



Participant Handbook

Sector
Food Processing

Sub-Sector
Generic

Occupation
Production

Reference ID: **FIC/Q9008**
NSQF Level 2



Sanitation Worker



Shri Narendra Modi
Prime Minister of India

“ Skilling is building a better India.
If we have to move India towards
development then Skill Development
should be our mission. ”



Certificate

CURRICULUM COMPLIANCE TO QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARDS

is hereby issued by the

FOOD INDUSTRY CAPACITY AND SKILL INITIATIVE for the SKILLING CONTENT: PARTICIPANT HANDBOOK

Complying to National Occupational Standards of
Job Role/ Qualification Pack: 'SANITATION WORKER' OP No. 'FIC/Q9008 NSQF LEVEL 2'

Date of Issuance: November 25th, 2021

Valid up to: November 24th, 2024

* Valid up to the next review date of the Qualification Pack

Authorized Signatory
(Food Industry Capacity and Skill Initiative)

Acknowledgement

FICSI (Sector Skill Council for Food Processing Industries) is thankful to all organizations and individuals who have helped us prepare this participant handbook

We extend our special thanks to the Ministry of Food Processing Industries (MoFPI) for providing their unequivocal support for developing and reviewing the content through the National Institute of Food Technology Entrepreneurship and Management (NIFTEM).

We also wish to extend our gratitude to all authors who reviewed the content and provided valuable inputs for improving the quality, coherence, and content presentation in the chapters.

The preparation of this participant Handbook would not have been possible without the support of the Food Processing Industries. The Industry feedback has been extremely encouraging from inception to conclusion & it is with their input we have tried to bridge the skill gaps existing today in the Industry.

This participant handbook is dedicated to all aspiring youth who desire to achieve special skills which would be a lifelong asset for their future endeavours and help them make a bright career in the Food Processing Sector.

About this book

This Participant handbook is designed to enable training for the Qualification Pack (QP) for the Sanitation Worker with Reference ID: FIC/Q9008 published by Food Industry Capacity Industry and Skill Iniative (FICSI).

This course encompasses all National Occupational Standards (NOS) of the Qualification Pack, Sanitation Worker, Reference ID: FIC/Q9008. Each NOS is covered across one unit/s. This book is designed to upgrade the knowledge and skills for working as a 'Sanitation Worker in the Food Processing Industry. This book will provide the necessary knowledge and skill inputs for a Sanitation worker to work in an organized and disciplined manner and following safe working practices, effective communication, documentation, and work ethics as well as production work, ensuring preparation and maintenance of work area along with the required machinery. Upon successful completion of this course, the participant will be able to:

Key Learning Objectives for the specific NOS mark the beginning of the Unit/s for that NOS

- 1. FIC/N9027: Prepare for cleaning and sanitation of food processing facility.
- 2. FIC/N9028: Carry out cleaning and sanitation of food processing plant.
- 3. FIC/N9901: Implement health and safety practices at the workplace
- 4. FIC/N9902: Work effectively in an organisation
- 5. SGJ/N1702: Optimize resource utilization at workplace

Symbols Used



Key Learning
Outcomes



Steps



Time



Tips



Notes



Unit
Objectives



1. Module 1



Unit 1.1 Introduction to Food Processing Industry

Unit 1.2 Roles and Responsibilities of Sanitation Worker



Key Learning Outcomes

At the end of this module, participant will be able to:

1. Explain the roles and responsibilities of a sanitation worker working in a food processing industry
2. Discuss the future trends and career growth opportunities available to a sanitation worker.
3. Discuss the significance of sanitation workers in ensuring smooth operations in the food processing industry
4. List the various types of cleaning and sanitation activities that are performed on the job.
5. List the various terminologies used in carrying out cleaning and sanitation activities in the food processing industry
6. Discuss the organisational policies to be followed about the delivery standards, health, safety and hazard handling procedures, integrity, dress code, etc.
7. State the importance of planning before starting the work
8. State the importance of ensuring a tidy workplace

Unit 1.1 Introduction to Food Processing Industry

Unit Objectives

At the end of this unit, participant will be able to:

1. Discuss the size and scope of the food processing industry in brief
2. Discuss the future trends and career growth opportunities available for Sanitation workers in the food processing industry.

1.1.1 Food Processing

Agriculture is India's mainstay industry. Most of the products from various agricultural occupations are consumed within the country and exported to different countries worldwide. Agriculture produce is also a raw material in the food processing industry. Food processing is the process of transforming raw materials into finished goods. They could be processed foods, ready-to-eat foods, food additives, or ingredients used to make other foods. The following figure explains the different levels of food processing.

Primary Food Processing

- Primary Processing relates to the conversion of raw agricultural produce, milk, meat, and fish into a commodity that is fit for human consumption
- It involves steps such as cleaning, grading, sorting, packing, etc.

Secondary Processing

- Secondary food processing is the conversion of ingredients into edible products -
- This involves combining foods in a particular way to change properties. E.g.- Preparing orange juices from oranges

Tertiary Food Processing

- Tertiary food processing is the commercial production of what is commonly called processed food
- These are ready-to-eat (RTE) or heat-and-serve foods .

Fig 1.1 Level of Food Processing

1.1.2 Journey of Food from Harvest to Consumer

The flowchart below explains how food material becomes a final, consumable product for various customers

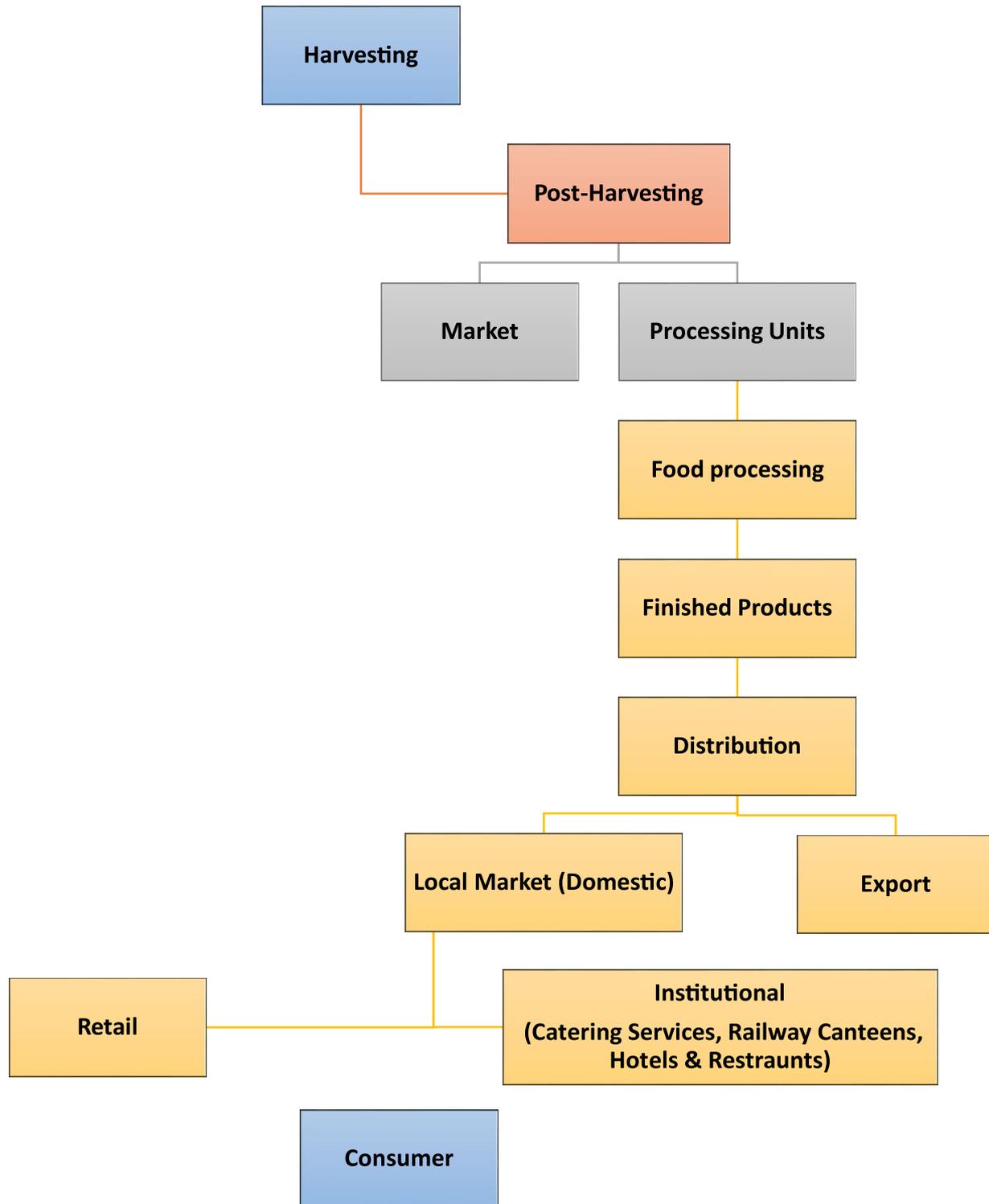


Fig.1.2 Journey of Foods from Farm to Consumer

1.1.3 India's Food Processing Industry

- The major segments in the Food Processing sector comprise Fruits and Vegetables, Dairy, Edible Oils, Meat and Poultry, Non-alcoholic beverages, Grain-based products, Marine products, Sugar and sugar-based products, Alcoholic beverages, Pulses, Aerated beverages, Malted beverages, Spices, and Salt.
- In India, the food processing industry is divided into several sub-sectors.

Dairy	•Wholemilk powder,skimmed milk powder, condensed milk, ice-cream, butter and ghee,cheeseetc .
Fruit and Vegetable Processing	•Beverages, juices, concentrates, pulps, slices, frozen and dehydrated products, potato wafers, pickles and pastes etc.
Grains and Cereals	•Flour, bakeries, starch glucose, cornflakes, malted foods, vermicelli, beer and malt extracts, grain-based alcohol etc.
Fisheries	•Fish oil, frozen and canned products
Meat and Poultry Processing	•Frozen and packed meat,egg powder, etc.
Bread and Bakery	•Biscuits, breads, buns, cakes, confectionery, pastries, cookies, etc.
Consumer Foods	•Snack foods,namkeen, biscuits, ready-to-eatfoods, alcoholic and non-alcoholic beverages

Fig.1.3 Sub-Sectors of the Food Processing Industry

Food processing is simply the method by which agricultural products are transformed into consumable food products. It entails various processing methods, such as grinding grain into raw flour, home cooking, and industrial methods for producing convenience foods, such as noodles, pasta, and chips. Due to the variety of food products that India harvests and processes for human consumption, the food processing industry is a significant contributor to India's economy. India is the world's leading producer of milk, bananas, mangoes, guavas, papaya, ginger, and okra; the second-leading producer of wheat, rice, fruits, vegetables, tea, sugarcane, and cashew nuts; and the third-leading producer of cereals, coconut, lettuce, chicory, nutmeg, mace, cardamom, and pepper. Rising incomes and growing demand for healthy packaged foods make it unlikely that this industry will ever experience a recession. Therefore, the government is also increasing its support for the industry.

Market Stats

- The food processing industry in India is one of the largest in the world, with an expected output of \$535 billion by 2025-26.

- By 2024, this sector is projected to generate 9 million jobs.
- The food processing sector accounts for 32% of the Indian food industry, expanding at a CAGR of 11%.
- Between April 2014 and March 2020, the food industry in India attracted \$4.18 billion in foreign direct investment.
- By 2030, India's annual household consumption is projected to have tripled, making it the world's fifth-largest consumer.

Key Growth Drivers & Trends

- The organised food retail sector is expanding, and urbanisation is rising.
- MSMEs play a vital role in India's food processing chain due to advancements in skills and technology.
- The online food ordering industry in India is expanding exponentially.
- There is a shift in emphasis from loose to branded packaging.
- There is a high demand for packaged, healthy, immunity-boosting snacks like roasted nuts, popcorn, and roasted pulses.
- The government's "Atmanirbhar Bharat" initiative prioritises this sector and provides support through several policies.

Recent Government Initiatives

In its "Make in India" initiative, the Indian government has prioritised the food processing industry and encourages investment in the sector. In addition, the government has developed the food processing supply chain by establishing 18 mega food parks and 134 cold chain projects. These initiatives will likely benefit food processing businesses. In addition, recent government initiatives, such as Mrs Nirmala Sitharaman's Rs. 10,000 crores (\$1.35 billion) scheme to support this industry, have placed the food processing sector on a high growth trajectory.

Launch of GIS One District One Product (ODOP) Digital Map of India:

The Ministry of Food Processing launched, on November 18, 2020, the capacity-building component of the Pradhan Mantri Formalisation of Micro Food Processing Enterprises Scheme (PM-FME Scheme) and the GIS One District One Product (ODOP) Digital Map of India, which provides detailed information on ODOP products to all stakeholders. The objective of the ODOP programme was to upgrade SMEs on specific products (within a district) by providing a credit-linked subsidy of 35% of the eligible project cost, up to a maximum of Rs. 10 lakh (US\$ 13,52 thousand).

Mr Narendra Singh Tomar, Minister for Food Processing Industries, emphasised the formation/creation of a local value chain and training of food processing entrepreneurs through the PM-FME Scheme. These training sessions will be conducted via online lectures and demonstrations and will benefit 8 lakh SME beneficiaries. In addition, on November 21 2020, the government approved a grant of Rs. 107.42 crores (\$14.52 million) for implementing 28 food processing projects.

New Cold Chain Initiatives to Decrease Food Waste and Increase Exports:

The Ministry of Food Processing Industries (MOFPI) approved 28 new local cold chain infrastructure projects in September 2020 to increase the export potential of the local agri-food industry and decrease food waste. These 28 projects fall under the “Pradhan Mantri Kisan SAMPADA Yojana” (PMKSY) programme, which the central government funds with Rs. 2,08 billion (US\$ 28 million).

MOFPI also highlighted the benefits of these cold chain projects, which will contribute to India's independence. These integrated cold chain projects will be implemented in eleven states by either central or state-owned enterprises or other government-approved entities.

Mr Harsimrat Kaur Badal, Minister of Food Processing, stated that these projects would not only boost the food processing sector but also streamline the agricultural supply chain, generate employment, offer farmers and end-users better prices, and benefit allied sectors. In addition, the Federation of All India Vyapar Mandal (FAIVM), the local trade and retail body for FMCG products, applauded this initiative. It stated that it would prevent agri-food waste caused by a lack of temperature-controlled warehouses.

Other Food Processing Initiatives:

The government approved seven food processing projects totalling >Rs. 234 crore (US\$ 31.63 million) in Meghalaya, Gujarat, Madhya Pradesh, Karnataka, and Maharashtra on November 25, 2020, including a grant-in-aid of Rs. 60.87 crores (US\$ 8.23 million). MOFPI stated that these projects will leverage Rs. 173.81 crores (\$23.49 million) in private investments and are anticipated to generate 7,750 jobs.

Recent State Measures in Kerala

Mr C Anandha Ramakrishnan, Director of the Indian Institute of Food Processing in Tanjore, emphasised India's enormous potential to become a global food factory, given the country's enormous food and grocery market share. During a webinar hosted by Kerala Agricultural University (KAU), he discussed the PM-FME scheme's new opportunities in the food processing industry.

Mr Ramakrishnan hypothesised that Kerala would benefit from food customisation and the promotion of convenient and ethnic food chains under the ODOP concept. Officials from KAU and the State Industries Department have collaborated to implement the ODOP concept to encourage SME concentration on local production. Under this initiative, various products, including mussels, tapioca, coconut oil, and spices, are considered for various districts.

Telangana

On November 2, 2020, tribal women in Untnoor, Telangana, established a food processing unit for the first time. Tribal Cooperative Finance Corporation Limited (TRICOR), Tribal Welfare Department of Telangana, the Government of India's Ministry of Tribal Affairs, and ICRISAT's Agribusiness and Innovation Platform collaborated to establish this unit (AIP). In addition to improving the economic conditions of tribal communities, this project aims to localise production and address malnutrition. Komaram Bheem Peanut Chikki Industries unit will supply its products with government nutrition programmes and anganwadis in the tribal region.

Chandigarh

The Punjab government established the Punjab Food Processing Advisory Committee in September 2020 to encourage investment in the food processing sector. Mr Om Prakash Soni, Minister of Food Processing for the state of Punjab, assured that this move would increase the farmers' faith in the system because they can realise reasonable crop prices. Captain Amarinder Singh, the chief minister of Punjab, called for special attention to the state's food processing industry, as it will boost farmer incomes and the state's economy. In addition, Mr Joginder Singh Mann, chairman of Punjab Agro Industries Corporation, praised the survey conducted by the food processing department in Chandigarh under the ODOP scheme.

International – Coca-Cola, Pepsi, Unilever, Mars, Mondelez (Kraft Foods), Kellogg's, Del Monte, Cargill, Ferrero, Nestle, Danone, McCain, Hershey, and Perfetti Van Melle National – Kissan, Amul, Godrej Industries, Parle Agro, ITC Ltd., Agro Tech Foods, Dabur India Ltd., Britannia Industries Ltd., Sunfeast,

Road ahead

Several factors, including a rise in health concerns, the ongoing COVID-19 pandemic, busy lifestyles, and an increase in food adulteration, have led to a shift in consumer purchasing habits, including an increase in demand for ready-to-cook, ready-to-eat meals and healthy, immunity-boosting snacks. In addition, during the COVID-19 outbreak, safe and processed food categories such as cookies and snacks have experienced growth. In an interview with Economic Times, Mr Anand Ramanathan, Partner at Deloitte India, stated that the Indian food processing industry has yet to capitalise on its opportunities. He stated that India ranks far below the global average in the sector and has only a 10% market share among Asian nations. The food processing sector in India is 1.5 times the size of the agricultural sector. At the same time, it is 4-5 times larger in developed nations. In India, the ratio of food retail sales to agricultural GDP is relatively low compared to other developed nations, indicating an opportunity to expand the food processing industry. Currently, India processes 10% of its agricultural output; therefore, there are enormous opportunities to increase processing levels and attract investments in this sector.

Mr Ramanathan added that the growth of the food processing sector would be driven by retail demand and the increasing number of health-conscious consumers who prefer safe, branded food. In addition, he described COVID-19's role in promoting agriculture and horticulture. Currently, the Indian food processing industry comprises a diverse assortment of MSMEs. In addition, he stated that a robust crop value chain with adequate funding and technological applications would boost the food processing industry through the SME sector.

1.1.4 Food Processing Sectors

The fruit and vegetable processing sub-sector deals with processed, semi-processed, and packaged foods made from fruits and vegetables. These includes:



Fig.1.4 Various Processed and Semi-Processed Food Products

Specific parameters are essential when selecting a fruit/vegetable for processing. They are:

1. **Demand for processed food made from that vegetable/fruit**
2. **High-quality produce**
3. **Continuous supply**

These parameters are critical for ensuring that raw materials can withstand the processing and preservation processes.

1.1.5 Food Processing Methods

The following are some standard methods of processing fruits and vegetables:



Fig.1.5 Different Food Processing Methods

Exercise



Answer the following questions:

1. Explain different levels of food processing.
2. Write a short note on the market and future food processing industry trends.
3. List different methods of food processing.

Give any two examples of processed food products.

Unit 1.2 Roles and Responsibilities of Sanitation Worker

Unit Objectives

At the end of this unit, participant will be able to:

1. Summarise the key roles and responsibilities of 'Sanitation Worker'.
2. List the various terminologies used in Sanitation.
3. Discuss the standards for handling hazards and ensuring a clean work area.

1.2.1 Roles and Responsibilities of 'Sanitation Worker'

Sanitation Workers play a crucial role in the Food and Processing industry by cleaning production equipment, machines, and workspaces in food processing facilities. In addition, they are responsible for handling and preparing cleaning chemicals, sanitisers, chemical concentrations, managing chemical accidents, and handling and storing the chemicals.

Sanitation Workers may work independently or in teams but collaborate closely with other department employees to ensure food safety and workplace cleanliness. They are typically employed in more extensive processing facilities where production quotas necessitate sanitation staff.

In India, employment is in high demand, and many businesses offer full-time positions with competitive salaries and benefits.

The Sanitation worker plays a central role in food processing plants, and in doing so, they are responsible for various tasks. Some key responsibilities include;

Key Responsibilities

- Reading chemical labels or Materials Safety Data Sheets (MSDS) to learn how to handle chemicals properly they will be using
- Reading and processing labels and packages, filling order forms, and essential measurement and estimation of cuts of meat.
- Completing and creating forms by marking checkboxes, recording numerical information or entering words, phrases, sentences or texts of a paragraph or more.
- Communicating orally to customers, employers, quality assurance personnel, and government inspectors.
- Referring to diagrams and charts of cuts of meat and animal anatomy.
- Analysing different products and filling special order requests (i.e. meat cuts) to suit the customer's needs.
- Incorporating special or rotational cleaning duties into their daily schedules for specialised cleaning or sanitation processes that might not occur every day
- Removing all trash from the streets and natural spaces

- Properly disposing of hazardous material
- Use a garbage disposal truck that is mechanised or collect trash by hand.
- Work in various weather conditions when lifting large goods.
- Properly disposing of hazardous waste and making sure that no trash is left on the ground or in public spaces
- Work with your hands to move furniture or brush heaps that trucks cannot lift.
- Drive garbage trucks
- Use the truck's mechanisms to lift, dump, and set the dumpsters or trash cans down.

The ideal worker - A Sanitation Worker in a food processing plant, will be expected to:

- Create and maintain an efficient, hygienic, and positive working environment
- Promote health and safety in the workplace
- Display good work ethic, resourcefulness, and organisation.
- Understand the Standard Operating Procedures and Inspection Regulations
- Ensure quality control and efficient workflow
- Display positive leadership

Work environment

A sanitation worker's time is spent on their feet and in motion. In addition, they may be required to hang from rigging or use ladders to reach elevated areas. Numerous cleaning tasks necessitate significant physical strength. Sanitation workers must be able to operate high-pressure hoses (typically 250 psi), lift heavy chemical containers, and empty trash receptacles throughout the production area. They should be able to lift loads weighing 50 pounds or more in a single motion. Sanitation employees must utilise their senses to detect potential sanitation or equipment issues. Many work independently but may collaborate to clean different areas of the same facility, assist with additional tasks, or assist a colleague whose duties have been completed.

Essential Skills

Essential Skills are those required for daily tasks, learning the job, and adapting to workplace change. Sanitation Workers must possess all nine skills, but the most important are:

- **Document use:** These skills are required to locate, enter, and utilise letters, numbers, symbols, and images in electronic and paper formats. For example, refer to visual diagrams or images illustrating equipment features or processes.
- **Job task planning and organising:** refers to the abilities required to carry out daily tasks and be prepared for any unanticipated shift-related changes. Plan, for instance, the most efficient way to perform cleaning and sanitising duties during a given shift.

Finally, decision-making: Decision-making refers to the skills required to perform a task effectively, manage time, use the proper equipment, and deal with a problem effectively. Determine, for instance, whether the severity of a problem warrants contacting a supervisor or whether it is

sufficient to write a note for the production team or others in a log book.

Career growth opportunities

As new sanitation workers gain experience, they can advance from sanitation worker to sanitation lead, shift manager, and with additional training and education to HACCP Coordinator and then quality assurance manager.

Shift managers and managers will have additional job responsibilities such as supervising employees, communicating with senior management, scheduling production, and ensuring workplace safety.



Fig.1.2.1 Career Growth Ladder

Other possible job titles

- Janitorial Worker
- Warehouse Worker
- General Labourer
- Mixer Operator
- Cleaning Worker

Production Line Sanitation Worker

1.2.2 Various Terminologies Used in Sanitation

The following table explains various terms used in Sanitation.

Terminology	Meaning
Refuse:	This is the most general term to indicate the wastes, which include all the rejects left as worthless, sewage, sullage - all these terms are included in this term.
Garbage:	It is dry refuse, including waste papers, sweepings from streets and markets, vegetable peelings, etc.
Rubbish:	It consists of sundry solid wastes from the residencies, offices and other buildings.
Sullage:	It is the discharge from the bathrooms, kitchens, washbasins etc., and it does not include discharge from the lavatories, hospitals, operation theatres, and slaughterhouses with high organic matter.
Sewage:	It is a dilute mixture of wastes of various types from residential, public and industrial places.
Sanitary sewage:	It is the sewage obtained from the residential buildings & industrial effluents establishments'.
Domestic sewage:	It is the sewage obtained from the lavatory basins, urinals & water closets of houses, offices & institutions.

