In any business, be it a small company to a big corporate, the workforce is a mix of both genders. The ratio of men vs. women varies from 70:30 or 60:40.
- A disability is any condition that makes it more difficult for a person to do certain tasks or interact with the people around them (socially or materially). These conditions, or defects, may be cognitive, developmental, intellectual, mental, physical, sensory, or a combination of multiple conditions.

Exercise

Multiple-choice Questions

1. Add your _____ at the bottom of your mail.
   a. Signature   b. Address

   c. DOB   d. None of the above

2. Being _____ impedes a company's operations and demonstrates a lack of consideration of the time concerns of others.
   a. Late   b. Courteous

   c. Appropriate   d. Discreet

3. Be _____ in speaking to your peers at the office.
   a. Rude   b. Polite

   c. Agreesive   d. None of the above

4. _____ are movements of hands and body to help explain or emphasize the verbal message.
   a. Gestures   b. Body posture

   c. Head nods   d. None of the above

5. _____is the process of delivering messages to a target audience in a way that guarantees satisfactory reception and understanding.

a. Active listing

b. Effective communication

c. Articulation

d. None of the above

Answer the following:

1. What is communication?
2. How to communicate with people with hearing impairment?
3. What are the three points you will focus on when you talk to people face to face?
4. Explain the importance of gender sensetisation.
5. List the hurdles of effective communication.

Notes

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Scan the QR codes or click on the link to watch the related videos

https://youtu.be/8v60jWtecrQ

youtu.be/K5qQ77cmNPs

youtu.be/wnzwgExFRR4

Effective Telephone Tips from Successfully Speaking

Types of Communication?

Communication with Customer and Colleagues

5. Annexure

Module No.	Unit No.	Topic Name	Page No	Link for QR Code (s)	QR code (s)
1.Introduction to FMCG	UNIT 1.1: Introduction to the Telecom Industry in India	1.1.1 Introduction to the Telecom Sector in India	21	youtu.be/Cag-bcbivtM	Introduction to the Telecom Sector in India
		1.1.3 Indian Handset Market	21	youtu.be/mcHW-EBh4Iw	Indian Handset Market
		1.1.4 Top Handset Manufacturers in India	21	youtu.be/0O8UoLcYYbI	Top Handset Manufacturers in India
		1.1.5 Regulatory Authorities in the Telecom Industry in India	21	youtu.be/VeoHhkjV6qo	Regulatory Authorities in the Telecom Industry in India
	UNIT 1.2: Introduction to E-Waste	1.2.1 What is Waste?	21	youtu.be/pb0O_gR7fQo	What is Waste?

Module No.	Unit No.	Topic Name	Page No	Link for QR Code (s)	QR code (s)
		1.2.2 Electronic Waste	21	youtu.be/dq7bBZUFR14	Electronic Waste
		1.2.3 Break-up of e-waste Generated in India	21	youtu.be/dI-DEBygfRg	Break-up of e-waste Generated in India
		1.2.4 E-Waste Awareness	21	youtu.be/aHaySL8EL6g	E-Waste Awareness
		1.2.5 E-Waste Problems	21	youtu.be/bEw34DyFBS4	E-Waste Problems
		1.2.6 E-Waste Recycling in India	21	youtu.be/blUf9WRHt7w	E-Waste Recycling in India

Module No.	Unit No.	Topic Name	Page No	Link for QR Code (s)	QR code (s)
		1.2.8 General Guidelines for Collection and Storage of E-Waste	21	youtu.be/E-JixTdyCoQ	General Guidelines for Collection and Storage of E-Waste
Module 2: Handling E-Waste Properly	UNIT 2.1: Need for Proper E-Waste Disposal	2.1.1 Effects of Improper Disposal of Telecom E-Waste	60	www.youtube.com/ watch?v=zB1nML5GMxw	Effects of Improper Disposal of Telecom E-Waste
		2.1.2 E-Waste Recycling	60	youtu.be/blUf9WRHt7w	E-Waste Recycling
		2.1.5 Responsibilities Assigned to Various Stakeholders for Disposal of Telecom E-Waste	60	youtu.be/6i96r8LGUXU	Responsibilities Assigned to Various Stakeholders for Disposal of Telecom E-Waste
	UNIT 2.2: E-waste Collection and Treatment from Telecom Sites	2.2.1 Collection and Processing of E-waste from Telecom Site	60	www.youtube.com/ watch?v=aUwFXDLOFO0	Collection and Processing of E-waste from Telecom Site