Table 1.2.1 Common Terminology in Sanitation

1.2.4 Standard Practices for Handling Hazards and Cleaning Work Area

Every employee is concerned about their health and safety. As a result, following safety guidelines is required to avoid hazards and accidents. Similarly, sanitation and hygiene are the most critical factors when working in the food processing industry. The figure below depicts the standard practices for dealing with hazards, risks, and cleaning work areas:

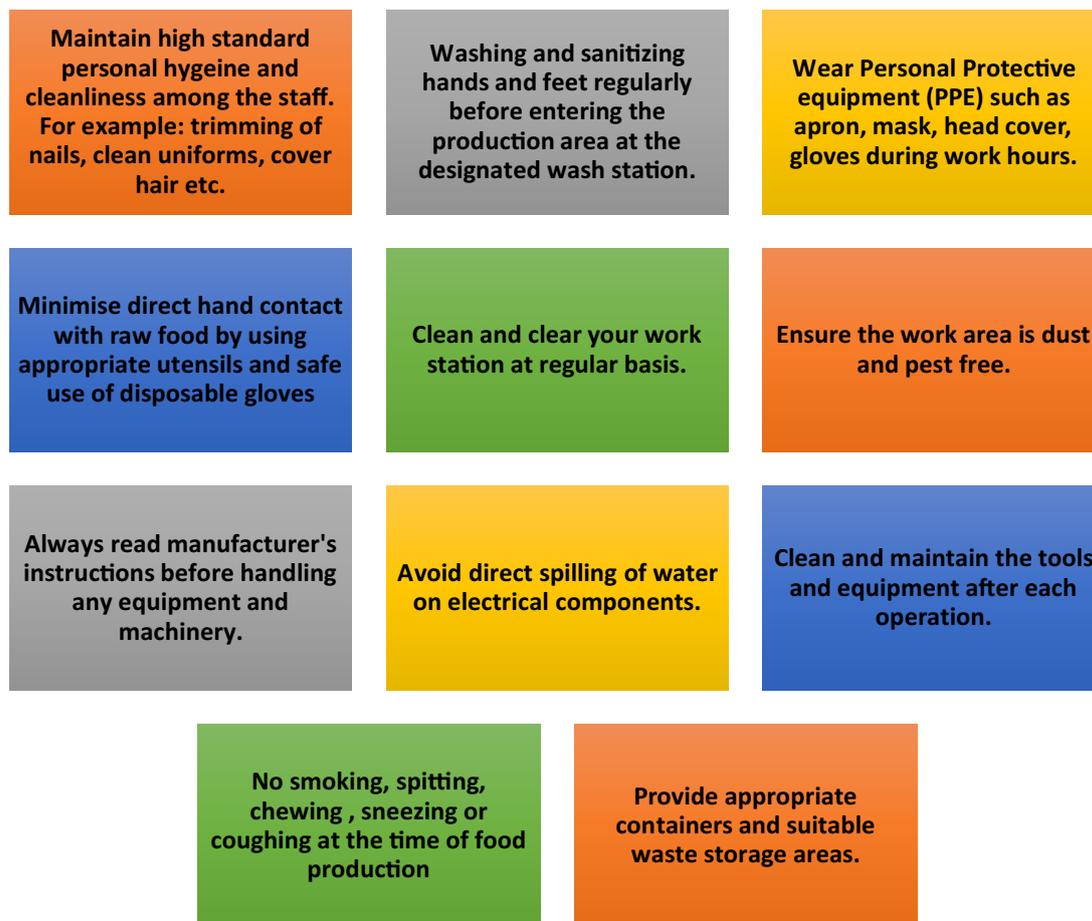


Fig.1.2.3 Standard Practices for Handling Hazards and Cleanliness

1.2.5 Cleaning and Sanitation

- Food premises and equipment shall be maintained in an appropriate state of repair and cleanliness to function as intended, facilitate all sanitation procedures and prevent contamination of food, such as from metal shards, flaking plaster, food debris and chemicals.
- Cleaning and disinfection chemicals shall be approved for use in the food industry wherever chances of it may come in direct or indirect contact through equipment or plant surfaces, handled and used carefully and following manufacturer's instructions, for example, using the correct dilutions, and stored (designated area with lock and critical provisions, having access to authorised personnel only) in clearly identified containers to avoid the risk of contaminating the meat

(A) Cleaning procedures and methods:

- Meat residues and dirt shall be removed by combining physical methods, such as heat, scrubbing, turbulent flow, and vacuum cleaning, and chemical methods involving detergents, alkalis, and acids. E.g. With soap and potable water, tables, floors, and walls must be scrubbed and washed. After that, they should be disinfected with an appropriate disinfectant. Similarly, knives, scissors, sharpeners, etc., must be cleaned and sterilised/disinfected (temp not less than 82 degrees Celsius).
- Cleaning and Sanitation Procedure includes one or more following steps appropriate to the equipment's requirements:
 - a) Dry Clean- removing all pieces of meat, fat and other product residues.
 - b) Soaking- small pieces/parts of equipment can be soaked in a tank of water and detergent. Large equipment, floor and walls can be foamed.
 - c) Physical cleaning- after soaking, equipment is cleaned manually, using a brush or mechanically using high pressure or steam cleaning. Manual scouring to remove protein crusts and adhesive layers.
 - d) Rinsing- thorough hose with warm water to remove detergent residues and contamination.
 - e) Drying- excess water should be removed from horizontal surfaces by wiping with paper towels or scraping with scrubbers.
 - f) Sanitation- sanitising agents may be applied as spray or mist immediately after post-cleaning rinse until the next day's production.
 - g) Pre-operation hose down- this serves to remove sanitiser residues and to rinse off contamination
 - h) Detergents- Detergent formulation may belong to the following categories
 - i. Alkalis- Caustic soda, caustic potash, carbonate, silicate, phosphate
 - ii. Acids- phosphoric, nitric, citric, glycolic, sulfamic, hydrochloric
 - iii. Chelating Agents- EDTA, NTA, gluconate, glucoheptonate, citrate
 - iv. Solvents- isopropanol, propylene glycol, butyl diglycol, ethers
 - v. Surfactants- anionic (Ammonium lauryl sulphate), Cationic (quartzquaternary Ammonium compounds), non-ionic, amphoteric.
 - vi. Inhibitors- organic (sodium benzoate). Inorganic (sodium nitrite, sodium chromate)
 - vii. Enzymes- protease, lipase, amylase h. Oxidising Agents- hypochlorite, Isocyanurates, Dichlor, Stabilized Chlorine Dioxide, Hydrogen peroxide.
 - viii. Stabilisers- Cyanuric acid
 - ix. Viscosity modifiers.

(B) Cleaning and sanitising programme

- Cleaning and sanitising programmes shall be established at the facility to ensure that the poultry-processing equipment and environment are maintained hygienically to prevent contamination of meat, such as from metal shards, flaking plaster, meat debris and chemicals

and records of the same shall be maintained. The programme should ensure that all parts of the establishments are appropriately clean and shall include the cleaning of cleaning equipment.

- A validation mechanism should be in place for all cleaning programmes.
- Master, cleaning & sanitation schedule shall be maintained for the overall facility, which includes:
 - Areas (e.g. holding area, storage area, refrigerated spaces, freezing cabinets, changing facilities, toilets, inspection area etc.), equipment (scalding, defeathering machine, eviscerator, chiller, metal detector, trolleys), utensils and implements (like knives, saws, mechanical instruments, trays, weighing machines, pallets, etc.) to be cleaned;
 - Cleaning method and frequency of cleaning;
 - Monitoring arrangements for checking the effectiveness of cleaning & Person responsible for cleaning; and
 - Persons are responsible for monitoring & verifying the effectiveness of cleaning. In case of any deviation, correction & corrective actions taken shall be recorded.



2. Prepare for cleaning and sanitation of food processing facility



Unit 2.1 Prepare For the Cleaning and Sanitation Activities



FIC/N9027

Key Learning Outcomes

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

1. Discuss organisational standards and procedures (including reporting and documentation) to be followed for carrying out cleaning and sanitation activities.
2. Discuss the information to be obtained from the hygiene coordinator/supervisor.
3. Discuss various equipment and areas to be cleaned and sanitised in a food processing facility.
4. Describe cleaning and sanitation methods for different types of surfaces and equipment used.
5. List the cleaning materials, chemicals, tools, and equipment required for cleaning and sanitation activities.
6. Describe the selection criteria of cleaning chemicals and how to handle them safely.
7. Identify various warning signs that need to be placed in the cleaning area for the safety of others during cleaning and sanitation work.
8. Describe the importance of adequate ventilation and off condition of all electrical switches before starting cleaning and sanitation work.
9. Describe the precautions to be taken and safe practices to be followed while performing cleaning and sanitation activities as required in the job.
10. Show how to identify and arrange the cleaning materials, chemicals, tools, and equipment required during cleaning work.
11. Show how to visually inspect the work area and plan the cleaning activities that need to be done.
12. Apply appropriate ways to place the signages during cleaning and sanitation work at the cleaning area.
13. Apply appropriate ways to maintain ventilation in the work area before the cleaning process.
14. Perform steps to prepare the work area for cleaning and sanitation activities by adhering to the organization's safety standards.
15. Show how to obtain a work plan from the supervisor appropriately.

Unit 2.1 Prepare For the Cleaning and Sanitation Activities

Unit Objectives

At the end of this unit, participant will be able to:

1. Understand the terms cleaning, sanitation, and sanitization.
2. Know the cleaning standards and documentation required for noting cleaning, sanitation and sanitisation process
3. List various chemicals and tools used during cleaning and sanitation procedure.
4. Comprehend the cautions while using and storing various cleaning chemicals and tools.
5. Identify various signages used at worksites.
6. Practice safety measures during cleaning tasks.
7. Understand the cleaning and sanitation process requirements in any organisation.
8. Recognise the usage of various cleaning tools and chemicals.
9. Plan the entire cleaning process for any food processing unit.
10. Comprehend the electrical and ventilation safety requirements while cleaning.

Introduction:

The food processing Industry deals in the manufacturing, packaging, labelling and storing of food to end consumers; the Food Processing Industry also involves selling or distributing food to the other business entities who deal in the same. In the Food Industry, the most crucial thing is Hygiene; How is the food prepared? Is there proper cleanliness? Do they Sanitise before preparing food? Thus, Food processing Industries ensure to prepare for the cleaning and sanitation Activities.

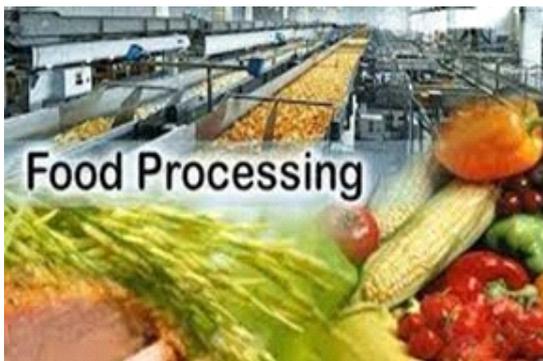


Fig-2.1.1 Food Processing Representations

Maintaining a hygienic work environment is crucial in averting foodborne illnesses. Bacteria may grow on unsanitary surfaces and then infect food. Just because a work surface looks clean does not necessarily mean it is sanitary. Always ensure that we clean and sanitise a work area before preparing food.

2.1.1 Determining the Work Requirements by Obtaining Instructions

Cleaning is essential but the most necessary step to be followed by any food processing unit. The entire cleaning process involves various activities – cleaning, sanitisation and disinfecting.

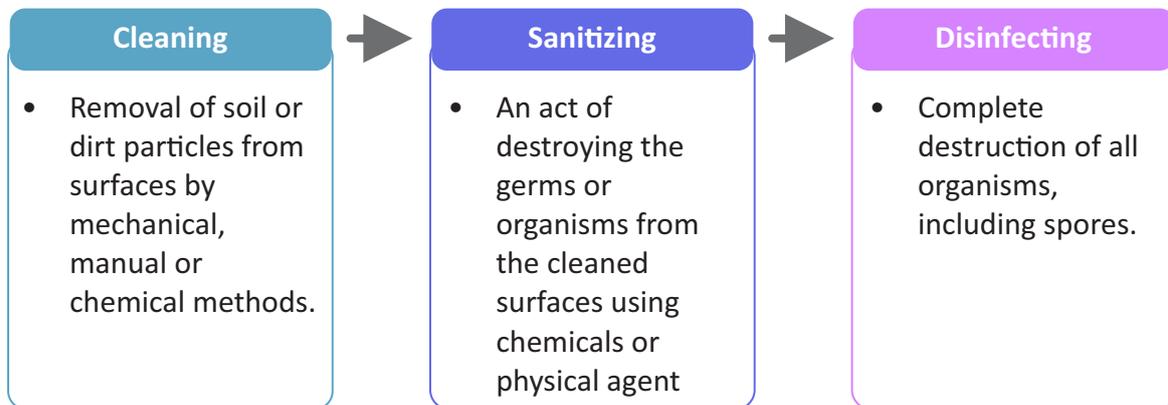


Fig-2.1.2 Work requirements



Fig 2.1.4: Difference between Cleaning, Sanitising and Disinfecting - Source: UNO Hygiene cleaning service (Facebook Page)

- The cleaning and sanitation process in the food industry varies based on the type of food (manufactured/sold), the surface to be cleaned, surrounding environment, machinery in use and the type of dirt/pathogens found.
- Workers have to understand the cleaning plan to understand their work and related requirements.

2.1.1.1 What is a Cleaning Plan? (From Where to Take Instructions)

- Each organisation develops a cleaning plan for ensuring proper implementation of the

cleaning program.

- The cleaning plan helps in understanding the cleaning requirements and instructions.
- It is a step-by-step explanation of cleaning and sanitising procedures and points out:
 - a) What is to be cleaned?
 - b) How is it to be cleaned?
 - c) How frequently is it to be cleaned? and
 - d) What are all records going to be used to monitor the procedures?
- It can be discussed verbally by the superior or made in a simple handout or as detailed as a system of procedure (Sanitation System of Procedure- SSoP). All sanitation workers are expected to read, understand and follow this plan/SSoP.
- There can be different SSoPs' for different machines, surfaces and work areas. Different areas/ surfaces need different cleaning schedules, tools and chemicals. For example, the cleaning procedure for the refrigerator will be different from grilling ovens, cleaning procedures for the storeroom will be different from that of the toilets.



Fig 2.1.5 Floor cleaning

What to clean?	How to clean?	When to clean?	Who does the activity?	How are parameters confirmed?	How to verify effectiveness of cleaning?
Item / Area	Procedure	Frequency	Responsibility	Monitoring	Verification
Food Preparation Tables	 Clear debris, wash & scrub with brush, rinse, & sanitize	- After production is completed - Before start of operations (sanitize only if table is clean)	Production Employee	- Confirm correct concentrations of detergents and sanitizers - Other resources provided	- Visual Check - ATP Test - Micro-swab
Floors at Production Zone	 Sweep debris with broom and dustpan, and throw in bin	- After production is completed - Once every 2 hours on accumulation of wastes	Production Employee	- Supervisor checks floor cleanliness - Resources e.g. broom, dustpan & broom provided	Visual Check

Note: This is a test example. Program may be more detailed and ranges from site to site

Fig 2.1.6 A Simple Cleaning SSoPs' / Procedure for Food Preparation Table and Floors at mistakes. Production_Zone

- Following SSoPs' make the cleaning procedure clearer, transparent and reduces the chance of
- Organisations can have the format of SSoP for cleaning procedures, but the general components of the SSoP's remain the same.
- Workers must learn to read and understand the components of the SSoPs'.

2.1.1.2 How to Read a Cleaning Plan? (How to take instructions?)

Every cleaning plan/SSoPs' has the following details.

- Name: Include the name of the person who has made this plan/SSoP.
- Approval: Include the name of the person who has approved it.
- Date: Include the date when it was written.
- Purpose: State the reason for using it like "Procedure for daily cleaning of Toilets".
- Name of responsible party: Indicate who is responsible for carrying out the plan.
- Frequency: daily, weekly, monthly, quarterly or yearly.
- Detailed procedures: This element should include instructions and a list of the steps to be performed.
- Record: how to record after the worker has completed the job.
- Correction: how failures of the plan can be corrected.

Sample 1

Cleaning Plan for food contact surface cleaning (kitchen slab/workstation)

Person In-Charge : Kitchen Manager

Effective Date:

20/05/2021

Frequency: Daily – Thrice

Policy: All food-processing employees must ensure that food contact surfaces are properly cleaned and sanitized after use. This policy is in place to prevent the spread of foodborne illnesses to the public.

Procedures: All food-processing employees should clean and sanitize food-contact surfaces after each use, or any time contamination by food occurs, by using the following methods:

1. Remove all large food particles and packaging from the food-contact surface before cleaning.
2. Scrape small food particles and residue off the food contact surface.
3. Spray the food-contact surface with hot water.
4. Prepare the necessary chemical solution. (See SOP XXX for instructions on chemical solution preparation.)
5. Apply the chemical solution and scrub the food-contact surface thoroughly.
6. Let the solution sit undisturbed for at least 10 minutes.
7. Rinse the chemical solution off the food-contact surface with hot water.
8. Check the food-contact surface to make sure no food particles or residues are visible. If particles or residues remain, repeat steps 3 through 7.
9. Apply the sanitizing solution to the food-contact surface.
10. Record your cleaning action in a record schedule.

Note: Cleaning procedure can be revised by the authorities based on requirement. This plan will be reviewed and revised on monthly basis.

Cleaning Staff In-Charge

Fig 2.1.7 Cleaning Plan for food contact surface cleaning (kitchen slab/workstation)

A Sample Cleaning SSoPs/ Plan for daily cleaning staff in a Restaurant

Sample 2

Daily Shift General Cleaning Schedule			Date:		
Area to Clean	How to Clean	Cleaning supplies	Times	Staff Initials	Mgt. Initials
Bathroom Mirror (each shift and as needed)	Use paper towel to wipe	Glass cleaner			
Counters/Shelves (each shift, and as needed)	Wash, rinse, sanitize	Warm soapy water and 200 ppm sanitizer			
Delivery Counters (each shift and as needed)	Wash, rinse, sanitize	Warm soapy water and 200 ppm sanitizer			
Food Scale (every 4 hrs. and as needed)	Wash, rinse, sanitize	Warm soapy water and 200 ppm sanitizer			
Front Doors (each shift, and as needed during shift)	Spot clean glass, wipe other surfaces	Glass cleaner			
Ice bucket (every 4 hrs. and as needed)	Wash, rinse, sanitize	Warm soapy water and 200 ppm sanitizer			
Prep Counters (always before each use)	Wash, rinse, sanitize	Warm soapy water and 200 ppm sanitizer			
Utensils (every 4 hrs. and as needed)	Wash, rinse, sanitize	Dish machine			
Management should verify and sign the form once the task is completed. Monthly cleaning should also be done consistently to prevent buildup.					

Fig 2.1.8 A Sample Cleaning SSoPs/ Plan for daily cleaning staff in a Restaurant slab/workstation)

Understanding cleaning and Sanitisation requirement are significant for a sanitation worker. A successful sanitation worker should take instructions (verbally or written) and should be able to deliver duties accordingly. Proper attention to the instructions would help the worker identify the nature of dirt he/she has to clean, the type of cleaning agent he must use, and the precautions he must take while doing the same.

Cleaning & Sanitizing Food Contact Surfaces

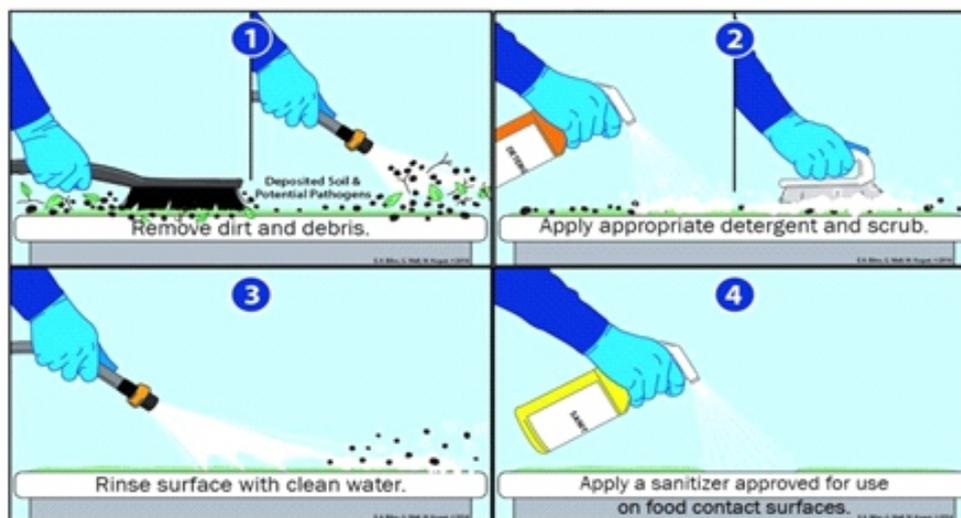


Fig 2.1.9: Cleaning and Sanitation process for food contact surfaces

2.1.2 Identifying and Arranging the Cleaning Materials, Chemicals, Tools and Equipment

Cleaning and Sanitizing is the most critical activity in any food processing unit. Whether it is a massive unit like a food processing plant or as small as a restaurant, cleaning, sanitation, and hygiene scheduling affect final output quality, poor cleaning of food cutting tools or the workstation, improper sanitation services, and poorly maintained hygiene standards might impact the final product's colour, odour, and taste.

For example, Improper washing and drying of the workstation can impact the crispiness of the potato chips.

Food safety is the fundamental norm of any food quality program. It is essential to ensure that the utensils, food contact surfaces any other equipment used:

- a) Are clean
- b) Have/had heat and compounds, or other procedures applied to them so that the number of microbes on the surface or utensil is reduced to a level that does not:
 - i. Compromise the safety of the food with which it may come into contact
 - ii. Permit the transmission of infectious diseases.

A food industry worker is expected to understand the cleaning and sanitation process and its elements in detail to maintain correct hygiene levels.

The cleaning and sanitation program of any food premises is based on the following factors:

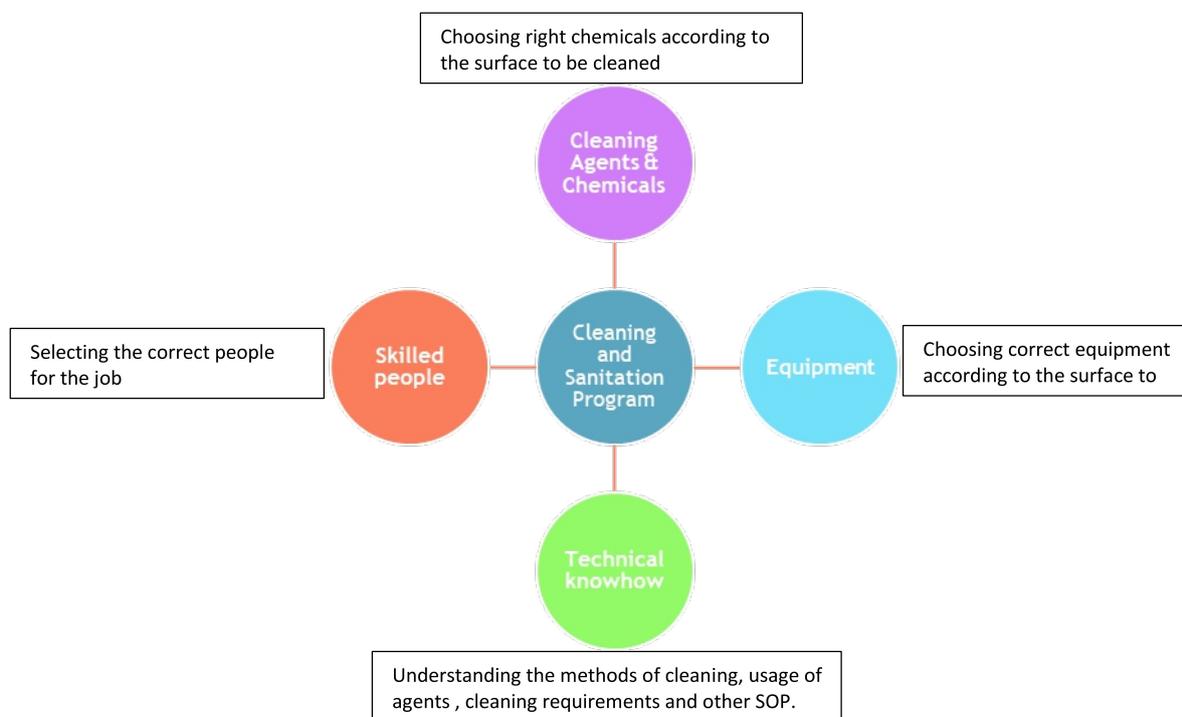


Fig 2.1.10 Important factors of Cleaning and Sanitation process

2.1.2.1 Cleaning Agents and Chemicals

Cleaning agents are chemicals used to clean any kind of dirt or soil deposited on the cooking utensils or surface of the work station. Different cleaning agents are used for cleaning depending upon the item to be cleaned, the cleaning method and the type of soiling/dirt found in the article. There are four fundamental types of cleaning agents used in commercial units:

1. **Detergents** are the most common cleaning agents to wash general or easy to clean soiled surfaces. These penetrate the dirt and makes it soft and easy to clean.

The detergents used in commercial food units are usually synthetic detergents made from petroleum products and maybe powder, liquid, gel or crystals



Figure 2.1.11 Detergents and the usage

2. **Degreasers** - Degreasers are also known as solvent cleaners. They are used to eliminate grease from surfaces, for example, oven tops, counters and grill backsplashes. They can easily dissolve oil and grease and makes cleaning easy. These are alkali in nature.

Earlier, Methylated spirits or white spirits were commonly used as degreasers. However, most food businesses now use non-toxic, non-fuming degreasers to prevent chemical contamination. Many of the maximum effective degreasers are also harmless for the environment. These include vinegar, lemon juice, corn-starch, borax, baking soda, and castile soap. Therefore, many dishwashing liquids also add natural grease-cutters to their formulas, like lemon and other citrus oils.

6 Different Types of Degreasers



Figure 2.1.12 Some variety of Degreasers

Caution while using degreasers:

- Read user instructions well before using on any surface.
- Wear rubber gloves to avoid contact with chemicals.
- Do not mix any chemicals, if not mentioned in user guide.
- Secure cleaning products away from the reach of children and pets.
- Avoid using on aluminium surfaces as it can darken the color.