Module No.	Unit No.	Topic Name	Page No	Link for QR Code (s)	QR code (s)
		2.2.3 Providing Certificates to Stakeholders after Collecting E-waste	60	www.youtube.com/ watch?v=a1Co8a8GuT4	Providing Certificates to Stakeholders after Collecting E-waste
	UNIT 2.3 Collection, Transportation & Storage of E-waste	2.3.1 Safe Transportation of the E-Waste	60	www.youtube.com/ watch?v=nWd-H7XqmsM	How should e-waste be processed?
	UNIT 2.4 Warehouse Etiquettes	2.3.4 Disposal of Hazardous E-Waste	60	www.youtube.com/ watch?v=vb9QFjkEmAU	Health and Safety Measures
	UNIT 2.5 Organisational Safety and Hygiene Practices	2.5.2 Maintain Personal Hygiene	60	www.youtube.com/ watch?v=ljzAe-SQtzk	Maintain Personal Hygiene
		2.5.2 Maintain Personal Hygiene	60	www.youtube.com/ watch?v=QEB7wE-YFXg	Personal Protective Equipment (PPE) while Telecom Handling E-waste

Module No.	Unit No.	Topic Name	Page No	Link for QR Code (s)	QR code (s)
		2.5.4 Causes of accidents while Handling E-Waste	60	www.youtube.com/watch?v=ntEVHTqsq6A	Causes of accidents while Handling E-Waste
		2.5.6 Safety Guidelines for Collecting E-Waste	60	www.youtube.com/watch?v=1k19eXJ3dH4	Safety Guidelines for Collecting E-Waste
		2.5.7 Fire Safety	60	www.youtube.com/watch?v=UlKS_A7Xg1E	Fire Safety
3.Organize Work and Resources as per Health and Safety Standards	UNIT 3.2: Different Types of Health Hazards	3.1.2 First Aid Techniques	90	youtu.be/GrxevjEvk_s	First Aid at Work Place
	UNIT 3.3: Importance of Safe Working Practices	3.3.1 Basic Hygiene Practices	90	https://youtu.be/IsgLivAD2FE	How to properly wash your hands

Module No.	Unit No.	Topic Name	Page No	Link for QR Code (s)	QR code (s)
	UNIT 3.3: Importance of Safe Working Practices	3.3.3 Safe Work-place Practices	90	https://youtu.be/qzdLmL4Er9E	How to give CPR to an Adult, a Child or an infant
	UNIT 3.5: time Management	3.5.6 Escalation Matrix	90	youtu.be/ccAZ9nCZSLc	Escalation Matrix PowerPoint Presentation Slides
	UNIT 3.9: Waste Man-agement	3.9.6 E-waste Management Process	90	youtu.be/dq7bBZUFR14	E-Waste Recycling and Management
4. Commu-nication and Inter-personal Skills	UNIT 4.1: Interaction with Supervi-sor, Peers and Customers	4.1.3 Effective Communication	106	https://youtu.be/8v60jWtecrQ	Effective Telephone Tips from Successfully Speaking
	UNIT 4.1: Interaction with Supervi-sor, Peers and Customers	4.1.5 Types of Communication	106	youtu.be/K5qQ77cmNPs	Types of Communication?

Module No.	Unit No.	Topic Name	Page No	Link for QR Code (s)	QR code (s)
	UNIT 4.1: Interaction with Supervisor, Peers and Customers	4.1.8 Communication with Colleagues & Customers	106	youtu.be/wnzwgExFRR4	Communication with Customer and Colleagues
Employability Skills				https://www.skillindiadigital.gov.in/content/list	

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