3. Abrasives are substances or chemicals that require rubbing or scrubbing to clean dirt from hard surfaces. In commercial food processing units, abrasives are usually used to clean floors, pots and pans. In addition, abrasive cleaners are used if the food equipment has creases and hard-to-reach places. These cleaners help take care of heavy accumulations and might even disinfect them. Scrubbers, sponges and stones are the most commonly used tools used with abrasives as scrubbing action is required.

Abrasive cleaners can be dry (powdered) and wet (liquid) in nature. Unfortunately, few disinfectant abrasives can disinfect soiled surfaces.

- Sandpaper, plastic and nylon meshes, scouring pads, and steel wool are examples of physical abrasives.
- Mineral abrasives are made up of tiny particles. Mineral abrasives such as baking soda, powdered borax, and salt are examples of natural cleansers.
- Particles are also found in chemical abrasives. Sodium dichloro-s-triazinetrione, for example, is a common compound found in commercial bleach preparations. These cleansers, also known as scouring powders, destroy microorganisms and clean surfaces.
- Mild abrasives - Fiberglass, laminate, countertops, grout, tile, sinks, tubs, appliances, and glass are all excellent choices for mild abrasives.
- Coarse or harsh abrasives - Outdoor stainless steel grills, oven baking racks, and cement can all be cleaned with coarse or harsh abrasives. Harsh abrasives, commonly sold for cleaning difficult stains, can damage various surfaces. Regular use, for example, Aluminum Oxide, Zirconia Alumina, Silicon Carbide, Ceramic Aluminum Oxide, can scratch the gleaming surfaces of sinks, bathtubs, and kitchen appliances, leaving them drab and harsh. Surfaces that have been harmed in this way will dirt more quickly and stain more deeply. It will then be necessary to use a hard abrasive to remove any remaining ingrained dirt or stains.

Cautions while using Abrasive cleaner

- Abrasives should be used with care as they may scratch or discolour certain types of materials such as plastic or stainless steel.
- Use proper tool/scrubbing instrument to get rid of dirt.
- Understand the nature of surface to decide upon the type of scrubber to be used .
- Read user instructions well before using on any surface.
- Wear rubber gloves to avoid contact with chemicals.



Figure 2.1.13 Abrasive Cleaner and Scrubbers used for cleaning purposes

4. Acids

Acid cleaners are the most potent type of cleaning agent. They are highly reactive. Acid cleaners can be very poisonous and corrosive. Thus, these are properly diluted before use. Any tough mineral deposit or rough dirt can be cleaned using acids. These are useful for descaling dishwashers or removing rust from restroom facilities. Acidic cleaners easily dissolve hard stains, breaking them down and making them easier to remove. Muriatic acid, Phosphoric acid and nitric acid are the most commonly used cleaning agents.

Acids can work as:

- Toilet bowl cleaner
- Rust remover
- Metal cleaners
- Hard water removers
- Tarnish removers



Figure 2.1. 14 Some commonly used Acid Varieties

Cautions while using acid cleaners:

- Always dilute acid with water before use. Never use it directly on any surface. It can discolour or change the nature of the surface.
- Always pour acid into water, never water into acid.
- Use a plastic bucket to mix it in and always add the water to the bucket first.
- Do not use it with naked hands.
- Keep the bottle tightly screwed after use and keep in safe place to ensure no spillage occurs.
- Keep away from reach of kids and non-trained personnel.

4. Bleaching Agents

Chemicals used to erase stains are known as bleaching agents. Many bleaching chemicals can also be employed as disinfectants. If a product contains a bleaching agent, it may be labelled as bleach, bleaches as it cleans, or chlorinated on the product specifications label.

Chlorine bleach is one of the maximum frequently used and reasonably priced disinfectants on the planet. Liquid chlorine bleach (Figure 1) is a water-based alkaline solution of sodium hypochlorite. It is a foundation that works wonders in removing stains and colours from textiles. Chlorine bleaches are also used for cleansing surfaces and reducing mildew and mildew.

Cautions while using Bleaches Agents

- Chlorine bleach is a strong corrosive material.
- Inhaling the fumes will irritate the eyes, skin, and respiratory tract.
- Never mix bleach with toilet bowl cleaners or rust remover because a poisonous gas is produced.
- Never mix bleach and ammonia because this produces a dangerous chemical

compound that could result in fire.

- Consumers should be aware that chlorine bleach can dull shiny finishes on sinks, bathtubs, and other porcelain enamel faces.

Many cleaning agents are used based on the surface they clean, like glass cleaners, toilet cleaners, or the nature and pH level (acid levels). All these types fall under the above discussed four categories.



Figure 2.1. 15 Various types of Cleaning Agents

Safety Do's and Don'ts for Cleaning Agents

Chemical safety do's

1. Store chemicals away from food storage and contact areas.

Chemicals can easily get into food or spill onto food-contact surfaces if they are stored incorrectly. A separate area should be used for chemical storage to make sure your food and equipment stay safe.

2. Label all chemicals clearly.

If chemicals are mislabelled or hard to read, it can be difficult to know what they are and should be used for. If you find a chemical container without a clear label, discard the chemical properly.

3. Follow the manufacturer's instructions for chemical use.

It is very important to follow the instructions for each chemical. If there is too much or too little of the chemical, or if it is used incorrectly, the chemical can be dangerous.

4. Wash your hands after handling chemicals.

Chemicals can get on your hands and you could spread them if you do not properly wash your hands. Be sure to keep yourself and others safe by washing your hands after handling chemicals.

Chemical safety don'ts**1. Don't clean or use chemicals near food.**

Chemicals can easily get into food if they are near it. Keep them separate and protect your food from contamination.

2. Don't mix chemicals together.

Chemicals can become more dangerous and unexpected results can happen if chemicals are mixed. Follow the manufacturer's instructions and use chemicals correctly.

2. Don't put used or spilled chemicals back into the original container.

If a chemical is spilled, it may react with unknown components on the surface it was spilled on. To keep your chemicals fresh and safe, discard of spilled chemicals properly.

2. Don't use a chemical container to store food.

Containers used for chemical storage can still have toxic materials in them, even if they appear clean. If you put food in them, your food may become toxic. Discard of chemical containers properly and use only food-grade storage containers to store food.

Cleaning Tools and equipment

Different cleaning processes are followed in food processing units, and different equipment is used for different methods.

Different types of cleaning processes followed in food processing plants**Manual & Mechanical- by hand or machines**

- Wet & Dry – with water and without water
- Immersion cleaning – dipping the machine, utensils or items in liquid for cleaning.
- Cleaning out of Place (COP) – removing equipment and soaking in tanks for cleaning.
- Cleaning in Place (CIP)- cleaning the machines and equipment without removing them.
- Foam Cleaning- Using foam to spray clean.
- High Pressure sprays- using high low pressure for cleaning- water or steam.

Cleaning tools and equipment are machines used for cleaning and sanitation purposes. These can be simple /manual, or can be mechanical. This section covers some of the commonly used cleaning tools.



Figure 2.1. 16 Some commonly used Cleaning tools and equipment

Manual Cleaning Tools

Manual cleaning tools are simple devices to clean dust, light debris, dust, oil, grease, or floor marks. Moreover, do not require any electricity or technical know-how to be used. example

A) Scrubber – used for scrubbing and scratching dirt using water and cleaning agents.



Figure 2.1.17 Some common types of Scrubbers

B) Brooms (Jhaadu) & Dustpans – usually used for cleaning dry dirt and dust. There are flower brooms, stick brooms, standing brooms with dustpans etc.



Figure 2.1.18 Different Types of Brooms

C) **Mops** with buckets / Wringer trolley– Mops are used for wet cleaning. Water is filled in the bucket, and the mop is repeatedly washed in detergent water. Mop heads should be replaced every day, washed, dried, and disinfected to ensure proper cleaning. Wringer trolley is a more sophisticated mop bucket that segregates dirty water and cleans detergents water in different compartments. Mops can be of different types based on their heads, like do-all mops, Kentucky mop, disposable mops. It is better to use a mop with a microfibre head than cotton as synthetic material does not bind any dirt or grease and is easy to clean.



Image 2.1.19 Different types of Mops and Wringer Trolleys

- D) **Brushes:** Different brushes are used to clean dirty surfaces, utensils, and machines in a unit. Soft bristle brushes are used on scratch-prone surfaces. In contrast, stiff bristles are used on heavy, greasy and inflexible dirt areas.



Figure 2.1.20 Different types of Brushes



HIGH LEVEL CLEANING:
Tools with telescopic handles, such as condensation squeegees and hook brushes help clean ceilings and overheads.



LOW LEVEL CLEANING:
Angled brooms with long extension handles can reach relatively inaccessible narrow junctions and corners.



DETAILED CLEANING:
Narrow bristle blocks with ergonomic handles are used on hard-to-reach nooks and crannies of equipment surfaces.



DEEP CLEANING:
Scrubbing tools, chemicals and water can be used to remove rigid soils from surfaces.

Figure 2.1.21 Some important cleaning tips

Brushes can be used for both wet and dry cleaning.

Mechanical Cleaning Tools

Cleaning is critical for food safety and worker safety in any food processing unit. Also, it is a mandatory requirement to maintain quality standards. However, manual equipment may not be enough to meet all

the hygiene requirements, so many automatic cleaning machines are used nowadays. Following are the machines explicitly used in the food sector.

- High-pressure washers
- Industrial sweepers
- Industrial scrubbers
- Industrial vacuums

1. High-Pressure Washers

These are used for cleaning direct food contact surfaces, from dairy tanks to conveyors used in processed food manufacturing facilities. They are commonly used to clean the outer parts of the equipment, walls, and loading docks. In addition, they are beneficial in removing tough dirt.

Uses of high-pressure washers

1. Cleaning the interior and exterior of stainless-steel tanks
2. Cleaning food preparation surfaces
3. Removing food residue from conveyor belts
4. Removing baked-on surface deposits
5. Removing food deposits from equipment
6. Cleaning the walls of production areas
7. Cleaning outdoor areas



Figure 2.1.22 Pressure cleaning in sea food

Advantages:

1. Suitable for Removal of Difficult or burnt soil
2. Lowest Water Usage
3. Works Against Broad Range of Soils



Figure 2.1.23 Pressure cleaning in Equipment (CIP)

2. Industrial Sweepers

Industrial sweepers eliminate dust and other dry rubble from the floors. We can clean larger areas using these. They do not disperse dust in the air instead of capturing it. Thus contamination of surface and food is avoided. Sweepers are available as walk-behind (for smaller facilities) and ride-on (for more significant facilities) devices (for more extensive facilities).

Tasks for industrial sweepers

1. Cleaning the flooring in the vicinity of the production equipment
2. Keeping outside places clean (e.g., front entrance, loading dock)



Figure 2.1.24 Industrial Sweepers

3. Industrial scrubbers

These clean the floor with water and detergent, like mops are much more efficient, time and money-saving. In addition, scrubbers keep drying the floor as they go. So, it saves chances of accidents. Scrubbers likewise come in both walk-behind and ride-on models.



Figure 2.1.25 Walk-behind and Ride-on Industrial Scrubbers

Tasks for industrial scrubbers

1. Cleaning the floors surrounding production equipment

2. Cleaning hallway and office floors
3. Cleaning cafe/eating areas
4. Cleaning warehouse floors

Industrial Vacuums

These clean the floors, remove dust from walls, pipes, and equipment, and collect trim from packaging machines.

Tasks for industrial vacuums

1. Cleaning the manufacturing area, warehouse, hallways, and offices' floors
2. Walls must be cleaned.
3. Cleaning dust from overhanging pipes and equipment parts
4. Collecting trash and excess trim from packaging lines



Figure 2.1.26 Different types of mechanical cleaning tools

There is various other cleaning equipment which can be used in any unit, like:

▪ Heavy-duty scrubber dryer	▪ Polishing & Cleaning Machine
▪ Vacuum Cleaner wet & dry	▪ Double bucket wringer trolleys/Multi - use
▪ High-Pressure Jet Cleaners/Washer	▪ trolleys/bucket carrying trolleys
▪ Road Sweeper (Manual and ride on Machine/vehicle)	▪ Spray pump for pest control as per(Indian Pest Control Association) IPCA recommendations
▪ Scrubbing & Vacuuming (Combined)	▪ Rubber squeezers
▪ Small battery-operated scrubber Machine	▪ Ladder (24ft and 12ft)
▪ Scissor Ladders	▪ Caddy Baskets

Cautions while using and maintaining cleaning equipment and tools:

- Follow “how to use” instructions given by the equipment company
- Take training for using the tool /equipment
- Wear safety gear, if specified while using the tools.
- Store all cleaning equipment and chemicals away from food.
- Always clean the equipment post cleaning and disinfect them.
- Store the chemicals in labelled containers.
- Ensure food is not contaminated during cleaning.
- Empty and clean all cleaning buckets, dust bins, dust pans daily.
- Follow the fixed cleaning schedule.
- Inform the senior staff in case of any issue affecting the cleaning schedule.
- Look after maintenance and servicing schedule of the cleaning equipment.
- Keep the cleaning chemicals and equipment away from the reach of kids and un-trained staff.



Figure 2.1.27 Cautions while using and maintaining cleaning equipment and tools

2.1.3 Carrying Out a Thorough Visual Inspection of the Work Area

Definition

- Visual inspection is the process of observing any area, equipment or item with naked eyes to look for flaws. Here, it is dirt and soil.
- Visual inspection is one of the firstborn methods followed by people.
- Visual inspection in the cleaning and sanitation process helps in:
 1. Understanding the type of dirt or soil present.

2. Recognise the vital parts requiring an immediate cleaning process.
3. It helps in making a practical cleaning plan.
4. Identifying which cleaning agent and tool is required for the process.
5. It helps validate the cleaning process by providing easy comparison of 'before and 'after' scenes.

Steps of conducting a visual inspection

Step 1. Clearly define criteria of cleanliness- what do you define as clean?

Step 2. Define the optimum result – how much cleanliness is sufficient?

Step 3. Analyse visual defects like the type of soil/dirt to be cleaned

Step 4. Use checklists to make the inspection report

Step 5. Make a cleanliness plan based on inspection- which cleaning agent and equipment will be used? Which cleaning process will be used?

Checklist for visual inspection

Though every organisation makes its checklist for visual inspection, a few universal points are as under:

- Area /equipment to be cleaned
 1. Identifying the type of surface
 2. Steel surface- can be easily cleaned with detergents
 3. Aluminium surface- highly reactive and corrosive with excessive exposure of acidic/alkaline. Avoid using abrasives and bleaching agents.
 4. Plastic- subject to breakage, melting and discolouring due to acidic cleaning agents and high temperatures.
 5. 'Soft metals' like copper, brass or mild steel can get discoloured and highly reactive to chemicals.
- Identify the type of dirt/soil
 1. Food product residue
 2. Water
 3. Airborne contamination
 4. Transient soil from workers
 5. Detergent ingredients
 6. Viable Microorganisms
- Suggested cleaning chemical/agent
- Suggested chemical equipment
- Observation (if any)

Name of the equipment/area to be cleaned	Type of surface	Type of Soil/Dirt	Nature of dirt	Cleaning agent suggested	Urgency of action
Cooking chimney	Stainless Steel	The thick greasy layer of oil	Soluble in alkali solution	Abrasive cleaner	To be done this week.
Toilet wall	Ceramic tiles	Watermarks and fungus	Soluble in alkali	Bleaching agent	Immediate action required

Table 2.2: Sample format of visual inspection

Routine Inspection Cleaning Checklist		Tick When Done
1	Clean the oven, grill, hot plates, and exhaust fan (particularly the detachable mesh) above the hotplates. Only non-abrasive chemicals should be used on stainless steel!	
2	If the foam is applied, the microwave and refrigerator must be cleaned both inside and out.	
3	Cleaning of dust and filth from exhaust fans (bathroom/laundry).	
4	All floor surfaces must be thoroughly cleaned. Only use the proper floor cleaning solutions if you have wooden floors!	
5	Cleaning the windows and sliding doors' sills, frames, and tracks are required.	
6	Cabinet fronts must be clean, and kitchen cabinets must be grease-free.	
7	Cleaning the skirting boards is required.	
8	All weeds/leaves must be removed from the courtyard paving/driveways.	
9	With a mop and bucket, sweep and clean the balcony, and remove any blemishes.	
10	Vacuum the carpets and get them professionally cleaned.	
11	Shower screens and shower recesses must be free of calcium and mould.	
12	All surfaces, including the kitchen and bathroom, must be stain-free.	
13	Clean the air conditioning vents; you can use a vacuum to do this.	

Table 2.2: Sample of Routine Inspection Report



Figure 2.1.28 Routine Inspection representations

2.1.4 Planning the Sequence of Cleaning Tasks

- Planning for the cleaning task is the most vital process. Effective planning leads to desired outcomes.
- Generally, every cleaning process follows:



Figure 2.1.29 sequence of Cleaning Tasks

- The planning process involves deciding upon the steps to complete the inspection process.
- Planning answers some vital questions:
 - i. What to clean? - decide on area and equipment to be cleaned
 - ii. How to clean? - equipment and cleaning agents to be used, method of cleaning- temperature based, chemical-based or pressure-based cleaning.
 - iii. Steps to be followed while cleaning.
 - iv. When to clean? – when to start and time frame for cleaning
 - v. When to repeat the cleaning?
- The success of the cleaning process depends on four vital factors:

4 factors affect the efficiency of cleaning processes

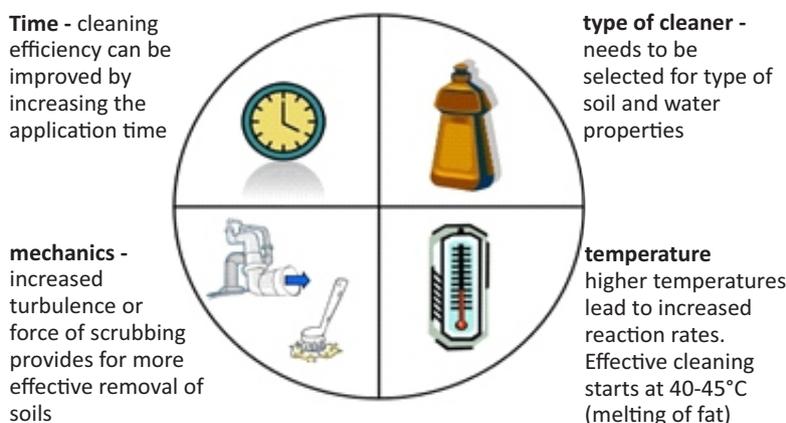


Figure 2.1.30 Factors affecting the efficiency of cleaning Processes

- These factors are universal though applied in different ratios/proportions during different types of cleaning viz- manual, Cleaning-in-place and Cleaning-out of place. For example, a higher proportion of mechanical components as required in manual cleaning. In contrast, more time components are required in COP. CIP requires all four components in equal proportions.

Tips

Tips to make your cleaning process work:

- Know your plant conditions and make your plan according to these situations.

- i. Soils
 - ii. Water Quality
 - iii. Equipment
 - iv. Facility
 - v. Zoning
- Train your teams.
 - Work safely – use PPE kits, safety equipment and gloves
 - Set the sequence of cleaning and sanitation work correctly

2.1.2.1 What a Simple Cleaning Process Looks Like?

- A simple cleaning plan consists of sequence wise activities during the cleaning process.
- It ensures that all surfaces are cleaned often and reduces the risks of transferring bacteria or other pathogens from an unclean surface to clean equipment such as cutting boards or tools.

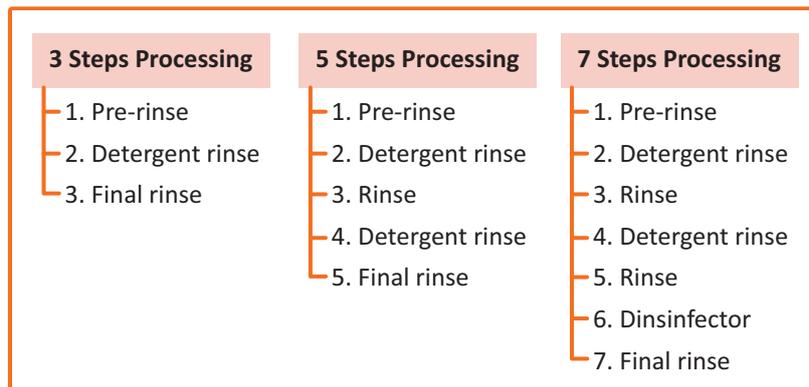


Figure 2.1.31 Sample of CIP planning process

- It can be as simple as 3 step processor as long as 7-step process.
- The number and complexity of steps are based on the surface area, the nature of the equipment or the amount of sanitisation/ disinfecting required.
- In times of pandemic, sanitizing and disinfecting has become an important function.

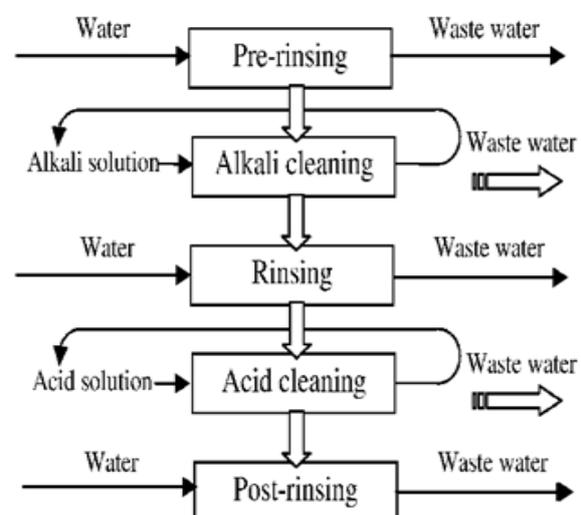


Figure 2.1.32 Sample of Sequencing of Cleaning Procedure

2.1.2.1 Cleaning Sequence and Tips

Step 1: Pre-Rinse

- Rinse to remove visible soils
- Consider the water temperature & pressure
- Rinse from top to bottom
- Target removal of 95% of visible soil
- Rinse parts and place on dedicated sanitation carts or into COP tank or bucket for cleaning

Step 2: Start Cleaning Process

- Cleaning can be done using any of the steps:

Foaming - Tips to do foam cleaning

- Good for surface cleaning
- Use wet foam
- Do not let the foam dry
- Scrub as necessary to clean fat and dirt
- Clean drain after cleaning

Manual Cleaning - Tips to do manual cleaning

- Suitable for heavy soil areas
- Using soap, detergent and scrubber
- Do not use the scrubber more than once
- Apply soap in the correct direction
- Do not keep any instruments or machine parts on the floor

CIP (Cleaning in Place) - Tips to do CIP cleaning

- Clean the equipment without moving it or dismantling it.
- Less time consuming
- Appropriate for bulky and challenging to assemble things

COP (Cleaning out of place) - Tips to do COP cleaning

- Thorough rinsing is required
- Soak all parts in cleaning solution properly,
- Rinse and dry well before reassembling. Follow the user manual to assemble equipment.



Figure 2.1.33 Pre-Rins



Figure 2.1.34 Apply Soap



Figure 2.1.35 Foaming



Figure 2.1.36 Manual Cleaning



Figure 2.1.37 Tips to do CIP cleaning



Figure 2.1.38 Tips to do COP cleaning

Cleaning the Drains - Tips to clean drains

- Clean drains after foaming, manual CIP or COP cleaning process
- Put water in the drain so that the soap is clear
- Keep drain un-blocked
- Use drain cleaning agents if necessary



Figure 2.1.39 Cleaning the Drains

Step 3: Rinsing Process - Tips to do Rinsing process

- Rinsing is done with plain water
- Check the quality of water
- Rinse in order the soap was applied.
- Rinse top to bottom.
- Do not apply any soap or chemical on equipment or surface once rinsing starts



Figure 2.1.40 Rinsing Process

Step 4: Sanitise/Disinfect - Tips to sanitise

- Sanitise using a prescribed and safe sanitising agent
- Dry the surface before sanitising
- Leave the surface or equipment unused for some time after sanitising
- Read the instructions for usage properly
- Wear safety gear before applying sanitising agents like gloves, masks etc.



Figure 2.1.41 Sanitise/Disinfect

Step 5: Post-Rising- Inspect the result of the cleaning and sanitising process - Tips to inspect the cleanliness

- Inspect using sight, smell, touch and feel
- Use flashlights or torches to check
- Surface/equipment should be free from visible dirt/soil and water droplets.
- You can also use swabs to check the cleanliness of equipment.
- This sequence gives an idea of the sequence of tasks and is not mandatory.
- The company can design its cleaning process, plan, and sequence.



Figure 2.1.42 inspect cleanliness



Figure 2.1.43 cleaning process, plan and sequence

2.1.5 Using the Signage at the Worksite While Sanitation Work is in Progress

- Safety signs must be used whenever the cleaning process is taking place.
- Signs provide information or instruction using a combination of shape, colour and symbols but no information in writing.
- These are thus very easy to understand
- Using signboards can save or minimise accidents at the cleaning site.
- Signs can clearly understand the user and the visitors about the rules to be followed while cleaning.
- There are numerous types of signs and are generally universal.
- Understanding these symbols is very important for a cleaning and sanitation worker.
- Any unit can adopt its safety signs also.
- Proper training must be provided to the worker regarding the significance of these symbols during induction training.



Figure 2.1.44 cleaning signages



Figure 2.1.45 Different types of signages



Figure 2.1.46 Different types of warning signs

Colour Coding

The aim of an equipment Colour Coding system is to prevent cross contamination during the cleaning process. It is vital that a system forms part of employee training programme.

The Colour Coding of cleaning equipment is a simple but important step that will make a large contribution to hygiene standards and the elimination of cross infection.



Figure 2.1.47 Some commonly used signage a cleaning worker should understand

2.1.6 Ensuring Adequate Ventilation and All Electrical Safety Before Starting the Cleaning

Electrical safety is the most important aspect when working in any organisation. Any kind of irresponsible handling may lead to severe accidents. For example, a sanitation worker has to keep in mind the following cautions while starting the cleaning process:

1. Understand the electricity-related signs properly so that potential accident areas can be avoided.



Figure 2.1.48 Common electricity-related signages

2. During wet cleaning, switch off the power distribution breaker of the concerned area.
3. Put a signboard stating "Wet cleaning in Progress- Do not switch on the breaker" to ensure no accident occurs during the process.
4. Use proper safety gear such as rubber gloves, boots, or slippers when working near electricity.



Figure 2.1.49 Personal Protective Equipment's

5. Switch off the electric supply and take off plugs of all the equipment and machines to be cleaned.
6. Cover all electric points with plastic sheets when going for intense wet cleaning.
7. Do not spray water on electrical switches or appliances.
8. Keep chemicals away from electric supply points.
9. Keep combustible material away from electric supply points.
10. If mechanised cleaning is done, ensure that the appliance has proper earthing. Then, take the help of an electrical assistant to check it.
11. While putting in the plug of the cleaning equipment, kindly check that the switch is in 'off' mode.
12. Follow the safety markings around the electric supply area for cleaning.



Figure 2.1.50 Electrical safety



Figure 2.1.51 Electrical safety signs

13. Check for any naked wires or live wires to avoid shock. It can be lethal.



Figure 2.1.52 Damaged electrical wire

14. Check the voltage requirement of the appliance before using it to avoid equipment failure.

Take the help of an electrician to:

1. Check and secure naked wire
2. Isolate power supply of area to clean
3. Grounding of the power supply of area to be cleaned



Figure 2.1.53 Electrical warning sign

2.1.6.2 Ventilation and Sanitation Work

Ventilation is an essential factor affecting the quality of eatables in the food processing industry. Air can contaminate food and may become a potential hazard. In addition, improper ventilation can lead to smell and suffocation in the processing unit. Thus, balanced ventilation is required. Ventilation includes the exhaust system that removes stale air from the food premises and the system that provides fresh air into the unit.

An ideal ventilation system in a food plant should have the following features:

- Decontaminate air by filtering;
- Maintain suitable moistness and temperature;
- Keep ducting reachable but out of the way of processing processes;
- Positively pressurised;
- Prevent contamination and be easy to clean;
- Supply sufficient volumes of air where needed.

Any unit can have a mechanical as well as a natural ventilation system. Mechanical ventilation systems can include fans, exhausts, ductwork, extraction units and air-conditioning units. Natural ventilation system includes proper windows and ventilators. Windows and ventilators should have mesh to avoid any insect or foreign agent entering inside.

The following points have to be taken care of by the cleaning staff in a food processing unit:

- Closely understand the ventilation system of the unit.
- Understand the priority ventilation areas, i.e. areas requiring continuous ventilation.
- Check the ducts and other openings regularly for dust or blockages to ensure uninterrupted ventilation.
- Check that no ventilation points are blocked during cleaning.
- Ensure that no chemical/ cleaning agent drops remain in the ventilation ducts, fans or exhaust as they contaminate the food.
- Conduct a visual inspection of the ventilation area, ventilating and air-conditioning system for hygiene deficiencies such as contamination, corrosion, limescale, and damage.
- Clean the area around ventilation ducts repeatedly and adequately.
- The use of proper detergents, disinfectants and their application technique is vital. To meet the hygiene requirements and avoid corrosion, the cleaning regimes should be adjusted according to the defined hygiene demands.
- Proper ventilation should be there after wet cleaning for proper drying.
- The airflow through the duct should be checked before spraying disinfectants to avoid contamination of the entire facility. In addition, the outward flow of air should be blocked while disinfecting.

2.1.7 Preparing the Work Area for Cleaning and Sanitation Activities

Preparing the area before cleaning ensures that no equipment, surfaces and food items are contaminated during the cleaning process. It can help save any hazardous exposure to the food product during the cleaning process.

Following essential factors to be considered for preparing the area for cleaning and sanitation:

- Remove production supplies from the room all ingredients, food products, packaging materials, etc.
- Empty & remove garbage and scrap containers
- Disconnect/ stop process lines
- Empty drain baskets with the help of dedicated personnel
- Remove all equipment that should be saved from getting wet
- Inform all concerned persons about cleaning procedure to be done.
- Disassemble equipment for COP.
- Dry clean & sanitise, then cover all electric eyes, electronic control equipment, adjacent production lines
- Remove loose soil & debris from equipment and floor (top to bottom)
- Put 'cleaning in progress' signage boards or other caution boards if required.



Figure 2.1.54 Cleaning and sanitation activities



Figure 2.1.54 Food area cleaning in place poster,
www. <https://in.pinterest.com/pin/374080312783379318/>

Some essential tips for cleaners and sanitation employees

FLOOR, CEILINGS & WALLS

- To remove oil or grease stains from a polished wood floor, add two tablespoons vinegar to half a litre of warm water and wipe.
- Avoid cleaning flooring tiles with harsh detergents or acids. These elements can rob the shine off your floor.
- Add a dash of detergent and disinfectant to the water to keep it germ free & spotless.
- For sparkling window panes and mirrors, rub them with a slice of lemon and wipe dry with a soft cloth.

BATHROOMS

- To unclog the showerhead, dip it in a bowl of vinegar for 4 hours. The acid will help clear the dirt.
- Clean bathroom rods regularly and wipe clean with a dry soft cloth.
- Bathroom floors are vulnerable to moss growth. Sprinkle some bleaching powder and let it stay for 10 mins. Wash clean.
- Chemical toilet cleaners will ruin the finish of bath tubs; opt for non-chemical-based cleaners.

KITCHEN

- Apply a little common salt to the inside of the freezer compartment to prevent the formation of ice crystals.
- To clean the clogged sink, mix a handful of sodium bi carbonate and one cup of vinegar and pour it into the wash basin followed by water.
- Put some table salt in your mixer and run it for a few seconds. Do this once in a month to keep your mixer blades sharp.
- Clean kitchen sink with a toothbrush while cleaning tough stains and grime around the corners of the sink.
- To clean a clogged tea strainer, heat it over a gas flame before cleaning it up post it cools down

Exercise



Assessment questions

I. Tick the correct option: (Multiple Choice Questions)

1. Cleaning involves removing dirt, soil and _____.
 - a. Shirt
 - b. Shoes
 - c. Apron
 - d. Grease

2. Sanitise is the first step to creating a food-safe surface.
 - a. Usually
 - b. Yes
 - c. No
 - d. Cannot say

3. Cleaning and _____ are critical to food safety in a food processing unit
 - a. Sanitising
 - b. Painting
 - c. Putting away
 - d. Replacing

4. _____ is the process of completely removing microorganisms from the food contact surface.
 - a. Sanitising
 - b. Disinfecting
 - c. Cleaning
 - d. Winding

5. To avoid _____ of food, cleaning agents, equipment and chemicals must be stored away from food, food surface, utensils and raw materials.
 - a. Freezing
 - b. Burning
 - c. Contamination
 - d. Rotting

6. Which of the following must be cleaned and sanitised?
 - a. Utensils
 - b. Equipment

- c. Surface
 - d. All the above
7. Sanitising is done to remove what?
- a. Microorganisms
 - b. Grease
 - c. Soil
 - d. Dirt
8. Food contact surface must be cleaned with:
- a. Chemical sanitiser
 - b. Detergent
 - c. Chlorine solution
 - d. Bleach solution
9. Food contact surface should be cleaned at least:
- a. 7 hours
 - b. 5 hours
 - c. 4 hours
 - d. Once in two days
10. What kind of contamination do the cleaning agents cause if kept in contact with food items or food contact surfaces:
- a. Allergenic
 - b. Microbial
 - c. Chemical
 - d. Physical
11. Personal protective equipment such as apron, gloves, and masks should:
- a. Fit properly
 - b. Big and loose
 - c. Disposable
 - d. Dark in colour
12. What should be done with the food and other ingredients while cleaning around:
- a. Clean the area around food and let the food be there
 - b. Cover the food which can not be moved and move the rest
 - c. Do not clean the area where food and other ingredients are lying

d. None of the above

II. Mark T (true) or F (false) for the below statements.

1. It is not good to mix cleaners with disinfectants. _____
2. It's best to clean and disinfect a room by starting with the cleanest area and moving to the dirtiest. _____
3. Cotton mops are the best type of mops to disinfect floors with. _____
4. We should let a disinfectant remain wet on a surface before wiping it dry. _____
5. When diluting disinfectant concentrates, It is OK to use more disinfectant than the label indicates, but not less. _____

III. Answer in short.

1. What is cleaning? How is it different from sanitising?

2. What are the different types of chemical agents used for cleaning? Write two examples of each.

3. State any five mechanical cleaning equipment.

4. Write a few points on electric safety measures to be taken before the cleaning and sanitation process.

5. Identify this signage

Exercise: Assignment

1. Meet any cleaning and sanitation worker of any food processing unit. Take his feedback on the following points:

Question	Answer
1. The cleaning agent used for cleaning a greased chimney?	
2. How often does he clean the food production area floor?	
3. What unique clothes/kits does he wear while his job?	
4. Does he use any mechanical cleaning equipment? If yes, name it?	
5. Does he understand the difference between cleaning and sanitising?	
6. Does he follow any cleaning routine for toilets or clean as and when required?	
7. Does he decide cleaning process on his own, or is he given a plan from authorities?	
8. Which manual cleaning equipment does he use?	
9. How often do they sanitise their facility?	
10. What precautions do they take while they sanitise the unit/area?	

3. Carry Out Cleaning & Sanitation of Food Processing Plant



- Unit 3.1 Cleaning of the plant equipment, furniture, fittings and fixtures
- Unit 3.2 Cleaning of the plant walls and floors to remove dirt, food residues etc.
- Unit 3.3 Cleaning of office area, canteen, washroom area etc
- Unit 3.4 Carry out post-cleaning activities



Key Learning Outcomes

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

1. List the steps to be performed for cleaning and sanitising the equipment, furniture, fittings and fixtures.
2. Discuss ways to clean the grease, oil, dirt, rust, food residues etc., from the equipment, furniture, fittings and fixtures.
3. List various cleaning agents, disinfectants and sanitisers required for cleaning and sanitising the equipment, furniture, fittings and fixtures.
4. List the steps to be performed for cleaning and sanitising the floors and walls of the cleaning area.
5. Discuss reasons for avoiding over-wetting of surfaces.
6. Discuss the need of leaving the equipment, furniture, fittings and fixtures, floors and walls for getting dry after cleaning and sanitisation activities.
7. Elucidate the cleaning and sanitation process of various areas of the food processing facility.
8. List the steps to be performed for cleaning and sanitising the office area, canteen, washroom area etc. and other areas of a food processing facility.
9. Discuss post-cleaning and sanitising activities.
10. List the types of information to be reported while performing cleaning activities to the supervisor or appropriate personnel.
11. Discuss the documents and records to be prepared and informed to be recorded about cleaning and sanitisation tasks being carried out.
12. State the importance of disposing of the waste and unwanted materials after task completion.
13. Apply appropriate ways to check the equipment, furniture, fittings and fixtures in the work area for cleaning requirements.
14. Show how to scrape off and dry sweep the dirt, rust, food residues etc., from the equipment, furniture, fittings and fixtures.
15. Apply appropriate industrial cleaning methods to remove the thick layers of grease, dirt and other food deposits from the equipment, furniture, fittings and fixtures.
16. Show how to wash the equipment, furniture, fittings, and fixtures to remove the visible deposits, layers of soil, and detergent residues.
17. Demonstrate the procedure of disinfecting the equipment, furniture, fittings and fixtures and wiping the water from them.
18. Perform steps to clean and sanitise the floors and walls of the cleaning area.
19. Show how to dry sweep and then clean the floors and walls using cleaning agents and scrub.
20. Show how to damp mop and disinfect the floors and walls of the cleaning area.
21. Apply appropriate ways to clean and sanitise the office area, canteen, washroom area, washing area, waste disposal area, storage areas etc. and other areas of a food processing facility as per the cleaning requirements and SOP.
22. Show how to change the waste bags and clean the waste bins per SOP.
23. Demonstrate the procedure to check and refill the supplies and accessories in the toilet, pot washing area, drinking area etc.

- Perform steps to report the supervisor or appropriate personnel about marks or spots that cannot be reached or cleaned, maintenance requirements of any damage and faults in items and any lost and found property or item by following organisational guidelines.
- Employ appropriate practices to safely clean and store the tools, equipment, and auxiliaries.
- Prepare sample records consisting of information such as the type of tasks performed.
- Demonstrate the procedure of disposing of the waste generated and unwanted materials safely.

UNIT 3.1 Cleaning of the Plant Equipment, Furniture, Fittings and Fixtures

Unit Objectives

At the end of this unit, participant will be able to:

1. To understand the meaning of dust, rust, and dirt and remove them.
2. Recognize the various types of cleaning clothes and agents used for dirty surfaces.
3. Learn the disinfection process, its importance and considerations to be kept in mind while disinfecting.
4. Understand how to dry the surface and make it moisture free.

3.1.1. Checking Scraping Off the Dirt, Rust, Food, Residues, Unwanted Materials

Cleaning is a necessary process, and each step carried out during cleaning has much significance. A worker has to understand the various steps, sequence of carrying out these steps and essential aspects of cleaning attached with each step. Different furniture, fixtures and machinery have different cleaning procedures based on their manufacturing material durability type of dirt. The following unit gives a clear idea about cleaning equipment and other fixtures in a unit.

- Food businesses need to keep their premises, fixtures, fittings, equipment, and food transport vehicles clean and sanitary. This means:
 - things like food scraps, garbage, dirt, grease, etc., should not be left to accumulate
 - utensils and surfaces that come in contact with food should be clean and sanitary.
- A typical cleaning plan in the food industry follows a systematized cleaning procedure:

Step 1 – Preparation (Remove loose dirt and food particles)

Step 2 – Cleaning (Wash with hot water (60 °C) and detergent)

Step 3 – Sanitising (bacteria-killing stage)

Step 4 – Air drying

Removal of dust



Figure 3.1.1 Dust is an essential issue in a unit

- Removal of dust sounds like a straightforward thing but is an essential process in cleaning.
- Removing dust from equipment, furniture, or any surface mainly involves dry cleaning using dampen (wet but tightly squeezed) micro-fibre cloth.
- It is imperative to determine that the cloth used for dusting does not cause any scratches on the surface cleaned. Therefore, choosing the suitable cloth material for dusting is essential to ensure this.
- Preferably a microfiber cloth is used for dusting, but there can be another category of cloths as well:
- **Swabs:** These are all-purpose cloths made of soft, absorbent material. They are used for wet cleaning and damp dusting on all surfaces above floor level. They can also be used for cleaning sanitary fittings such as bathtubs and washbasins.
- **Wipes:** Sponges are used for washing walls, woodwork, glass, and upholstery.



Figure 2.1.2 Swabs



Figure 2.1.3 Wipes



Figure 2.1.4 Dusters

- **Dusters:** These are meant for dusting and buffing. A fine mist of water or dusting solution is sprayed on them for damp dusting.
- **Chamois leather** is the skin of a chamois goat (antelope) used to clean windows and mirrors and polish silver and other metals when dry.
- **Glass cloths:** Glass cloths are linen tow yarn and do not leave lint. They can therefore be used for wiping mirrors.



Figure 2.1.5 Chamois



Figure 2.1.6 Glass cloths

- **Floorcloths are more prominent, thicker, and coarser cotton** than all-purpose swabs. They are used to wipe WC pedestals, clean tile floors, clean marble or granite floors, remove spills from floors etc.



Figure 2.1.7 Floor cloths

- **Scrim:** looks like sackcloth. It is used instead of chamois leather for cleaning windows and mirrors.



Figure 2.1.8 Scrim

Scrapping of Rust

Any food processing unit has a lot of equipment, furniture, and metallic fixtures. Mainly these are made of stainless steel, iron, or chromium oxide coated. When wet or in moisture, these metals react with oxygen and develop rust over time. Rust is brown and orange (iron oxide) and is extremely dangerous if consumed. In addition, rust can lead to the contamination of food and other ingredients. Thus, rust is fatal in a food processing unit.



Figure 3.1.9 Patches of rust inside the oven

Rust can easily be removed using chemicals like acids and abrasive agents. However, it can also be removed using readily available materials such as vinegar and salt. We will discuss easy ways to clean rust from furniture, fixtures and, cooking surfaces in the incoming section.

Cleaning rust using chemicals-

1. How to use oxalic acid

- Oxalic acid generally comes in powdered form.
- Very effective on rust but may adversely affect the furniture/fixture/surface if used in excess quantity.
- Highly reactive and may be dangerous if used without proper precautions
- Use proper protective gear like hand gloves, eyeglass, mask when using them.
- Clean the rusted area with detergent and water. Let it dry properly.
- Mix oxalic acid with warm water (25 ml acid:250 ml water). Avoid inhaling fumes.
- Pour the mixture on the rusted area and scrub the rust with steel wool.
- Wash off the acid from the furniture/surface and let it dry.

2. How to use citric acid?

- Citric acid is safer than oxalic acid and readily available.
- It has to be used with caution as it can even remove the layer of paint (if any) from the furniture or fittings. Thus, repainting has to be done.
- Clean the rusted area with detergent and water. Let it dry properly.
- Mix citric acid with warm water (10-15 ml acid: 50 ml water).
- Pour the mixture on the rusted area and scrub off the rust with steel wool or brush.

- Wash off the acid from the furniture/surface and let it dry.

3. Chemical Rust Remover

- Chemical rust removers are very effective for removing rust.
- They are available in gel as well as liquid form.
- These are made of very toxic and harsh chemicals like phosphoric acid, oxalic acid, etc.
- Few chemical rust removers can also be organic and non-toxic.
- The worker is advised to follow the instructions given by the company for the usage of these chemicals.
- Also, since these are highly reactive, it is advised to wear safety gear like gloves, eyeglasses, masks, and a respirators



Figure 3.1.10 Some common rust removers

Cleaning rust using organic cleaners-

1. Baking Soda Paste

- It is a safe and organic method to clean light rust.
- Mix baking soda with water
- Apply the paste on the rust and rest for 1-2 hrs.
- Scrub using steel wool and brush.
- Wash the paste and let the furniture dry.

2. Lemon and Salt

- Apply salt religiously over the rusted area.
- Use more salt if rust is more.
- Put lemon juice over the salt and rub.
- Let the paste rest for 2-4 hrs
- Use a brush over the surface to scrub
- After some time, wash the furniture/surface and let it dry



Figure 3.1.11 Organic ways to remove rust

3. White Vinegar

- Dip the rusted part of the equipment in the vinegar
- Let it be dipped for some time
- Take out the part after some time and scrub and wash.



Figure 2.1.12 Impact of vinegar on rust

4. Rub potato and dish soap/salt

- Take a cut potato.
- Dip it in dish soap/salt
- Scrub over the rusted surface
- For tricky corners, pour potato juice and detergent soap mixture in that corner and let it rest for some time.
- Repeat the process if the process does not look very satisfactory.
- Wash and rinse the surface and let it dry.

Manual Cleaning method

1. Use Abrasive and scrubbers
 - It is a bit time-consuming method
 - It can be done using sandpaper, screwdriver, or steel wool.
 - Scrubbing involves high muscle power and is suggested only when rust is light.

How to protect surfaces from rusting?

The worker can follow many methods to check that equipment and surfaces remain rust-free.

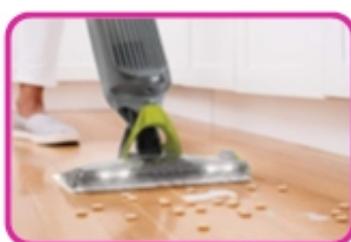
- Furniture should be kept dry and wiped with soft cloth time-to-time to save it from rusting
- Use waterproof covering during the rainy season.
- Use anti-rust agents like WD-40 on surfaces and parts to save them from rusting. This is highly effective on surfaces like sinks in continuous contact with water.



Figure 3.1.13 Applying anti-rust chemicals

Cleaning food residues and unwanted materials from the food processing area-

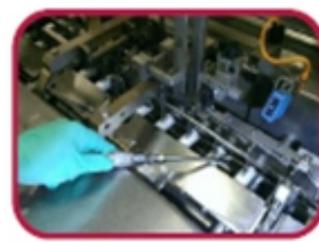
- It is advisable to remove/clean the food residues and unwanted materials from the unit area to avoid any contamination.
- Food residues can also affect the visual cleaning environment.
- It is generally done through the dry cleaning method.
- Residues can be effectively cleaned using two methods:
 - I. Manual cleaning- using broom- dustpan, brushes, and a dusting cloth.
 - II. Mechanical cleaning- using vacuum cleaners, limited compress air, product flushes, specialized application cleaning tools, e.g. belt scrapers, rotary brushes, air knives.
 - III. Suppose residue is sticky like oil crust created during the frying process. In that case, the scrapping method using sharp scrapers can also be used.
- It is advisable to clean the workspace floor thrice during the working day. In addition, some units also clean the residues once every hour.



Vacuum cleaning



Brush cleaning



Air Hose and Nozzle



Manual Scrubber



Broom and Dust pan



Brush and Pan

Figure 3.1.14 Cleaning Equipment for food residue and waste material

3.1.2 Applying Recommended Chemicals and Cleaning Methods

There can be several cleaning methods explained in earlier units, viz.

- Dry (without water) and wet cleaning (using water as a base)
- Manual (by hand) and mechanical (using machines)
- CIP (cleaning the parts in place) COP (removing the parts to clean them)

What is Wet Cleaning?

Wet cleaning is the most common method of food processing cleaning, particularly in facilities such as meat processing facilities. It involves:

1. Cleaning up loose debris,
2. Pre-rinsing with ambient water,
3. Cleaning and scrubbing with specific cleaning chemicals,
4. Rinsing, and
5. Sanitisation.

Wet cleaning in food manufacturing environments involves pre-rinsing, washing (with chemicals), post-rinsing and sanitising food contact surfaces and food processing equipment. Below is an ideal process for you to follow.

3.1.2.1 - 3 Step Process for Effective Cleaning and Disinfecting in Food Processing



Elpress advises the following 3 step process for effective cleaning in the food processing industry.

Step 1. Rinse

At the end of the production process, the areas and equipment are no longer clean. Food residues will always be present to a greater or lesser degree. In order to guarantee hygiene, the production areas must therefore be thoroughly cleaned. This process begins with the rinsing of equipment, walls and floors. This process requires pressurised water, transported to the required location by a booster unit and a network of pipes. The coarse dirt is removed by this boosted water rinsing step.

Step 2. Foam

Immediately after rinsing, the equipment, floors and walls must be thoroughly cleaned using foam cleaning – also often called 'foaming' for short. In a centralised system, a foam system with an automatic dosing unit is used for this. In a decentralised system, the chemical is dosed to the water in the satellites themselves. The foam is created with air pressure. A layer of foam should be applied to all surfaces in the production area. The longer the foam is allowed to work, the better. The layer of foam is then rinsed off.

Step 3. Disinfect

An optional step in the hygienic process is possible after the foaming and the rinsing away of

the foam: a post-treatment with disinfectant. This product has an antibacterial effect and is atomised over the equipment and, if necessary, the walls and floors. The disinfecting process ensures that micro-organisms are removed or "killed". Depending on the disinfectant used, a further round of rinsing with clean water only may be necessary.

An effective cleaning method involves proper heat/temperature, chemicals, human effort, and time.

Different cleaning methods can be decided for cleaning based on various factors:

- Type of product manufactured in the unit

PRODUCT	TYPICAL CLEANING METHOD
Cereals	Wet cleaning/ combined wet and dry cleaning Dry cleaning post thermal process
Baked and fried snack	Wet cleaning/ combined wet and dry cleaning Dry cleaning post thermal process

- Type of process used for manufacturing the final product

PRODUCT	TYPICAL CLEANING METHOD
Seasoning/Flavouring/Coating	Wet Cleaning
Oiling and Frying	Wet Cleaning

- Type of equipment and infrastructure

PRODUCT	TYPICAL CLEANING METHOD
Ovens and stoves	COP
Conveyor belts for shifting foods	CIP



Figure 3.1.15 CIP cleaning of food conveyer belt

Similarly, different chemicals clean different dirt/soils in the food production unit.

A worker has to keep the following points in mind while selecting the correct chemical for cleaning:

- Understand the aim of cleaning
 - Detergents dissolve grease and fat but will not kill bacteria.
 - Disinfectant removes infection (reduce bacteria to a safe level) but will not dissolve fats.
 - Sterilizers kill all living micro-organisms.
 - Sanitizers combine the effect of both detergent and disinfectant.
- Type of soil or dirt
 - Oil/grease (fatty soil) strong detergents with hot water
 - Deposits like hard water mark clean best with acidic cleaners
 - For rust and other mineral deposits use more acidic cleaners like vinegar. Even toilet cleaners are acidic in nature.
 - For dairy products, highly caustic detergents, are widely used.
- Type of surface
 - Avoid using chlorine cleaners on the food preparation surfaces, it may be highly reactive.
 - Aluminium can get dis-coloured if acidic cleaners are used. Use mild detergents for aluminium surfaces.
 - Metal tables, sinks and panelling should be cleaned using a non-abrasive cloth and cleaner. Clean with a detergent and a disinfectant, or a sanitizer, then rinses with hot

Cleaning Different Types of Equipment

3.1.2.2 Steps to Clean Ovens

Step 1. Use specialised chemicals such as a heavy-duty oven cleaner.

Step 2. Ensure that cleaning fluids are rinsed off thoroughly, as they are highly toxic.

Step 3. For griddles & grills, use specialised chemicals to remove carbon (burnt food residue).

Step 4. Clean when the oven is a little warm to effectively clear the burnt carbon and dirt.

Step 5. Let it dry. Switch on only after the oven is completely dry.

Step 6. Switch on and check.



Figure 3.1.16 Oven Cleaning in a bakery

3.1.2.3 Steps to Clean Fryers

- Step 1.** Ensure that electricity or gas burners are turned off.
- Step 2.** Allow the oil to cool, and drain warm oil through an oil filter into a container large enough to hold all of the oil.
- Step 3.** Remove all food debris and clean with a strong detergent/degreaser.
- Step 4.** Rinse and dry well.
- Step 5.** Refill with filtered oil (no darker than nut brown) or fresh oil.
- Step 6.** Turn on to check fryer still works.

3.1.2.4 Steps to Clean Refrigerators, Freezers & Cold Rooms

- Step 1.** Mop up any spillages immediately.
- Step 2.** Use a detergent & disinfectant which will not taint the food.
- Step 3.** Plan your cleaning well, with regular defrosting of freezers.
- Step 4.** Heavy-duty equipment and all electrical catering equipment.
- Step 5.** Refer to manufacturers cleaning guidelines.
- Step 6.** Ensure that all equipment is turned off and disconnected prior to cleaning.
- Step 7.** Check equipment after cleaning.



Figure 2.1.17 Cleaning a Refrigerator

3.1.3 Washing

- Washing is an essential process of cleaning.
- Follow the following steps for washing surfaces or equipment in a unit:
 - a. Wear proper protective gear like gloves, apron and eye protection glass.
 - b. Clean up loose debris, waste or residue
 - c. Put a “Cleaning in Progress” mark to save any accident.
 - d. Choose and apply appropriate detergent, chemical or cleaning agent. Apply detergent from top to bottom.
 - e. Scrub as per the requirement (apply more pressure and time of dirt is strong)
 - f. Rinse with water. The direction for rinsing should be top to bottom.
 - g. Preferably use low-pressure foaming, scrubbing and low-pressure rinse to save the dirt, foam and filthy water spread in surroundings. Also, it is better to use lesser pressure for equipment safety.
 - h. Use appropriate cloth, sponge or mop (on the floor) for removing the excess water
 - i. Check for the visual impact of cleaning. If the result is not satisfactory, repeat the process.
 - j. Dry the surface or the equipment properly using a lint cloth or wipe.



Figure 3.1.18 Washing, scrubbing and Cleaning of equipment and cleaning signage

3.1.4 Disinfection

- Disinfection is the most crucial process after washing.
- It determines that the surface and equipment become free of micro-organisms.
- It is advised to be done after sufficient training and knowledge.
- Following steps should be followed to disinfect the facility:

3.1.4.1 Step to Carry Out Disinfection

- Step 1.** Wear proper safety gear like gloves, masks, eye protection glasses, respirators or a PPE kit.
- Step 2.** Read the instructions given on the disinfectant regarding the usage and precautions.
- Step 3.** Inform all the concerned personnel regarding the disinfection process to avoid an accident.
- Step 4.** Put signage regarding disinfection, if possible.
- Step 5.** Determine that the area to be sanitized is arid. Then, remove all the equipment, food items, and ingredients from the area to be disinfected.
- Step 6.** Do not mix the disinfecting chemical with any other chemical until specified.
- Step 7.** Cover the things which are not movable and not supposed to be sanitized.
- Step 8.** Close all the windows ventilators and seal all gaps to determine that the fumes of the sanitiser do not seep out from the area.
- Step 9.** Post-disinfection, let the area be out-of-bound and out of use for some time.
- Step 10.** Take off protective gear, dispose of it properly and wash hands.
- Step 11.** After the prescribed time, open the windows, ventilators and ducts to allow cross ventilation.
- Step 12.** Inform people about completing the process and ask them to use good protective gear like masks and eye-protective glasses to avoid allergies or reactions.
- Step 13.** Wipe the equipment with a sponge before using it again.



Figure 3.1.19 Disinfection



Figure 3.1.20 Disinfection



Figure 3.1.21 Understanding Disinfection

3.1.5 Wiping Off the Water, Drying and Making Them Free from Moisture

- Wiping activity helps in drying the surface thoroughly after washing and disinfection.
- Not wiping/ drying the water after cleaning or chemical after disinfecting can lead to marks on the surface.
- It is mainly recommended to air dry the surface and equipment, but sometimes even cloth can dry.
- Wiping cloth should preferably be soft (to save from scratches), lint-free, and one time usable.
- Reusing the wiping cloth can lead to potential contamination and transfer of bacteria from one surface to another.
- Wiping cloth, if reused, should be washed thoroughly using soap or detergents and dried (air-dried, machine dryer or sun-dried) to ensure no bacteria or microorganisms grow on the cloth.
- No damp cloth from earlier cleaning should be reused for wiping at all.
- Wiping should be done gently, and the wiping direction should be up to down.
- Once wiping is done, remove all signboards put during cleaning or disinfecting.
- Wash your hands thoroughly after the job is done.
- By now, the surface becomes free from dirt and bacteria and ready to be used again.



Figure 3.1.22 Wiping and drying surfaces after cleaning and disinfecting

TIPS to Clean Effectively

- Follow any cleaning schedules or cleaning plan.
- Follow any training you have received, if cleaning at work.
- Use the right products for the cleaning activities you carry out.
- Always follow the manufacturer's instructions and guidance, including any recommended concentrations and dilutions of chemical substances.
- Store the cleaning materials safely and in accordance with instructions.
- Remember to never mix different chemicals together, as this can cause dangerous reactions.
- Wear PPE, such as gloves and aprons.
- Ensure that there is sufficient ventilation.
- Make sure to always wash your hands after cleaning, with an effective hand washing procedure, even if you were wearing gloves.



Figure 3.1.24 cleaning equipment

Exercise



Assessment questions

I. Tick the correct option: (Multiple Choice Questions)

- Which cloth is used for cleaning glass and mirrors?
 - Chamois leather
 - Glass cloth
 - Both a and b
 - Swab
- Rust can be removed using the following:
 - Chemicals
 - Organic solutions like baking soda paste
 - Manual scrapers like sharp blades
 - All the above
- Grease can easily be removed by using detergent with:
 - Normal water
 - Hot water
 - Nail polish remover
 - Acid
- Wiping cloth should have the following properties:
 - Lint-free
 - Rough
 - Small
 - Reusable
- The following point is not correct for disinfecting:
 - Close all windows and doors
 - Wear proper PPE kit
 - Inform all personnel
 - Use facility immediately after disinfection

II. Mark T (true) or F (false) for the below statements.

- Oxalic acid is highly reactive in nature. _____
- Scrims can be used to clean glass/mirrors. _____
- Rust cannot contaminate the food. _____

4. Direction of rinsing should be top to bottom. _____
5. Furniture should be kept dry and wiped with soft cloth time-to-time to save it from rusting. _____
6. Wiping dry the surface is not a compulsory step in cleaning. _____
7. Windows and doors should be left open during disinfecting the facility. _____
8. High pressure water pipe should be used while washing any equipment. _____

III. Answer in short.

1. Name some organic ways of cleaning rust from surfaces?

2. What points should be taken care of while disinfecting any facility?

3. Name and write the utility of any five types of cleaning cloths.

4. How washing process should be done? Write the important points to remember.

Exercise: Assignment

Meet any cleaning and sanitation worker of any food processing unit. Take his feedback on the following points:

Question	Answer
1. What cloth he is using to clean the furniture?	
2. Is he using chemical or organic solutions for cleaning rust? Please write the name of the cleaning agent.	
3. How often does he perform the rust cleaning procedure?	
4. Does he know about disinfection or sanitization?	
5. What precautions did he take while sanitizing the facility?	
6. Do they take the help of a thirdparty for sanitization/ disinfection?	
7. Do they get formal training for sanitization and disinfection?	
8. How often do they sanitize the facility?	
9. Which disinfectant are they using to sanitize?	
10. Do they have any format for noting the cleaning and disinfection routine? If yes, closely see how do they record the activity.	

UNIT 3.2 Cleaning the Plant Walls and Floors to Remove Dirt, Food Residues etc.

Unit Objectives

At the end of this unit, participant will be able to:

1. Understand the mechanism of sweeping the walls and floor in the food processing unit.
2. Learn how to use scrubs and detergents on surfaces.
3. Understand the techniques of damp mopping.
4. Learn the importance of disinfection and the process of disinfection in a unit.
5. Understand the points to remember while disinfecting a facility.

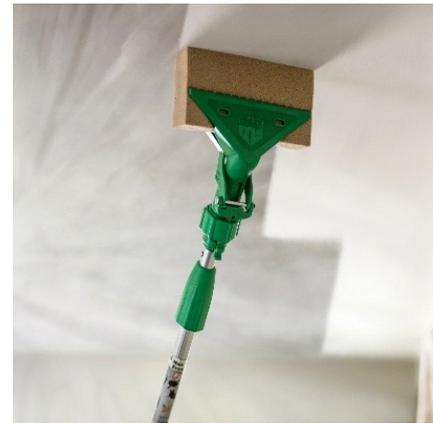
3.2.1 Dry Sweeping All the Walls and Floors of the Plant

Cleaning of plant walls and floor is essential as bacteria and microorganisms also thrive on walls and floors. Therefore, they can be a significant source of contamination. Therefore, a systematic yet straightforward routine is followed for cleaning walls and tiles and floors.

Items required- Dusting cloth, brooms, dustbin and dustpan.

- Dry clean the walls and floor for removing dust, webs and food residues using a cloth/dry mop/broom and dustpan. Dry cleaning can also be done using machines like vacuum cleaners.
- (Bigger residues can be removed using brush, broom and dustpan from floors)
- For floors, broom from inside of room towards the entrance and collect the residue in dustpan. (broom can be dipped in disinfectant to save the dust from becoming airborne).
- Empty the dustpan in the dust bin immediately.
- For walls, work from top to bottom.
- Before cleaning the walls, cover the items like stove, utensils, furniture and remove all food items to save them from falling dirt and debris.
- Use a broom with long handles to clear the upper side of the walls. It helps in removing the cobwebs and any other accumulation from the top.
- Pay special attention to floors/walls around stoves, bins and preparation areas.
- The frequency of cleaning the floors should be decided judiciously. Broom at least once an hour to keep the area cleaned.
- The food processing area and storage area should be cleaned every time after the movement of stores or machinery.
- Remove small movable items like drums, chairs and trolleys at least once in a week for deep cleaning.

- Walls around the cooking station and dust bins should be cleaned at the end of each day.
- Be observant clean as soon as any unwanted material is sited on the floor.



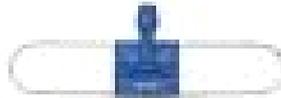
TASKI MOPS AND TOOLS



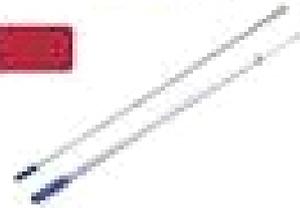
DRY MOPPING SYSTEM



TASKI Dry Blue Refill



Dry mop frame SS



Aluminium Handle

DAMP MOPPING SYSTEM



TASKI Mop Wringer Bucket (30 litre)



TASKI Fringe Mop (450 gm)



TASKI Twin Trolley System (2 X 25 litre)

Figure 3.2.1 Wall cleaning and floor cleaning tools in a unit

3.2.2 Using Cleaning Agent with a Scrub



Figure 3.2.2 Dry cleaning

- Use suitable PPE kits such as gloves, eye protectors and masks to avoid impact on the body.
- Select the suitable cleaning agent based on the dirt, surface etc.
- Read the instructions for using the agent as given on its packaging.
- Dilute it if suggested in the instructions.
- Put the agent on the floor/ wall and scrub well.
- Use scrubber depending upon the type of surface example, use a brush or metal wool for tiled surface though use a sponge for the painted surface. Use cloth or sponge on a wooden surface, wooden surface or wallpaper to avoid scratching.
- Automated floor scrubbers can also be used for substantial surface areas.
- While cleaning floors, place an obvious warning sign in the area.
- Wash the scrubber well after use and dry it before keeping it back in store.



Figure 3.2.3: Using cleaning agents with scrubbers

3.2.3 Damp Mopping the Floors

Items required- Mop, Mop- bucket, detergent, disinfectant.

- Put a “Wet Floor- cleaning in progress” sign during the cleaning. (Bigger residues can be removed using brush, broom and dustpan from floors)
- Dry clean the walls and floor for removing marks and food residues using a damp cloth. Figure 2.2.4 Damp Mopping
- Wet the mop cloth in detergent.
- Squeeze properly to ensure that extra water is removed from the mop/cloth. Extra water will make the walls and floor wet, leading to more accidents/falls. Extra water also leads to watermarks on walls and floors.
- Move the cloth in straight overlapping strokes.
- For floors, begin with the entrance and move around the room.
- Move the mop to form the number '8' pattern.
- For walls, work from top to bottom.
- Pay special attention to walls around stoves, bins and preparation areas.
- Change cloth if the floor or walls are too soiled to get better results.
- Mop or cloth can be re-washed during the cleaning process to avoid the transfer of dust from one portion to another. In this case, always washcloth with clean water, squeeze and use.
- The cleaner may also mix disinfectants like 'Lizol tile cleaner' to clean the walls and floors. The quantity to be added should be as per the instruction given on the bottle of the disinfectant.
- Remove cleaning signage after the cleaning process is over.
- Wash the cloth/mop with soap and clean water after cleaning to avoid the growth of bacteria and microorganisms.
- Completely dry the mop or cloth for subsequent use.
- The frequency of dry cleaning of the floors should be decided judiciously. At least 2-3 times a day.
- Walls around the cooking station and dust bins should be cleaned at the end of each day.



Figure 3.2.4 Damp Mopping



Figure 3.2.5A common floor cleaner

Cleaning Painted surfaces

- Use a non-abrasive cloth and cleaner (preferably detergent)
- Do not use a rough cleaning cloth as the paint may get scrapped
- Do not use excessively wet cleaner



Figure 3.2.6 Damp Mopping

TIPS for cleaning Grease from walls/floors naturally & effectively

- Create a baking soda grease stain remover by combining one cup of baking soda with one cup of warm water. Apply the paste to the stubborn stains with a cloth and rinse clean with a clean rag.
- Heavy-duty grease can be removed by using a mixture prepared by combining equal parts vinegar and water. Spray the solution directly onto stains and allow it to sit for five minutes. Then, wipe clean with a rag.
- For wooden surfaces, microwave a wet sponge on high for 30 seconds. Next, spray the woodwork with vinegar and wipe it off with a hot sponge.
- For a hefty greasy layer, mix $\frac{1}{2}$ cup of trisodium-phosphate in one gallon of water. Trisodium-phosphate is adequate but not suggested for wood and painted surfaces to remove the shine.
- These solutions can be used for exhaust blades, workstation counters, doors and cabinets very effectively.



Figure 3.2.7 A common disinfectant

HOW TO CLEAN GREASE OFF WALLS



Figure 3.2.8 Clean grease off walls

3.2.4 Disinfection of Walls and Floors

Floors and walls can be potential carriers of germs and microorganisms, leading to contamination. Thus, it is essential to disinfect them from time to time.

Selection of appropriate disinfectant:

- Select the disinfectant based on the type of floor.
- Preferably use disinfectant with mild fragrance in a food facility.
- A disinfectant should be non-corrosive, non-irritating and effective in hard water.
- Should be able to dilute in hot or cold water
- Should not adversely affect the floor finish.
- Finally, a disinfectant should be economical to use.
- How to disinfect walls/ floors?
- Remove dust and bigger wastes before wet mopping and disinfection. Dust, soil or dry waste on the surface can impact the effectiveness of the disinfectant.
- Preferably use a vacuum cleaner to clean dust/soil.
- After wet cleaning, start the process of disinfection.
- Mix the disinfectant with water (dilute it) as per the instructions given on the package.
- Use a clean mop head to disinfect the floor.
- Preferably change the mop head after every room/area.
- Change the disinfectant water if it gets too dirty during the process.
- Put wet floor signage.
- Let the floor and walls dry after applying disinfectant.
- Wash the mop head properly with soap/detergent and dry it before storing.

3.2.5 Problems One Might Face While Disinfecting Floors and Walls:

Problem 1: Layer formation on floor from use of disinfectants.

Solution 1: Dust mop with untreated dust mop prior to damp mopping with disinfectant.

Solution 2: Change disinfectant at recommended times--approximately every three to four rooms.

Problem 2: Dis-colouring of floor tile caused by too strong a solution.

Solution 1: Rinse the floor periodically with clean, clear water.

Solution 2: Use disinfectant at proper dilution



Figure 3.2.9 Problem & Solutions Representation

Exercise



Assessment questions

I. Tick the correct option: (Multiple Choice Questions)

1. The frequency of dry sweeping should be at least:
 - a. Once in a day
 - b. 2-3 times a day
 - c. Once in an hour
 - d. Once in two days

2. What is the feature of a good disinfectant:
 - a. Non-corrosive
 - b. Non-reactive
 - c. Soluble in hot and cold water both
 - d. All the above

II. Mark T (true) or F (false) for the below statements.

1. Automatic scrubbers should be used for large units. _____
2. Dipping the broom in disinfectant is advisable. _____
3. Dry cleaning is not necessary before mopping and disinfecting. _____
4. Disinfectant should be non-corrosive and non-reactive in nature. _____
5. Rough cloth can be used on painted surfaces. _____

III. Answer in short.

1. State some points to be taken care of while dry sweeping the floor.

2. What points should be taken care of while selecting the correct disinfectant for floors?

3. Why is damp mopping necessary?

4. Write some points about scrubbing using detergents.

Exercise: Assignment

Meet any cleaning and sanitation worker of any food processing unit. Take his feedback on the following points:

Question	Answer
1. How do they dry sweep the floor?	
2. Do they use manual cleaning equipment or automatic scrubber?	
3. Which disinfectant do they use for floors?	
4. What protective gears do they use?	
5. What kind of scrubbers are they using?	
6. Are they given any formal training to mop and sweep?	
7. Write your general observations about the cleaning process.	

UNIT 3.3 Cleaning of Office Area, Canteen, Washroom Area etc.

Unit Objectives

At the end of this unit, participant will be able to:

1. Learn the techniques of cleaning toilet – washbasins, fixtures and toilet seats.
2. Understand the importance of drinking water area cleanliness and learn how to keep that area clean.
3. Learn how to keep the pot washing area clean.
4. Understand the still areas and their cleaning.
5. Study how to manage waste in a unit and stop contamination.
6. Study the cleaning of the entrance and service areas and learn techniques to keep the canteen area clean.

3.3.1 Cleaning of the Office Area

Cleaning in a food processing unit does not only mean cleaning the food production area. It involves maintaining other areas in the unit as well. Hygienic surroundings mean happy workers, a healthy environment, and a final product.

1. Toilet and its amenities

Cleaning Wash Basins/ Sinks in toilets

Items Required	Cleaning Sink/Wash Basin	Issues affecting cleaning
<ol style="list-style-type: none"> 1. Spray bottle of cleaner, disinfectant or 2. Synthetic neutral detergent solution 3. Sponge or soft scrubber 4. Wiping Cloths 5. Hand mirror 6. Gloves 	<ol style="list-style-type: none"> 1. Prepare a solution of detergent and water. 2. Assemble equipment and supplies 3. Clear the sink area of soaps and other items. 4. Clean the water drain mesh. 5. Scrub the inside surface and underside surface of the bowl. 6. Wash tap, pipes and other fittings like mirror around the sink. 	<ol style="list-style-type: none"> 1. Detergent /cleaning agent might cause skin irritation if used with naked hands 2. Scratch on the sink and metal taps if a rough scrubber is used. 3. Fear of cuts to the cleaner due to sharp edges of metal fittings. <p>Important Tip</p>



Figure 3.3.1 Cleaning the washbasin is important

7. Rinse and dry bowl
8. Inspect under the rim with a hand mirror
9. Wipe and polish metal fixtures
10. Wash wall area nearby
11. Clean- up
12. Inspect work

Put a drain cleaner agent in the washbasin as per the cleaning routine to keep the drain clean.

(A). Cleaning metal bathroom fixtures like taps, health faucet (jet spray), towel rod etc.

Items Required	Cleaning Sink/Wash Basin	Issues affecting cleaning
<ol style="list-style-type: none"> 1. Wiping Cloths 2. Spray bottle of cleaner disinfectant 3. Glass cleaner solution  <p>Figure 3.3.2 Taps require regular cleaning</p>	<ol style="list-style-type: none"> 1. Prepare a cleaning solution of soap and water 2. Scrub the solution on fittings very gently 3. Wash fittings 4. Wipe to dry 5. Wipe with disinfectant solution (optional)s 6. Polish with glass cleaner and dry cloth 7. Remove hard water deposits or rust with a solution with the appropriate solution. 	<ol style="list-style-type: none"> 1. Detergent /cleaning agent might cause skin irritation of used with naked hands 2. Scratch on the sink and metal taps if a rough scrubber is used. 3. Fear of cuts to the cleaner due to sharp edges of metal fittings. <p>Important Tip Use a sponge to clean the taps. It gives shine and saves the fittings from scratches.</p>

(B). Remove Mold and Mildew from the toilet and bathroom areas

Items Required	Cleaning Sink/Wash Basin	Issues affecting cleaning
<p>Mild chlorine bleach solution Cloths Bucket Sponge Brush</p>  <p>Figure 3.3.3 Mold and Mildew in bathroom</p>	<ol style="list-style-type: none"> 1. Prepare bleach water solution 2. Apply the solution to the area and let it remain for 5 minutes. 3. Rinse with clear water.' 4. Dry 5. Repeat procedure if mould and mildew remain 	<ol style="list-style-type: none"> 1 Skin irritation while handling and use of cleaning chemicals 2 Fume inhalation <p>Important Tip Wear gloves and masks while working to avoid any reaction</p>

(C) Clean toilet seat and Urinals

Items Required	Cleaning Sink/Wash Basin	Issues affecting cleaning
Roundhead brush Sponge or cloths Toilet bowl cleaner (eg. Harpic) Rubber gloves  	<ol style="list-style-type: none"> 1. Flush the toilet (check operation) 2. Put cleaner disinfectant in a bowl, let stand few minutes (use toilet bowl cleaner at least twice a week to remove scales. Doing it every day is highly recommended in scenarios like pandemics) 3. Clean exterior surfaces of the toilet with a sponge 4. Wash the flush tank from the outside and put beaching powder inside the tank if it is dirty from the inside. 5. Polish metal surface with a dry cloth 6. Clean interior surfaces of the toilet with a brush 7. Inspect inner rim with a hand mirror 8. Flush toilet to rinse the bowl 9. Wipe outer part and seat to dry. 10. Mop the floor around the pot to dry 11. Wash the brush properly before keeping back 12. Keep the brush exclusively for pot. Avoid using it for other areas. 	<ol style="list-style-type: none"> 1. Toilet cleaners are highly reactive. 2. Avoid mixing them with any other chemicals 3. Use masks and gloves to stay safe. 4. Use acids to clean rust/hard watermarks. <p>Important Tip</p> <ol style="list-style-type: none"> 1. Never use acid on the seat and flush the tank as it discolours the surface. 2. The tank inside using white vinegar or bleaching powder for cleaning flush is a good idea.

Figure 3.3.4 Cleaning of toilet seat and urinals is very important

Cleaning of washrooms can be recorded in the routine cleaning record, as the unit uses. The cleaner has to update the record after cleaning work is over



WASHROOM CLEANING CHECKLIST

Date	CHECK STOCK <small>AS REQUIRED</small>						CLEAN & TIDY <small>HOURLY</small>					MOP <small>AS REQUIRED</small>	Signed by
	Toilet Paper	Paper Towels	Soap	Hand Lotion	Feminine Hygiene	Air Freshener	Wipe Sink & Fittings	Wipe Mirror	Check / Wipe Toilets	Pick Up Litter	Empty Bins	For Clean Floors	
Supervisor Inspection													
9am													
10am													
11am													
Supervisor Inspection													
12pm													
1pm													
2pm													
Supervisor Inspection													
3pm													
4pm													
5pm													
Deep Cleaning													

Tick box only if an item has been restocked or completed
Report any faulty or broken items to your supervisor as soon as possible

Figure 3.3.5 Sample format of Toilet cleaning schedule

2. Pot washing area

Cleaning the pot washing area is significant as all the utensils like moulds, trays, and vessels finally land up in this area. Poor hygiene of this area may impact this hygiene. Unhygienic utensils mean exposure of food to harmful bacteria and micro-organisms. Pots can be washed in sinks or open broad areas. Sinks for washing pots in units generally has three compartments:

- 1st compartment for putting soap and scrubbing
- 2nd compartment for rinsing and washing
- 3rd compartment for sanitizing or disinfecting the utensils.
- Utensils are then kept in a place for drying



Figure 3.3.6 Pot cleaning area sample view

Generally, these pot washing sinks are made of stainless steel. This is much easier to be cleaned.

How to clean the pot washing sink?

- Remove all the pots and other materials from the sink.
- Take mild detergent/soap and water solution and put it all around the sink.
- Scrub with an abraser or sponge. Please do not use a hard scrubber as it may leave scratches on the steel surface.
- Do not use solid chemical cleaners. A sit may discolour the steel sink.
- Clear the water outlet drain. Check if any solid food material is stuck. If so, remove it so that water does not get blocked.
- Preferably use hot water to help boost cleaning results.
- Wipe with a soft cloth after washing the sink area.
- Also, clean the walls and floors around the sink area.
- Leave it for some time to dry.



Figure 3.3.7 TOP Tips

Keep the following points in mind about cleaning pot washing area:

- Regularly clean this area. Make a cleaning schedule and follow it strictly.
- Figure 3.3.7 TOP Tips
- Do not let the soiled utensils keep lying in the area for long.
- Wash the area with detergent, scrubber and brush after the pot washing process is over.
- Do not use harsh disinfectants in this area as they might contaminate the utensils and pots.
- Check that the drains are not choked and the drain mesh is clean always.
- Put drain cleaner from time to time to keep it clear.
- Mop and wipe off the extra water from this area to dry it thoroughly after use.

3. Drinking Area

Drinking Area the drinking area is the primary utility area of any unit. Every individual comes here and has direct contact. Therefore, poor hygiene in this area can affect water quality and the employee's health.



Figure 3.3.8 Drinking water area is basic utility in any company

The drinking area may be any of these:

- Water purifier machine

- Water canister
- Filter and dispenser

How to keep this area clean:

- Internal cleaning of the water purifier or water dispenser is the job of the maintenance company.



Figure 3.3.9 Drinking water area should be maintained clean

- A cleaner is responsible for maintaining cleanliness around the purifier/filter and dispenser.
- Wash all the pots like canister, glasses and water storage pots regularly. Use mild soap and rinse well to determine that no soap residue is left. This might contaminate the drinking water otherwise.
- Mop the area around the water dispenser. This is to avoid accidents due to slipping and falls
- Wipe the water dispenser and filters from outside to remove any dust or dirt layer.
- Do not let the water accumulate as it might lead to the breeding of insects and mosquitoes.

4. Still areas

Still, areas include lobby and staircase. It has to be cleaned everyday using manual or mechanized systems. For huge lobbies, it is advisable to use mechanical scrubbers or else manual mops and brooms work well. The lobby area is subject to the most wear and tear. The lobby floor has to experience foot walls and the effects of snow, rain, sand or mud. Trolleys and equipment also roll through lobbies all day.

There can be a different ways of cleaning the lobby and staircases:

Day Cleaning:

- The following activities are carried out during the day cleaning operations:
- Removing all debris from a lightweight basket.
- Cleaning of the entrance throughout the day. Mopping and dusting the entrance should be carried out regularly throughout the day.
- Emptying of wastebasket as and when required during the day.

Overnight Cleaning:

Most of the cleaning activities in the lobby are carried out during the night when traffic is low.

The night cleaning activities include the following:

- Dusting, vacuuming and cleaning of stairs.
- Vacuuming cleaning of all carpeted areas (if any).
- A dusting of all furniture and front office area.

- Polishing of all elevator's floors and walls.
- Cleaning of all glass surfaces/mirrors.
- Removing of fine marks and spots from walls and woodwork.
- Polishing of metal handles, rails and doorknobs.



Figure 3.3.10 Still areas like hallways, stairs, and lobbies require deep cleaning

Waste disposal area

This area has the most considerable chances of spreading contamination and microorganisms. Therefore, maintaining the cleanliness of this area is a challenging task.

A waste disposal area would typically have the following things:



Figure 3.3.11 Colour coded dustbins are used based on category of garbage

- Dust bins- wet and dry waste bins Figure 3.3.11 Colour coded dustbins are used based on category of garbage
- Garbage bags/ sacks for collecting garbage and giving for disposal
- Garbage disposal machines (found in big units for automatic disposal of garbage)



Figure 3.3.12 Cleaning the dustbin and the area around it is an important job of cleaner

Following things should be kept in mind for cleaning garbage disposal facility:

- Follow the standard procedure fixed by the company for waste disposal and cleaning.
- Clean the garbage disposal area every day. At least two times is most preferable.
- Use soap and water to wash the area and sanitize it properly after drying.
- Deep cleaning of the area should be done once a week.
- Clean the walls and floor in the garbage area regularly. They attract maximum bacteria and germs.
- Keep a watch that garbage is appropriately segregated. Wet in 'wet waste bin' and dry garbage in 'dry bin'. This helps in proper waste disposal.
- Do not let the garbage overflow. Change the bag as soon as one gets filled.
- Empty the dustbin regularly
- Remove the full plastic liner from the dust bin, seal/tie the opening and give for disposal.
- Check that wet waste bin is always covered with a lid to save surrounding from infection, insects and foul smell
- Wash the bins every time they are emptied.
- Preferably clean daily. Remove lid and wash bucket as well as the lid.
- Wash with regular soap and water. Use a dedicated scrubber for this purpose.
- Let it dry before reuse.
- Spray disinfectant to kill all types of microorganisms. (optional)
- Put the plastic liner again to make it ready for use.



Figure 3.3.13 Cleaning the dustbin

5. Storage Areas

Dirty storage areas mean toxic food ingredients and massive wastage for the company. Therefore, cleaners have to be very cautious while cleaning food storage areas.



Figure 3.3.14 Storage area includes floors as well as shelves for stocking stuff

Following steps to be followed for cleaning the storage rooms:

- Follow the cleaning schedule set by the company.
- Do not remove or keep any material in the storage area without knowing the inventory in charge. This can affect the inventory list.
- General cleaning like dry sweeping should be done every day. However, deep cleaning should be done at least once a fortnight (15 days).
- Deep cleaning involves removing all the material from the storage room
- Dry clean the room.
- If pests and rodents are noticed, immediately report as pest control must be exercised. (In case of pest control, wipe all the shelves before stocking and ensure proper ventilation before stocking)
- Washing the floor and shelves with soap water. The direction of putting soap and washing should be up to down.
- Scrub tightly if any heavy grease or soil is noticed.
- Check that ventilation is not blocked during the cleaning operations.



Figure 3.3.15 Top Tips

- Vacuum clean the ventilators too.
- Let the shelves and floor dry.
- Sanitize and disinfect the storage room. Leave it closed and unused for some time after sanitizing.

After sanitization is over:

- Open the doors and let fresh air pass in the storage area. (Do not keep the doors open if the storage area is refrigerated.)
- Wipe the shelves and place the stock as per the inventory list.
- Follow the instructions of the inventory incharge while re-stocking the stock.
- Report immediately if anything unusual is noticed, like missing stock or rotten stock.

6. Serving Areas

Serving areas are the actual image builders. Customers are exposed to this area, and thus its cleanliness makes a long-lasting impression on the customer.

- Points to be considered:
- These areas should be cleaned before regular customer footfalls start.
- Dry sweep, wet mop, and sanitize the area regularly.
- Furniture, tables, chairs, and other articles like statues and flower vases should be sparkling clean to catch the customer's immediate attention.
- Remove all items from the table and clear loose debris from and under the table.
- Spray cleaning solutions (in standard cases soapy water) and clean with a soft, lint-free cloth.
- Spray some disinfectant in the cloth and wipe the table and chair.
- Avoid repetitive use of disinfectant as it may cause the surface to become sticky.
- If you have to put the table cloth, ensure clean.
- Put back all the accessories on the table like a flower vase, tissue holder etc.
- These articles should also be cleaned as per the prescribed method, based on the type of material.
- Before closing the serving area, wipe all the tables and chairs with warm water to remove any sticky or greasy material from the surface.
- While mopping and dry cleaning the serving area, remove all the movable items and clean.
- Ensure proper cleaning of the ventilators, windows and counters.
- Disinfect the serving area as per the schedule of the unit/restaurant.
- They might disinfect the serving area every night before closing so that the disinfectant can rest during the night. Then, the area can be wiped in the morning and ready for use again.

7. Entrance area

- Entrance areas need deep and continuous cleaning.
- Dust, germs and soils can quickly enter the premises from the entrance area.

- The cleaning person has to fix a schedule for entrance cleaning and strictly adhere to it.
- People have to continuously watch this area and keep repeatedly cleaning as people enter and exit.
- Doormats and flooring are essential parts of the entrance. One doormat or runner should be placed just outside the entrance, and another must be placed just inside the entrance.

Cleaning points to be kept in mind:

- The doormats and runners must be vacuum-cleaned daily to remove dust and soil.
- In the rainy season and during times of heavy traffic (such as in the high season), cleaning the mats twice a day or even more often may be called for.
- The floor at the entrance has to be mopped frequently throughout the day.
- Plants at the entrances (if any) should be watered when required.
- Glass doors should be cleaned twice a day, and where public traffic is high, the frequency of cleaning may have to be even three or four times daily.
- A glass-cleaner agent or a vinegar-and-water solution may be used for glass not too soiled. Spray the solution and wipe with any glass cleaning cloth.
- Dirt, grease, and other hand/shoe marks on the door frames should be damp, cleaned with an alkaline detergent and water and re-wiped with clean water to remove all traces of the detergent.
- Wooden doors should be damp-dusted once daily. A neutral detergent should be used with water for damp-dusting once a week to avoid the build-up of layers of dust.
- Brass knobs and handles should be polished weekly, and in the case of lacquered brass, only damp-dusting is sufficient.
- Lights and lighting fixtures should be checked daily and cleaned weekly.



Figure 2.3.16 Entrance needs a special cleaning routine

- Put 'Cleaning in Progress' signage
- Move out of chairs, tables,
- Remove all bits on the seat and back of the chair using a whisk broom or a vacuum cleaner.
- Spot clean any stains using suitable detergents.
- Perform damp dusting of all furniture, polishing of wooden furniture at regular intervals.

- Wipe all glass surfaces with a proprietary glass cleaner.
- Wipe of window ledges, tables legs, metal floor vents with a damp cloth.
- Dust and polish metal chairs to remove finger marks from chrome fittings.
- Clean and check lighting and other fixtures.
- Clean and wipe dry the floors.
- Remove the signage

During the day, the cleaning activity is limited to cleaning tables and picking up debris using a small broom and dustpan. During the day, the primary assignment of the day shift is to keep the restaurant floors as neat as possible.

Exercise



Assessment questions

I. Tick the correct option: (Multiple Choice Questions)

1. Toilet cleaning involves cleaning of:
 - a. Washbasin
 - b. Taps and fixtures
 - c. Urinals
 - d. All the above

2. Following items can be used for cleaning the organically flush tank:
 - a. White vinegar
 - b. milk
 - c. bleaching powder
 - d. only a. and c.e

II. Mark T (true) or F (false) for the below statements.

1. Deep cleaning of the entrance and lobby is possible only during night hours. _____
2. A Roundhead brush is best for toilet seat cleaner. _____
3. Using a foot mat is not required at the entrance. _____
4. Cleaning of the lobby is not required daily. _____
5. The area around drinking water can be left wet. _____

III. Answer in short.

1. State some points to be taken care of while cleaning the toilet seat.

2. What points should be taken care of while cleaning the unit's entrance?

-
-
3. How to keep the garbage area clean?
-
-
-
-

Exercise: Observation-based Assignment

Observe any food processing unit/ restaurant and note the following:

Question	Answer
1. How many types of dustbins are in use?	
2. Are there foot mats outside and inside the entrance?	
3. Are plastic bags used for garbage disposal?	
4. What items are kept in the lobby area?	
5. What kind of cleaning equipment is cleaning the entrance and lobby?	
6. Write your general observations about the cleaning of the unit.	

Unit 3.4 Carry Out Post-Cleaning Activities

Unit Objectives

At the end of this unit, participant will be able to:

1. Learn to take stock of cleaning supplies and accessories required for cleaning
2. Understand the various records used during cleaning operations like reporting spots and damages, recording cleaning functions, reporting lost and found, reporting maintenance requirements, etc.
3. Learn the techniques to clean and store various cleaning tools and equipment.
4. Study various chemicals and dos and don'ts of using the chemicals for cleaning.
5. Understand the importance of communication, etiquette and punctuality at the workplace.
6. Learn the significance of problem-solving and prioritizing tasks while working.

3.4.1 Taking Stock of The Supplies and Accessories Required for Cleaning

'Taking Stock' is another way of saying stocktaking. It is a process of counting the amount of stock available for cleaning service. A cleaning worker is issued some cleaning material by the stores or inventory department.

The items issued are based on:

- Areas to be cleaned by the cleaner
- Depth of cleaning needed
- As per the SOP (Standard Operating Procedure) of the unit
- A cleaner should take care of the supplies and accessories given to him. He should:
 - Count and check the items
 - Report if any leakage damage to the equipment is noticed or any item from the list is missing
 - Keep the supplies safely in the assigned area (Janitor's Room), correctly and neatly. For example, if the worker has got a cleaning trolley (janitor trolley) or cleaning caddy, arrange the items safely in there.
 - Use the items as defined in the SOP of the unit.
 - Judiciously use the items. Wasting or overusing any item should be avoided.
 - Keep updating the inventory about finishing any item and intimate the requirement in advance for procurement of it.
- Written formats can be made and maintained if required by the unit. Every company can have a unique format for recording the issue of supplies.

Cleaning Supply Record sheet					
Cleaner 's Name: MrXYZ			Cleaning Area: Toilet		
Item issued	Inventory Code number	Date of Issue	Details of item	Signature of receiver	Signature of issuer
Bleaching Powder	BPX011	21/01/2021	Packet wt: ½ kg		
Glass cleaner spray	GCX 023	21/01/2021	250 ml		

Table 3..4.1 Sample of Cleaning Issue supply sheet

Cleaning Supply Requisition Sheet				
Cleaner 's Name: MrXYZ		Date :	Cleaning Area: Toilet	
Item required	Inventory Code number	Date of last Issue	Details of item	Signature of Cleaner
Bleaching Powder	BPX011	21/01/2021	Packet wt: ½ kg	
Glass cleaner spray	GCX 023	21/01/2021	250 ml	

Table 3.4.2 Sample of Cleaning Issue supply sheet

A cleaner may have to fill requisition form to get any item from the store. One sample of the same can be seen in table 3.4.2.

3.4.2 Recordkeeping and Documentation

Though much documentation is not expected as a cleaner, minimum record-keeping is expected. A record can be maintained in the formats developed by the unit. It can be filled in language easily understandable by the cleaner.

1. Report any marks or spots that cannot be cleaned

Though the cleaner is expected to clean the area thoroughly, there could be some spots or locations he cannot clean due to technical and physical limitations. He is supposed to inform the supervisor about what to do due to arrangements for cleaning. The reasoning for the inability to clean the area or device should be logical and acceptable. Some spots or things cannot be cleaned as they may require technical assistance or the cleaning equipment is unavailable.

Some formats can be used to do the same.

Special External Cleaning Request			
Name of the cleaner: MrXYX		Area of Cleaning: Store Room	
Name of area/facility/equipment requiring exceptional external service	Reason	Suggested action	
Air Conditioner Duct	Internal cleaning requires technical know-how	Request for scheduled cleaning from A.C. servicing agency	

Table 2.4.3: Sample of Special Cleaning Request

2. Report maintenance requirements

- A cleaner is responsible for the cleanliness and maintenance of the area allotted to him.
- It is his responsibility to share any notable observation regarding improper functioning, service requirement etc., with the higher authorities.
- If any area or equipment is due for maintenance, the cleaner must inform the supervisor on time.
- This will help timely action towards the requirement.
- Timely maintenance can save machines from wear and tear.
- Information can be conveyed verbally or in writing if the unit makes any format. There could also be a register for noting such observations and requirements.

Special Maintenance Requirement Record			
Name of the cleaner: MrXYX		Area of Cleaning: Store Room	
Date: 20/12/21			
Name of equipment requiring Maintenance	Due date of Maintenance	Date of the last service	Special Remark
Air Conditioner	25/12/21	25/12/20	Annual Maintenance

Table 3.4.4: Sample of Special Maintenance Requirement

3. Report Lost and Found Property

- Integrity and honesty are essential requirements to be a good worker.
- Pay attention to the cleaning area allotted closely.

- If any item is found missing or not in records is found, both the cases have to be reported to the supervisor.
- If any, always record information in lost and found records to avoid discrepancies later.
- Units may have their formats to do so.
- Generally, a lost and found register is maintained.
- All the items found under this category are put safely in a nominated place to make searching easy.

Lost and Found Ticket	
Facility Name _____	Today's Date _____
Item Description _____	

Location found _____	Room Number _____
Name of finder _____	
Supervisor who received item(s) _____	

DISPOSITION OF PROPERTY	
Date item returned to owner _____	
Owner Name _____	Owner Address _____
Owner Telephone _____	_____

Figure 3.4.2 Lost and found format

3.4.3 Clean and Store the Tools, Equipment and Process Auxiliaries as Per Organizational SOP

Tools are the most critical assets for any cleaner. A good cleaning is a result of good maintenance of tools. Different cleaning routines are followed for different types of equipment based on their usage and contact with the food area. For example, a broom will not be cleaned after every use. However, a tank brush used to clean the interior of a batch tank should be cleaned and sanitized before and after each use.

- Proper care of all dust removal tools should be taken to maintain the life of the equipment and eliminate cross-contamination.
- Wet/dry vacuums should be cleaned internally and externally daily with a disinfectant and when contaminated with any fluid after each use.
- Disposable dust mops should be discarded when thoroughly soiled.
- Washable dust mops should be washed daily.
- A routine of changing mops after a certain number of rooms should also be adopted.
- Automatic scrubbers should be cleaned daily by running a disinfectant solution through the machine. Pads or brushes should also be cleaned in disinfectant for 10 minutes and air dry.
- Tools should be colour coded and stored separately for avoiding cross-contamination.



Figure 3.4.3 Colour coding the equipment according to their usage area

- Tools should be adequately dried after washing.
- Brushes, brooms and squeegees should be stored in wall brackets and should not touch the walls or other cleaning tools while drying or while being stored.

Storage of the cleaning equipment:

- Store in a clean, cool and dry space.

- Store in well-ventilated areas.
- Store no higher than eye level and never on the top shelf of a storage area.
- Do not overcrowd shelves and include anti-roll lips to avoid falling containers.



Figure 3.4.4 Storage of cleaning equipment should be planned and neat

3.4.4 Prepare and Maintain Cleaning Reports and Documents

- A sanitation worker must record the cleaning activity in the log as per the organization's format.
- Record is like a checklist of his completed work and what is yet to be done.
- It help is in understanding the routine of cleaning operations and shows that the cleaner is doing his job correctly.
- Also, where there is work in shifts system followed record help make other people understand the work already done and work to be done.
- Every organization develops its cleaning record sheet. Most common are the toilet cleaning schedule and checklist.

Cleaning Check List	Regular	First Time or Spring Clean	move-in /move-out	Special Project
General				
• Sweep and mop all hard floors	X	X	X	
• Dust all furniture	X	X	X	
• Dust baseboard	X	X	X	
• Dust window sills and ledges	X	X	X	
• Remove all trash	X	X	X	
• Remove all cobwebs	X	X	X	
• Clean wood shutters		X	X	
• Spot clean walls		X	X	
• Clean all doors			X	
• Wet clean front door and light fixtures at the door			X	X
• Clean inside every cupboard and drawer			X	X
• Clean inside every closet and closet shelves			X	X
• Sweep all patios and decks			X	X
Kitchen				
• Clean and sanitize sink and counter tops	X	X	X	
• Clean outside of appliances	X	X	X	
• Clean inside of microwave	X	X	X	
• Clean range	X	X	X	
• Disinfect floors	X	X	X	
• Wet-clean all cabinet fronts		X	X	
• Clean oven			X	X
• Clean inside of refrigerator			X	X
Bathroom				
• Clean and sanitize sink and counter tops	X	X	X	X
• Clean and sanitize shower and/or tub	X	X	X	
• Clean mirrors	X	X	X	X
• Disinfect bathroom floors	X	X	X	X
• Clean and disinfect in and around toilet and sink	X	X	X	X
• Wet-clean all cabinet fronts		X	X	X

Table 3.4.5 Sample Cleaning checklist

Manual Dishwashing Procedure

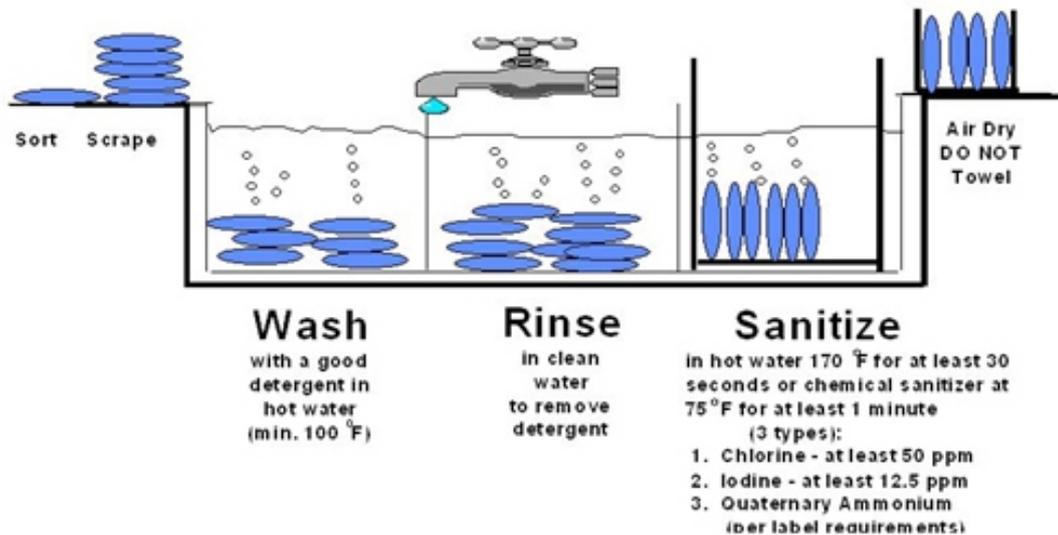


Figure 3.4.8 Sample SOP for washing utensils in 3 compartment sink

There can be SOPs for different operations.

3.4.5.1 Cleaning and Sanitation as Per the Type of Surface and Equipment Used in the Food Processing Facility

There are different specifications regarding the cleaning of different surfaces. Either they can be based on the type of surfaces like:

- Steel surface- can be easily cleaned with detergents
- Aluminium surface- highly reactive and corrosive with excessive exposure of acidic/alkaline. Avoid using abrasives and bleaching agents.
- Plastic- subject to breakage, melting and discolouring due to acidic cleaning agents and high temperatures.
- Soft metals' like copper, brass or mild steel can get discoloured and highly reactive to chemicals.

Example of SOP for Food-Contact Surfaces

Areal Equipment/ Item	Frequency of Cleaning	Cleaning Agents, Summary of Procedures
All food and handcontact surfaces.e.g. Cutting boards Knives Stainless steel tables Other preparation surfaces Internal surfaces of microwavesmeat slicers Planetary mixers Blenders Other food equipment Fridge and other handles Controls and switches Can opener Food containers Cutlery Plates and cups Door handles, Hand washbasins &taps Sinks and draining boards, Wall near food prep surfaces Other site-specific surfaces (Specify below)	Clean as you Go	Use either a sanitiseror a detergent and disinfectant Store, prepare, use and rinse all such cleaning agents following the manufacturer's instructions. Electrical items must be switched off and unplugged before cleaning and reassembling. Dangerous machinery must ONLY be cleaned by Staff specifically trained to do so.If in doubt, ask.

Remember: The above items and surfaces must be cleaned at the frequency and using the abovementioned chemicals. After cleaning, all surfaces must be visually free from grease and food debris, having used and rinsed the above cleaning agent(s) following the manufacturer's instructions. Paying particular attention to dilution rates and contact times. Site management must produce their cleaning schedules if they are not used. It is recommended that this schedule be laminated and displayed in the processing facility and office. The separate cleaning log must be used and signed daily.

Table 3.4.7 SOP for Food-Contact Surfaces

Example of SOP for Non-Food Contact Surfaces

Area/ Equipment/ Item	Frequency of Cleaning	Cleaning Agents, a summary of Procedures
All Non-food-contact surfaces, including: <ul style="list-style-type: none"> • Table legs • Other outer surfaces of refrigerators,freezers, ovens and microwaves etc. • Shelving used only for wrapped/low-risk food and cupboard • Similar storage areas etc. 	As required, but a minimum of weekly	<ul style="list-style-type: none"> • Detergent and hot water • Store, prepare, use and rinse all cleaning agents following the manufacturer's instructions

Remember: The above items and surfaces must be cleaned at the frequency and using the abovementioned chemicals. After cleaning, all surfaces must be visually free from grease and food debris, having used and rinsed the above cleaning agent(s) following the manufacturer's instructions, paying particular attention to dilution rates and contact times. Site management must produce their cleaning schedules if the above is not used. It is recommended that this schedule be laminated and displayed in the kitchen and office. The separate cleaning log must be used and signed daily.

Table 3.4.8 SOP for Non-Food-Contact Surfaces Source: Black Country Partnership, NHS Foundation

3.4.5.2 Selection of Chemicals and Using Them Safely During Cleaning

Type	Uses	Hazards	Examples
Strong alkali	Dissolves grease and protein deposits; destroys microbes	Corrosive burns skin and lungs	Sodium hydroxide (caustic soda), potassium hydroxide
Medium alkali	Removes fat, grease, lacquer, paint	Slightly corrosive	Sodium carbonate (wash soda)
Mild alkali	Removes minor soils, softens water		Sodium bicarbonate
Strong acid	Dissolves surface mineral deposits	Corrosive to concrete, metals, fabric, and skin	Phosphoric and hydrofluoric acids
Mild acid	Controls mineral deposits, softens water	Slightly corrosive	Acetic acid, gluconic acid, levulinic acid
Solvent	Dissolves grease and oil	Flammable*, reactive*	Acetone, D-limonene
Soaps and detergents	Emulsifies fat, oil, and grease		

*Property varies with solvent type

Table 3.4.9 Different types of chemicals can be used for different types of dirt and soils Table Credit: Cole-Parmer

Chemical safety do's

- **Store chemicals away from food storage and contact areas.** If stored incorrectly, chemicals can quickly get into food or spill onto food-contact surfaces. A separate area should be used for chemical storage to ensure your food and equipment stay safe.
- **Label all chemicals clearly.** If chemicals are mislabelled or hard to read, it can be challenging to know what they should be used for. If you find a chemical container without a clear label, discard the chemical appropriately.
- **Follow the manufacturer's instructions for chemical use.** It is essential to follow the instructions for each chemical. If too much or too little of the chemical is used, the chemical can be dangerous.
- **Wash your hands after handling chemicals.** Chemicals can get on your hands, and you could spread them if you do not properly wash your hands. Be sure to keep yourself and others safe by washing your hands after handling chemicals.

Chemical safety don'ts

- **Do not clean or use chemicals near food.** Chemicals can quickly get into the food if they are near it. Keep them separate and protect your food from contamination.
- **Do not mix chemicals.** Chemicals can become more dangerous, and unexpected results can happen if mixed chemicals. Instead, follow the manufacturer's instructions and use chemicals correctly.
- **Do not put used or spilt chemicals back into the original container.** If a chemical is spilt, it may react with unknown components on the surface it was spilt on. To keep your chemicals fresh and safe, discard spilt chemicals properly.
- **Do not use a chemical container to store food.** Containers used for chemical storage can still have toxic materials, even if they appear clean. If you put food in them, your food may become toxic. Discard chemical containers properly and use only food-grade storage containers to store food.

Table 3.4.10 Safety Do's and Don'ts for Cleaning Agents

Exercise



Assessment questions

I. Tick the correct option: (Multiple Choice Questions)

1. SOP stands for:
 - a. Standing above partition
 - b. Standard operating procedure
 - c. Standard operation of payments
 - d. None of the above.

2. Which of the following form the part of etiquettes in a workplace:
 - a. Coming on time
 - b. Following dress code
 - c. Talking politely to your co-workers
 - d. All the above

3. Which of the following is strictly no-no when handling chemicals?
 - a. Mixing two chemicals
 - b. Labelling the chemicals
 - c. Keeping away from reach of children
 - d. Wash your hands after using the chemicals

4. Why is SOP made?
 - a. So that workers can know how to do a specific task.
 - b. Save time
 - c. Help achieve task objectives
 - d. All the above

II. Mark T (true) or F (false) for the below statements.

1. Communication is the process of exchanging thoughts. _____
2. If you wear gloves, there is no need to wash your hands after using chemicals. _____
3. Avoid using abrasives and bleach on the aluminium surface. _____
4. Disposable dust mops should be discarded when thoroughly soiled. _____
5. Timely maintenance can save machines from wear and tear. _____

III. Answer in short.

1. How can you improve your professional development? Suggest some points.

2. What steps should a worker follow in a company to maintain personal hygiene?

3. How should the worker safely store the chemicals in the unit? Suggest some points.

4. As a cleaner, how will you take stock of the supplies? How will you determine that no wastage is done?

Exercise: Observation-based Assignment

Question	Answer
1. If you find that your co-worker is not working correctly, how will you communicate?	
2. What are different ways to carry out dry cleaning of the food processing unit?	
3. Find some essential words related to cleaning and sanitation. Then, write them and practice pronouncing them, e.g. Janitor Trolley.	

Scan the QR Codes to Watch the related Videos

Cleaning procedures of equipment, furniture and fixtures in food premises



Cleaning and Disinfection



Cleaning & Sanitation

Key Learning Outcomes

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

1. Identify the hazards, types of hazards (Physical, chemical, biological and Allergenic) and risks at workplace
2. HACCP, TACCP, VACCP, Control measures, CCP, Critical limit
3. Explain the preventions of product contamination
4. Discuss the factors affecting food spoilage and food storage techniques
5. Describe Schedule IV requirements of FSSAI
6. Discuss cleaning and sanitization process, needs and importance and storage of sanitizing materials
7. Discuss health and safety policies and procedures
8. Discuss Employee health do's and don'ts, Food borne illness and preventive health checkups

UNIT 4.1: Introduction to Food Safety

Unit Objectives

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

1. Identify types of hazards and risks at work place

4.1.1 Food Safety

Food safety refers to routines in the preparation, handling and storage of food meant to prevent food borne illness and making food safe for human consumption. Safe food handling practices and procedures are thus implemented at every stage of the food production life cycle in order to curb these risks and prevent harm to consumers.

4.1.2 Food Safety Hazard and Risk

Hazard is a factor or agent which may lead to undesirable effects like illness or injury in the absence of its control, whereas, risk refers to the probability that the effect will occur.

Hazard is that part of food which somehow entered in the food and which is non-consumable.

Types of hazards and risks at work place

There are two types of hazards: one is food safety hazard and second is health safety hazards.

Food Safety Hazard

There are four major hazards that may be introduced into the food supply any time during harvesting, processing, transporting, preparing, storing and serving food. These hazards may be microbiological, chemical, physical and allergens.

Microbiological hazards

When harmful microorganisms are found or grown on food it is called microbiological hazards. Food which contains harmful or pathogenic bacteria when eaten can make people ill.

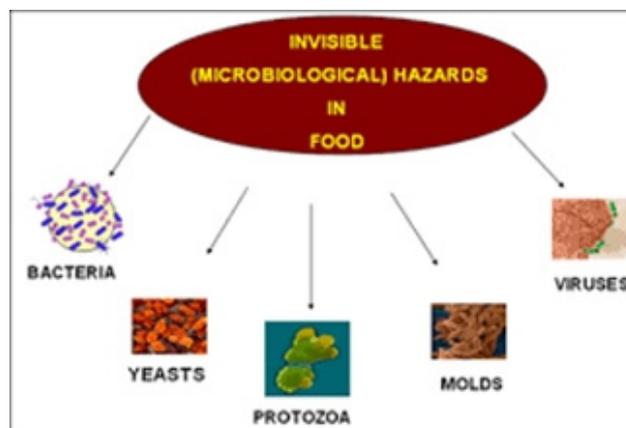


Fig. 4.1.1: Microbiological Hazards

Food spoilage and deterioration is no accident. It is a naturally occurring process. To understand how to maintain the quality of food and prevent spoilage, we need to know what can cause it.

Food spoilage: The microorganisms that can cause food-borne illness are called pathogenic microorganisms. These microorganisms grow best at room temperatures (25-30°C), but most do not grow well at refrigerator or freezer temperatures. Pathogenic microorganisms may grow in foods without any noticeable change in odor, appearance or taste. Spoilage microorganisms, including some kinds of bacteria, yeasts and molds, can grow well at temperatures as low as 4°C. When spoilage microorganisms are present, the food usually looks and/or smells awful.



Fig. 4.1.2: Food Spoilage

FAT TOM- This is a term used commonly in food industry to describe the six favorable conditions required for the growth of the food borne pathogens/micro-organisms.

FAT TOM - FOOD SAFETY

F **Food:** Microorganisms need a constant source of nutrients to survive, especially protein. Moist, protein-rich food (raw meat or seafood, cooked rice or pasta, eggs, and dairy products) are potentially hazardous.

A **Acidity:** Bacteria grow best in an environment that is slightly acidic or neutral (pH level of 4.6-7.5) and they flourish in a pH range between 6.6 and 7.5.

T **Time:** Food should not remain in the temperature danger zone (40°F - 140°F) for more than 2 hours, and either be cooled or heated.

T **Temperature:** Bacteria grow best at a temperature range of 40°F to 140°F - which is referred to as the "temperature danger zone".

O **Oxygen:** Almost all foodborne pathogens are aerobic, that is, requiring oxygen to survive and grow.

M **Moisture:** Water is essential to bacterial growth. Microorganisms grow faster in food with high water content (meats, produce, and soft cheeses).

FAT TOM is a mnemonic device used in the food service industry to describe the six aspects that contribute to the growth of foodborne pathogens. With the proper control of these aspects, the chance of food illness is reduced.

Fig. 4.1.3: FATTOM Food Safety

Physical Hazards

These include any foreign material, which you would not expect to find in your food. Hair, finger nails, pieces of wood, metal, plastic, glass and insect debris are examples of what can find their way into food as foreign matters.

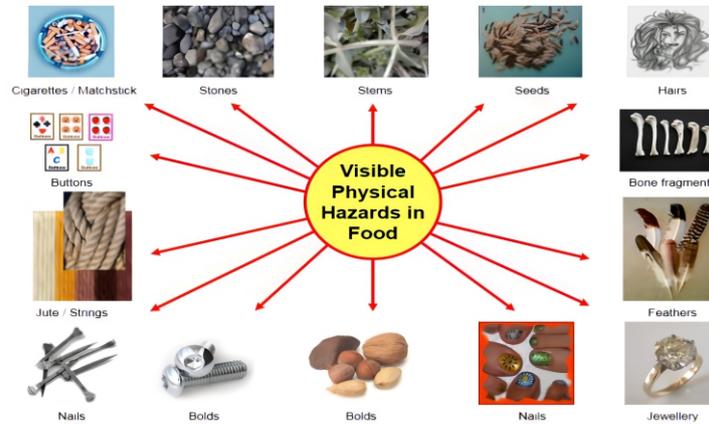


Fig. 4.1.4: Physical Hazards

Chemical Hazards

Chemical hazards include, food contact materials, cleaning agents, pest control substances, contaminants (environmental, agricultural and process e.g. acrylamide), pesticides, biocides and food additives. They are naturally occurring, intentionally added or unintentionally added.

- Preservatives
- Colours and dyes
- Flavour enhancers
- Water additives
- Packaging materials
- Processing aids

Allergen

An allergen is any protein that is capable of producing an abnormal immune response in sensitive segments of the population.

A known component of food which causes physiological reactions due to an immunological response (e.g.- nuts, gluten, egg, ,milk etc, identified in legislation relevant to country of production or sale)



Fig. 4.1.5: Allergens

It is important to be aware of food allergens in food industry as this is the risk associated with the unintended presence of allergen due to cross contamination and should take this a matter of serious concern. Food allergies can cause serious and even deadly reactions.

What Are the Most Common Food Allergens?

There appears to be eight common allergens accounting for most food allergic reactions. They stand to be- milk, eggs, peanuts, soya, wheat, tree nuts (like walnuts and cashews), fish and shellfish (such as shrimp).

What Are the Signs & Symptoms of a Food Allergy?

The common sign and symptoms are: trouble breathing; coughing; hoarseness; throat tightness' belly pain' vomiting' diarrhea' itchy, wateru, or swollen eyes; red spots; swelling, a dropi in blood pressure and is capable of happening because a person can't digest a substance, such as lactose.

Handling of Allergenic Foods:

The common sign and symptoms are: trouble breathing; coughing; hoarseness; throat tightness' belly pain' vomiting' diarrhea' itchy, wateru, or swollen eyes; red spots; swelling, a dropi in blood pressure and is capable of happening because a person can't digest a substance, such as lactose.

4.1.3 Contamination, Cross Contamination and Prevention

Contamination: The presence of unwanted materials such as dust and particles during the manufacturing and transportation time is called contamination. The term contaminants include any unwanted matter that is found in the product. These contaminants affect the quality of the product or the process.

The most common types of contaminant include:

- Physical contaminant Examples: fiber material, particles, chips from your pill press tooling.
- Chemical contaminant. Examples: vapor, pesticides, grease. detergents, and so on.
- Biological contaminant Examples: fungus, bacteria, virus.

Cross contamination is possible when the unwanted matter is introduced or brought from one process to the next during manufacturing.

A leak in the holding containment would contaminate the product inside it; this would be an example of physical contamination.

Certain metals standing to be more advantageous to health, like iron, appearing to be globally added to some foods, involving infant formulas as well as breakfast cereals, to highlight their dietary advantages.

For biological contamination, bacteria may thrive if the container is not properly cleaned and dried. The contaminated container will then affect the product and microbes may thus be introduced to the batch.

Prevention of Contamination:

- Determine the cause of the contamination
- Anticipate the effect
- Eliminate the source material

- To remove the contaminant carrier:
 - Reduce human involvement
 - Regulate the use of the equipment
 - Regulate the use of air
 - Regulate the use of water
- To reduce human carrier risk:
 - Ensure that proper attire is worn when coming and going from the production area
 - People frequently touch their eyes, nose, and mouth without even realizing it. Germs can get into the food through their contaminated unwashed hands.
- To reduce water as carrier:
 - As water is the number one source for cross contamination, it is important to reduce and prevent water contamination
 - Water borne contaminants: particulates (such as minerals) and pathogens (e. coli, salmonella, etc.)
 - Use of preventive measure such as filtration devices, distillation or reverse osmosis, UV treatments
- To reduce air as carrier:
 - Control air flow through AHUs (Air Handling Unit)
 - Use of air locks
 - Installation of HEPA (High Efficiency Particulate Absorbing Filters) filters
 - Ultra-Low Particulate Air

4.1.4 Storage (Importance of Storing Food at Specified Temperature)

Storage temperature is one of the most important factors in the preservation of food because microorganisms have been found to grow in almost all temperature.

Food storage is a major issue when keeping food safe. Food which is not correctly stored can spoil or become contaminated, which can make people sick. There are very specific rules regarding the temperatures that food must be stored at, cooked to and reheated to and if not followed, the risk of becoming ill as a result of contamination increases.

Room Temperature Food Storage

Keep dry storage areas clean with good ventilation to control humidity and prevent the growth of mold and bacteria. 21°C is adequate for dry storage of most products. One of the first things to check regarding food which has been stored in the 'use-by' or 'best-before' dates printed on the packaging.

These dates will give you the most accurate indication of a food's shelf life, however, when a packet or can is opened, the expiry date almost always changes.

Refrigerating and Freezing Food

To reduce the risk of bacterial contamination, many foods must be stored in the refrigerator and thus kept below 5°C. These foods are often classified as 'high-risk foods' and include – meat, poultry, dairy,

seafood, eggs, small goods and cooked rice and pasta. This also refers to ready-to-eat foods that have high-risk foods as ingredients and include – casseroles, quiche, pasta salad, pizza, sandwiches and many cakes.

By keeping these high-risk foods under 5°C it stops them from entering the ‘danger-zone’ – temperatures between 5°C and 60°C. The danger-zone is the temperature zone which provides bacteria with the perfect environment to rapidly grow and multiply to numbers that cause food poisoning.

By freezing food its longevity is increased because the water content of the food freezes – this prevents bacteria from multiplying and food spoiling. Food should be kept frozen at –18°C; when thawing, it should be stored in a refrigerator that reaches no more than 5°C until it is ready to be prepared.

4.1.5 Transportation

Selling fresh and high-quality produce is essential in groceries and retail food businesses. That’s why the transport and storage of foods is so important, and refrigerated transport is essential to achieve this.

Refrigerated Transportation

Refrigerated transportation is a shipping cargo with advanced temperature adjustment features. It is built and designed mainly for climate-sensitive goods such as vegetables, fruits, meat, all-prep meals, bread, etc. in which the freight is loaded with ice and salt to maintain the food’s quality at a particular temperature.



Fig. 4.1.6: Refrigerated Transportation

Ambient Temperature for Shipping

When it comes to cold chain logistics, maintaining ambient temperature tends to mean maintaining a temperature between 15°C to 25°C or 59°F to 77°F. These temperatures fall in the range of comfortable room temperature instead of being on one extreme end of temperature ranges.

4.1.6 HACCP, TACCP, VACCP, Control Measures, Critical Control Point, Critical Limit

HACCP (Hazard Analysis Critical control point): It is a systematic approach in identification, evaluation and control of food safety hazards and it's written documented plan based on HACCP principles known as HACCP Plan. It has 12 steps and 7 principles as:-

- Assembly of HACCP Team
- Describe Product
- Identify indent use
- Draw Flowchart / Diagram
- Verify Flowchart/ Diagram
- Conduct a hazard analysis (Principle 1)
- Determine critical control points (CCPs) (Principle 2)
- Establish critical limits (Principle 3)
- Establish monitoring procedures (Principle 4)
- Establish corrective actions (Principle 5)
- Establish verification procedures (Principle 6)
- Establish record-keeping and documentation procedures (Principle 7)

VACCP (Vulnerability Analysis Critical control points):

It focuses on food fraud as well, and widens the scope to include systematic prevention of any potential adulteration of food, whether intentional or not, by identifying the vulnerable points in a supply chain. It is especially concerned with economically motivated adulteration (EMA). Examples include product substitutions, unapproved product enhancements, counterfeiting, stolen goods and others.

TACCP (Threat Analysis Critical control points): generally requires a wider range of employee involvement than HACCP, as it covers issues such as manufacturing plant and transportation security, IT security, and employee background checks. Some points will overlap with HACCP, such as tamper-proof seals and various quality control checks.

Reduce the likelihood (chance) and consequence (impact) of a deliberate attack;

Protect organizational reputation;

Reassure customers and the public that proportionate steps are in place to protect food;

Demonstrate that reasonable precautions are taken and due diligence is exercised in protecting food.

Control: It is means to prevent, eliminate, or reduce hazard.

Control measures: It is means of any action or activity that is used to prevent, reduce to acceptable levels, or eliminate a hazard.

Critical limit: it is means a point, step, or procedure in a food process at which a control measure can be applied and at which control is essential to prevent, reduce to an acceptable level, or eliminate an identified food hazard.

UNIT 4.2: Schedule IV Requirements of FSSAI

Unit Objectives

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

1. Identify requirements in Schedule IV in FSSAI

4.2.1 Schedule IV Requirements of FSSAI

To provide assurance of food safety, Food businesses must implement an effective Food Safety Management System (FSMS) based on Hazard Analysis and Critical Control Point (HACCP) and suitable pre-requisite programmes by actively controlling hazards throughout the food chain starting from food production till final consumption.

As per the condition of license under FSS (Licensing & Registration of Food Businesses) Regulations 2011, every food business operator (FBO) applying for licensing must have a documented FSMS plan and comply with schedule 4 of this regulation. Schedule 4 introduces the concept of FSMS based on implementation of Good Manufacturing Practices (GMP) and Good Hygiene Practices (GHP) by food businesses and is divided into five parts as under:

Schedule 4	General Requirements
Part 1	General hygienic and sanitary practices to be followed by food business operators applying for registration - Petty food operators and Street food vendors
Part 2	General hygienic and sanitary practices to be followed by food business operators applying for license- Manufacturing/ processing/ packaging/storage/distribution
Part 3	General hygienic and sanitary practices to be followed by food business operators applying for license- Milk and milk products
Part 4	General hygienic and sanitary practices to be followed by food business operators applying for license- Slaughter house and meat processing
Part 5	General hygienic and sanitary practices to be followed by food business operators applying for license- Catering

Table 1.2.1: Five Parts of Good Manufacturing Practices (GMP) and Good Hygiene Practices (GHP)

Part II: General hygienic and sanitary practices to be followed by food business operators applying for license- Manufacturing/ processing/ packaging/storage/distribution

- **Location and Surroundings**
- Location shall be:
 - away from environmentally polluted areas
 - away from industrial activities which produce:
 - Disagreeable or obnoxious odor,
 - Fumes
 - Excessive Soot
 - Dust



Well Guarded Entrance of the Plant



Demarcation of the area

Fig. 4.2.1: Location and Surrounding factors

- Smoke
- Chemical or biological emissions
- Pollutants
- Layout and Design of Food Establishment Premises

Facility in good condition leads to clean, pest free environment

- Repaired or replaces tiles missing ceiling panel etc.
- Sealed/ grated sewer grids less than 1/4 inch

Hole free exterior walls

- Louvers in exterior fans that close tightly when turned off
- Screened pipes & windows
- Sealed outside

Striped or sealed gaps around all doors

- Use Of Screen door, air curtains & other mechanisms
- Sealed tracks to prevent insect harborage

Fig. 4.2.2: Layout and Design factors

- **Equipment and Containers**

- made up of non-corrosive / rust free material
- smooth, free from any grooves
- easy to clean and maintain
- non-toxic and non-reactive
- of food grade quality



Fig. 4.2.3: Equipment and Container factors

- **Facilities**

- **Water supply**

- Only potable water meeting BIS (Bureau of Indian Standards) standards
- Appropriate facilities for storage and distribution of water
- Periodic cleaning of storage tanks and its record
- Non-potable water, if used, only for cooling of equipment, steam production, fire fighting
- Distinguished non-potable water pipes

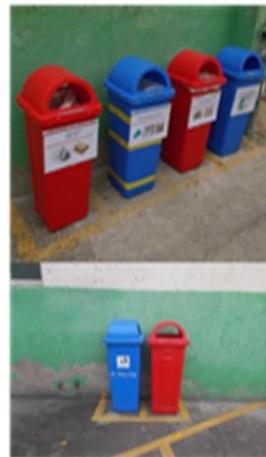


Colour coding of water pipes to avoid contamination



Fig. 4.2.4: Water Supply

- Drainage and waste disposal
 - Disposal of sewage and effluent in conformance with the requirements of Factory
 - Designed and constructed to reduce risk of contamination to food and potable water
 - Separate waste storage area
 - Covered containers for waste storage
 - No accumulated waste in food handling, food storage or other working areas
 - Periodic disposal of waste/refuse
 - Pedal operated adequate size bins for waste collection
 - Waste bins emptied and washed daily with a disinfectant and dried before next use



Sr. No.	Material	Dustbin Colour	SYMBOL
1	Oily Cotton Waste	Red	
2	Paper	Green	
3	Plastic Jars, Sampling Bottles	Blue	
4	Plastic Bags	Yellow	
5	Polish Filter	Grey	
6	Food Waste	Orange	
7	Glass Bottles	Black	

Fig. 4.2.5: Waste Disposal



Fig. 4.2.6: Drainage System

- Personnel facilities and toilets
 - Facilities for washing and drying hands
 - Supply of hot and cold water
 - Separate lavatories of appropriate hygiene design for males and females separately
 - Suitably located Changing facilities for personnel
 - No direct opening of such facilities in food processing, service or storage area
- **Ventilation and Lighting**
 - Air quality and ventilation:
 - Natural / mechanical ventilation system including air filters, exhaust fans
 - Designed and constructed as such air does not flow from contaminated areas to clean areas
 - Lighting
 - Adequate Natural /artificial lighting
 - Protected lightings to avoid contamination by breakages



Fig. 4.2.7: Personal facilities



Fig. 4.2.8: Ventilation and Lighting

- **Food Operations And Controls**

- **Procurement of raw materials**

- Quality raw materials (free of parasites, micro-organisms, pesticides etc.)
 - Raw material conforming to the regulations under the act
 - Records of raw material as source of procurement



Fig. 4.2.9: Procurement of raw materials

- **Storage of raw materials and food**

- Adequate food storage facilities to protect food from contamination
 - Cold storage facilities according to requirement
 - Segregation of storage area for raw and processed food, recalled materials, packaging materials, stationary, cleaning materials/ chemicals
 - Separate cold storage of raw food like meat/poultry/seafood product away from the area of WIP (Work in Progress), processed, cooked and packaged products.
 - Monitoring of temperature and humidity
 - FIFO First received (In) materials must move out first
 - Non –toxic containers for food storage
 - Stored on racks or pallets well above the floor and away from the wall



Fig. 4.2.10: Storage of raw materials and food

Review Of Product Label /Packaging Usage And Control

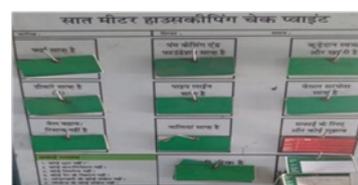
Labels should be reviewed allergens are mentioned don't it prior to their receipt for their accuracy. Line Personnel should be trained to ensure labelling is changing when a changeover takes place.

Food Processing / Preparation, Packaging and Distribution / Service

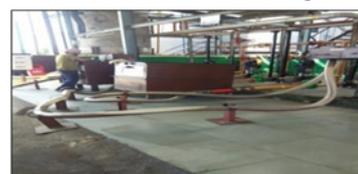
- **Storing at appropriate temperature:** The Food Business shall develop and maintain the systems to ensure that time and temperatures are controlled effectively where it is critical to the safety and suitability of food. Such control shall include time and temperature of receiving, processing, cooking, cooling, storage, packaging, distribution and food service till it reaches the consumer, as applicable.
- **Food Packaging:** Packaging materials shall provide protection for all food products to prevent contamination, damage and shall accommodate required labelling as laid down under the FSS Act & the Regulations there under.
- **Transportation:** All critical links in the supply chain need to be identified and provided for to minimize food spoilage during transportation. Processed / packaged and / or ready-to-eat food shall be protected as per the required storage conditions during transportation and / or service.
- **Management and Supervision**
 - Provision of resources to implement & maintain Food Safety
 - Developing SOPs for processing, packing, dispatch & storage of food
 - Competent Technical Managers & Supervisors:
 - having skills on food hygiene principles & practice
 - taking appropriate preventive & corrective action
 - ensure effective monitoring and supervision.
- **Maintaining Process related records (e.g. production records)**
- **Sanitation And Maintenance of Establishment Premises**
 - Facilities should permit effective cleaning.
- **Cleaning Program**
 - areas to be cleaned,
 - cleaning frequency,
 - procedure,
 - equipment,
 - cleaning material and method



Visualizing for HK material



Kamishibai Board for maintaining HK



Hanging of Flexible pipes for ease of cleaning

Fig. 4.2.11: Cleaning Program

- **Maintenance**

- Preventive and Corrective Maintenance
- Lubricants and heat transfer fluids shall be food compatible Procedure for releasing maintained equipment back to production
- Maintenance personnel shall be trained in the product hazards associated with their activities



Fig. 4.2.12: Maintenance

- **Pest Control Systems**

- Report pest infestations immediately.
- Do not use pesticides/insecticides in food processing area.



Fig. 4.2.13: Fly Catcher and Rodent Traps

- **Personal Hygiene**

- Health Status
 - Personnel suffering from disease or illness shall not be allowed to enter in food handling area
 - System to report illness or symptoms of illness to management
 - Medical examination of food handlers/ employees once in a year
 - Records of medical examination
 - Factory shall be compulsorily inoculated against the entire group of diseases and recorded
 - In case of epidemic, all workers to be vaccinated irrespective of the yearly vaccination.

- **Personal Cleanliness**

- High degree of personal cleanliness by food handlers
- Food business shall provide to all food handlers;
- Protective clothing
- Head covering
- Face mask
- Gloves
- Foot wear



Fig. 4.2.14: Personal Cleanliness

- **Visitors Generally**
 - Generally visitors should be discouraged to go inside the food handling areas
 - The food business shall ensure visitors to its food manufacturing/ handling areas shall;
 - Wear protective clothing
 - Footwear
 - Adhere to personal hygiene provisions envisaged in the respective section
- **Product Information And Consumer Awareness**
 - Batch Identification
 - Identifies producer
 - Product recall
 - Effective stock rotation - FIFO
 - Product Information
 - Adequate information & enables other person in food chain to handle, display, store, prepare & use the product safely & correctly
 - Labeling
 - Should confirm to Legal Requirements
- **Consumer Education**
- **Training**
 - Awareness & responsibilities
 - Training Programmes
 - Nature of food
 - Control Spoilage
 - Handling of food
 - Storage
 - Training Records
 - Instruction & supervision
 - Periodic assessment of training & effectiveness
 - Refresher training
- **Good Manufacturing Practices For Whole Premise**

Good Manufacturing Practices* (GMPs) are the basic operational and environmental conditions required to produce safe foods. They ensure that ingredients, products and packaging materials are handled safely and that food products are processed in a suitable environment.

GMPs address the hazards associated with personnel and environment during food production. They provide a foundation for any food safety system. Once GMPs are in place, processors can implement a Hazard Analysis Critical Control Point (HACCP) system to control hazards that may affect the ingredients and packaging material during food processing.

GMPs Address:

- **Environmental control (premises):** Location, design and construction of the building and its interior, equipment, water supply.
- **Personnel practices:** Personal hygiene, hand washing, clothing/footwear/headwear, injuries and wounds, evidence of illness, access and traffic patterns, chemical use.
- **Shipping, receiving, handling, storage:** Inspection procedures for transport vehicles; loading, unloading and storage practices; inspection procedures for incoming products; shipping conditions; returned and defective products; allergen control; chemical storage; waste management.
- **Pest control:** Monitoring procedures for the exterior and interior of the building (ex: surveillance, fumigation) and the use of pesticides.
- **Sanitation:** Cleaning and sanitizing procedures and pre-operational assessment.
- **Equipment maintenance:** Procedures describing preventive maintenance and calibration of all the equipment and instruments that can affect food safety (ex: thermometers, thermocouples, metal detectors, scales, pH meters)
- **Recall and traceability:** Procedures that ensure final products are coded and labeled properly; incoming materials; in-process and outgoing materials are traceable; recall system is in place and tested for effectiveness (ex: procedures for mock recalls).
- **Water safety:** Water safety monitoring procedures for water, ice and steam, and water treatment procedures that ensure it is potable for use in food processing



Fig. 4.2.15: GMPs Address



Fig. 4.2.16: Storage of sanitizing materials

Where and How to Store Your Cleaning Supplies

- **Clean, Cool, Dry:** Store your cleaning supplies in an area that is clean and free of debris. Make sure that there aren't any temperature extremes in the area where your cleaning supplies are stored. Another thing to make sure of is that the area is dry.
- **Original Containers:** Keep cleaning supplies in their original containers. If you mix your own cleaners, make sure you use new clean bottles and label them to avoid a mixup.
- **Safe Storage:** Be sure to keep your cleaning supplies stored in places where your children and/or pets will not be able to get to them. Consider higher storage or locked storage options to protect small children and pets.

Cleaning and Sanitization Process, Need and Importance

Workplace Sanitation: Maintaining a clean work environment is critical in preventing foodborne illness. Bacteria can grow on unsanitary surfaces and then contaminate food. Just because a work surface looks clean does not mean that it is sanitary. Always ensure that you clean and sanitize a work area before starting to prepare food.

Cleaning Procedures and Schedules: Cleaning with soap and other detergents is just one step of the cleaning procedure. It is also necessary to sanitize. Cleaning will remove any dirt or grease, but will not necessarily kill any bacteria or other pathogens. Only a sanitizer will kill bacteria and ensure the area is safe for food preparation. Leading sanitizers used in the food service industry are chlorine solutions (bleach), quaternary solutions (quats), and iodine. Use these materials according to the manufacturer's instructions that accompany the product and that are found on the material safety data sheet (MSDS) using the appropriate personal protective equipment.

A sanitation plan is important in any food service preparation area. It ensures that all surfaces are cleaned on a regular basis and reduces the risks of transferring bacteria or other pathogens from an unclean surface to clean equipment such as cutting boards or tools. A sanitation plan has two components:

- A list of cleaning and sanitizing agents or supplies with instructions on their safe use and storage
- A cleaning schedule, outlining how each item needs to be cleaned, who is responsible, and how frequently it happens

Routine Equipment Maintenance

Refer to the manufacturer's instructions and training provided by your employer or instructor on how to do this safely. Some equipment is intended to be cleaned in place. This should be identified in your sanitation plan and cleaning schedule.

All equipment must be routinely cleaned and inspected. Older equipment may have nooks and crannies where dirt and bacteria can hide, which can be difficult to clean effectively. Proper cleaning procedures must be established and followed at all times with regular review to ensure that procedures are working. If equipment is replaced or cleaning materials change, the process may have to be adjusted. If you notice any safety concerns with the equipment while cleaning it, such as a frayed cord, missing guard or loose parts, let your supervisor know immediately.

• Good Food Hygiene Practices

- Cleaning
 - Food areas and equipment between different tasks, especially after handling raw food shall be cleaned.
 - The surface shall be thoroughly cleaned in case if somebody spills food / water / drink.
- Raw materials
 - Raw materials shall be purchased from reliable and known dealers and checked for visible deterioration & off-odour, physical hazards and foreign body contamination.



Fig. 4.2.17: 8 Principles based on eight quality management principles

- Cooking
 - The preparation/ processing/ cooking should be adequate to eliminate and reduce hazards to an acceptable level which might have been introduced at the raw food level.
 - The preparation/ processing/ cooking methods should ensure that the foods are not re-contaminated.
 - The preparation/ processing/ cooking of veg. & non-veg. products should be segregated.
 - Whenever cooking or reheating of food is done, it should be hot all the way through, it is especially important to make sure that food is cooked thoroughly.
 - Re-use of cooking oil should be avoided.
 - In case of reheating of oil use maximum three times to avoid the formation of Trans fat. It is ideal to use once if possible.
- Chilling
 - Semi cooked or cooked dishes and other ready-to-eat foods such as prepared salads and desserts having short shelf life should not be left standing at room temperature.
 - Chilled food intended for consumption should be cold enough.
 - Food items that need to be chilled should be put straight away into the fridge.
 - Cooked food should be cooled as quickly as possible and then put it in the fridge.
 - Chilled food should be processed in the shortest time possible.
 - Fridge and display units should be cold enough and as per requirement. In practice, fridge should be set at 5°C to make sure that food is kept in chilled condition. Also, fridge and display units should be maintained in good working condition to avoid food spoilage and contamination.
- Cross-contamination

Following should be done to avoid cross-contamination.

 - Separation of each crop/species and also processed and unprocessed foods.
 - Hands should be thoroughly washed after touching.
 - Work surfaces, chopping boards and equipment should be thoroughly cleaned before the preparing of food starts and after it has been used.
- Personal Hygiene
 - High standards of personal hygiene should be maintained.
 - All employees handling food should wash their hands properly:
 - before preparing food
 - after touching raw food or materials, specially meat/poultry or eggs
 - after breaks
 - after using the toilet after cleaning the raw materials or utensils / equipments
 - Street shoes inside the food preparation area should not be worn while handling & preparing food.
 - Food handlers should ensure careful food handling & protect food from environmental exposure.
- Transportation and Handling Of Food
 - Food shall be adequately covered during transportation to assure food safety.
 - Transportation vehicles
 - Vehicle inspection
 - Shall not contaminate foods & packaging
 - Should be easy to clean and maintain

- Provide effective protection from dust & dirt
- If required maintain temperature, humidity, atmosphere
- If required allow monitoring of temperature, humidity, etc.
- Should be used only for carrying food.
- Regular maintenance of vehicles is required.
- Appropriate supply chain to minimize food spoilage
- Non-toxic, clean, well maintained food containers during transportation
- Temperature and humidity control during transportation
- Dedicated vehicles for food transportation
- Effective cleaning and sanitation of vehicles between loads carrying high risk foods as fish, meat poultry to avoid cross contamination



Fig. 4.2.18: Transportation and handling of food

- Storage
 - It is very important to store food properly for the purpose of food safety. Following things must be ensured:
 - Raw meat/poultry should be stored separately from other foods
 - Storage temperature of frozen food should be -18°C or below.
 - Storage instructions over food packaging should be followed.
 - Dried foods (such as grains and pulses) should be stored off the floor, ideally in sealable containers, to allow proper cleaning and protection from pests.
 - Store commercial ice cream at temperatures below 0°F .
 - Store biscuit, brownie, and muffin mixes at room temperature.

Stock rotation

The rule for stock rotation is FIFO (first in, first out) to make sure that older food is used first. This will help to prevent wastage. Older product will have nearer shelf life expiry, so older product should be moved out first, but new products will have time to move out since expiry is so far. That's why a rule of FEFO does also exist which means First Expiry First Out. It is called Good Distribution Practice.

UNIT 4.3: Personal Hygiene

Unit Objectives

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

1. Identify types of health and safety policies and procedures

4.3.1 Personal Hygiene

The expression “food hygiene” is often associated to personal hygiene. The concept of food hygiene really refers to the general cleanliness state of the food handlers’ body and clothes. Microorganisms can easily pass to food and reach the consumer if the handler comes into contact with any pathogenic microorganism by their clothes, hands, hair, nails, rings and then sets out to prepare food. As so, the personal hygiene of whoever contacts with food, as well as behaviors they assume during its processing, constitute an important preoccupation in the food business. The set of rules, conditions and practices that assure adequate personal hygiene make up the good practices for personal hygiene.

4.3.2 Importance of Personal Hygiene

It is imperative for safe food-handling outcomes for all workers to be familiar with standard sanitation and hygiene practices. Fig. 1.3.1 shows the cycles of transmission of micro-organisms. One of the basic principles is to break the cycle by avoiding cross-contamination, which can be achieved by ensuring personal hygiene practices are followed.

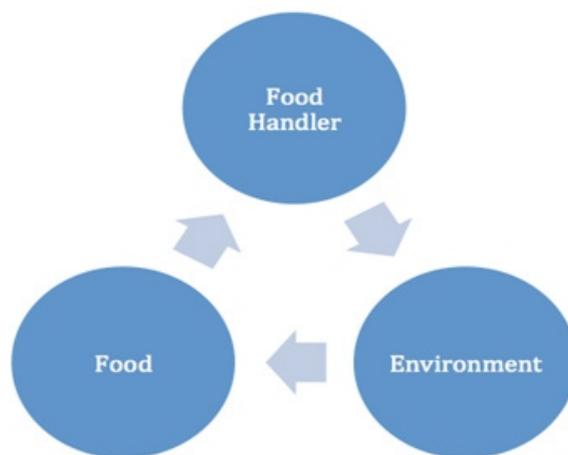
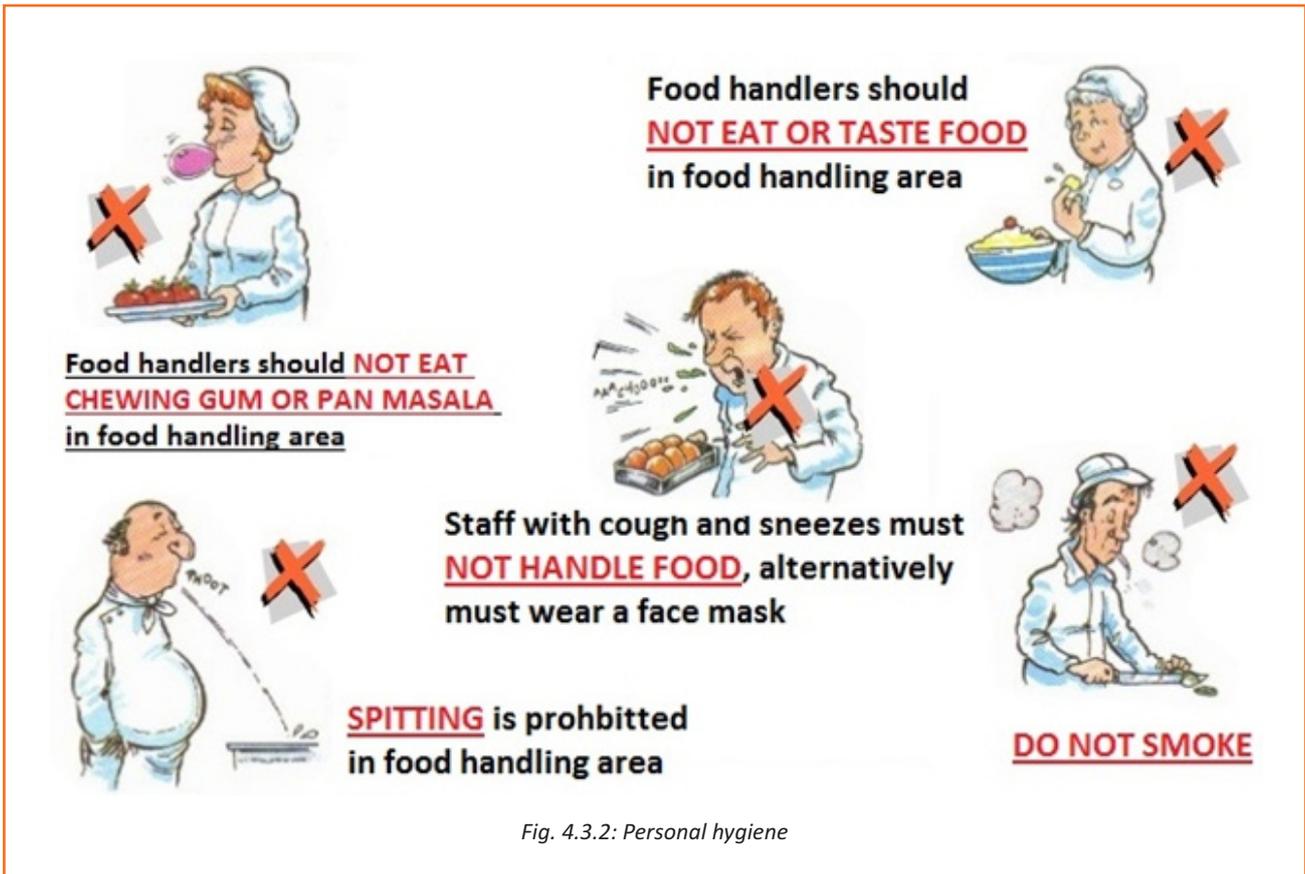


Fig. 4.3.1: Importance of Personal Hygiene

Proper personal hygiene is critical in any food service premise. Personal hygiene includes:

- Showering and bathing regularly
- Keeping hair clean hair and covered or tied back
- Keeping clean clothing and footwear that is used only at work
- Hand washing regularly



4.3.3 Hand Washing

Proper and regular hand washing is a critical part of any food safety system.

How to wash hands



Fig. 4.3.3: Methods of washing hand

How to Use Sanitizer?

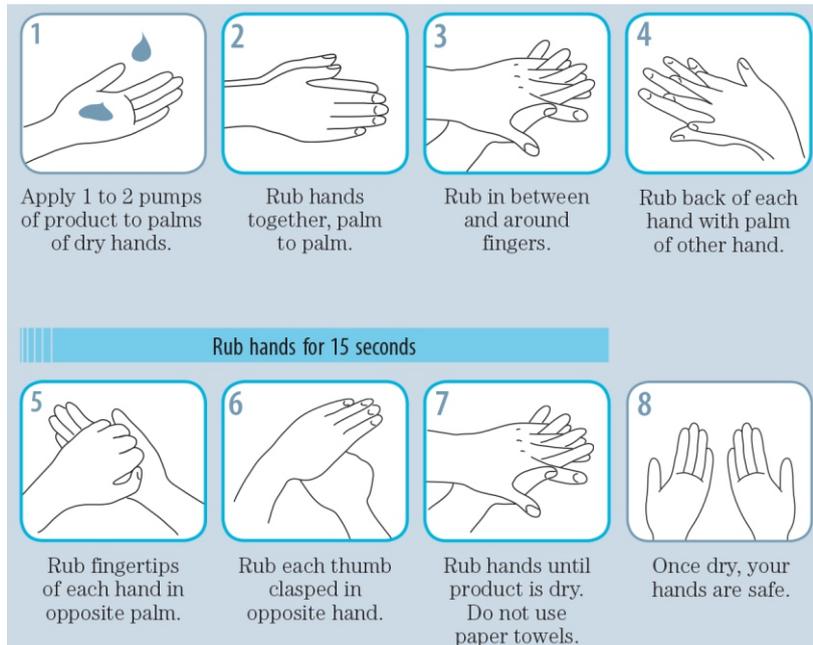


Fig. 4.3.4: Usage of Sanitizer

When to Wash and Sanitize Hand?



Fig. 4.3.5: Times to wash and sanitize hand

We need to stop the spread of COVID-19 in food industry by washing hands regularly with soap and water for 20 seconds – especially after going to the bathroom, before eating, and after coughing, sneezing, or blowing our nose.

4.3.4 Good Personal Hygiene Can Prevent Food Poisoning

Bacteria that cause food poisoning can be on everyone – even healthy people. You can spread bacteria from yourself to the food if you touch your nose, mouth, hair or your clothes, and then food.

Good personal hygiene also makes good business sense. Customers like to see food-handling staff who take hygiene seriously and practice safe food handling.

- Personal hygiene is important to prevent food poisoning.
- When handling food, wash your hands thoroughly and often.
- If you are sick, do not go to work, because you can contaminate food more easily.
- Food handlers should be properly trained in safe food handling.

Food handling businesses ensure the following factors are considered to ensure personal hygiene:

- **Hand Washing** — ensure effective hand washing techniques are followed at appropriate times
- **Minimise hand contact with food** — try to minimise direct hand contact with raw food by using appropriate utensils and safe use of disposable gloves
- **Personal cleanliness** — cover hair; do not sneeze or cough over food; cover cuts and sores; and do not wear jewellery
- **Wear protective clothing** — wear suitable clean protective clothing and handle appropriately to prevent cross contamination
- **Exclude ill staff** — staff must report illnesses; exclude staff with vomiting or diarrhoea

UNIT 4.4: Health Safety

Unit Objectives

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

1. Illustrate the concept of health safety
2. Understand the hazards of health safety
3. Explain the health and safety policies and procedures
4. Describe the personal protective equipment
5. Discuss the types of personal protective equipment

4.4.1 Health Safety

The term Health and Safety is generally used to describe Occupational Health and Safety, and relates to the prevention of accidents and ill health to employees and those who may be affected by their work.

4.4.2 Health Safety Hazards

Safety hazards exist in every workplace, but how do you know which ones have the most potential to harm workers? By identifying hazards at your workplace, you will be better prepared to control or eliminate them and prevent accidents, injuries, property damage, and downtime.

First of all, a key step in any safety protocol is to conduct a thorough safety hazard assessment of all work environments and equipment

In a safety hazard assessment, it is important to be as thorough as possible because after all, you can't protect your workers against hazards you are unaware of and unprepared for. Avoid blind spots in your workplace safety procedures by taking into consideration these 3 types of workplace hazards:

- **Safety hazards**

Safety hazards are number one on the list of 3 types of workplace hazards. These hazards play an effect on employees who work directly with machinery or in construction sites. Safety hazards are unsafe working conditions that that can cause injury, illness, or death.

Safety hazards are the most common workplace risks. They include:

- Anything that can cause spills or trips such as cords running across the floor or ice
- Anything that can cause falls such as working from heights, including ladders, scaffolds, roofs, or any elevated work area.
- Unguarded and moving machinery parts that a worker can accidentally touch.
- Electrical hazards like frayed cords, missing ground pins and improper wiring
- Confined spaces

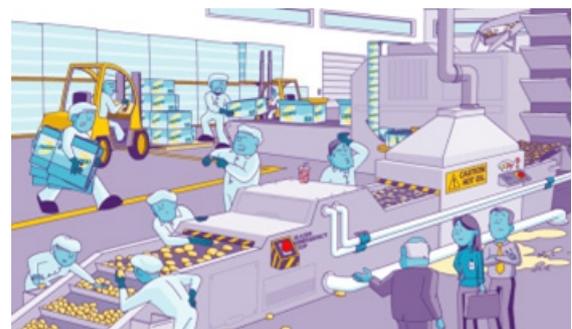


Fig. 4.4.1: Safety hazards

- **Ergonomic hazards**

Ergonomic safety hazards occur when the type of work, body positions, and working conditions put a strain on your body.

Ergonomic Hazards include:

- Improperly adjusted workstations and chairs
- Frequent lifting
- Poor posture
- Awkward movements, especially if they are repetitive
- Having to use too much force, especially if you have to do it frequently
- Excessive vibration



Fig. 4.4.2: Ergonomic Hazards

- **Work organization hazards**

Safety hazards or stressors that cause stress (short-term effects) and strain (long-term effects). These are hazards associated with workplace issues such as workload, lack of control and/or respect, etc.

Examples include:

- Workload demands
- Workplace violence
- High intensity and/or pace
- Respect (or lack thereof)
- Flexibility
- Control or say about things
- Social support or relations
- Sexual harassment

4.4.3 Health and Safety Policies and Procedures

Overview

The law says that every business must have a policy for managing health and safety.

A health and safety policy sets out your general approach to health and safety. It explains how you, as an employer, will manage health and safety in your business. It should clearly say who does what, when and how.

4.4.4 What is Personal Protective Equipment?

Personal protective equipment, commonly referred to as "PPE", is equipment worn to minimize exposure to hazards that cause serious workplace injuries and illnesses. These injuries and illnesses may result from contact with chemical, radiological, physical, electrical, mechanical, or other workplace hazards. Personal protective equipment may include items such as gloves, safety glasses and shoes, earplugs or muffs, hard hats, respirators, or coveralls, vests and full body suits.

Employers are also required to train each worker required to use personal protective equipment to know:

- When it is necessary
- What kind is necessary
- How to properly put it on, adjust, wear and take it off
- The limitations of the equipment
- Proper care, maintenance, useful life, and disposal of the equipment

If PPE is to be used, a PPE program should be implemented. This program should address the hazards present; the selection, maintenance, and use of PPE; the training of employees; and monitoring of the program to ensure its ongoing effectiveness.

4.4.5 Types of PPE

Head protection

Examples of head protection equipment:

- Helmets;
- Hard hats;
- Hair nets

Hand protection

Examples of hand protection equipment:

- Work gloves and gauntlets;
- Wrist cuff arm nets.

Eye and face protection

- Safety glasses and goggles;
- Eye and face shields;



Fig. 4.4.3: Eye and face protection

Respiratory Protection

This type of PPE must be present when being in contact with large amounts of gases, powders, dust and vapors.



Fig. 4.4.4: Types of Respirators

Hearing protection

Examples of hearing protection equipment:

- Earplugs and defenders;
- Noise meters;
- Communications sets;
- Acoustic foam.

Foot protection

As examples of foot protection equipment can be pointed out the following ones:

- Safety boots and shoes;
- Anti-static and conductive footwear.

Height and access protection

As examples of height and access protection equipment can be mentioned in the following ones:

- Fall-arrest systems;
- Body harnesses;
- Lowering harnesses;
- Rescue lifting;
- Energy absorbers and others

First aid kit

The kit should be kept in an accessible location and /or close to areas where there is a higher risk of injury or illness. The first aid kit should provide basic equipment for administering first aid.



Fig. 4.4.5: FSSAI dos and don'ts for food handlers

Pictograms

Not only is preparing your workshop for accidents a smart thing to do, it is even smarter to organize your workshop in such a way that no serious accidents can take place. A simple way to make your workshop safer is to use pictograms: indicating flammable materials, the necessary use of hearing protection, indicating emergency exits.

Health and Safety Policy

FBO is committed to the goal of providing and maintaining a healthy and safe working environment, with a view to continuous improvement. This goal is only achievable by adherence to established objectives striving to exceed all obligations under applicable legislation, and by fostering an enthusiastic commitment to health, safety and the environment.

In particular:

Management, working in cooperation with the Joint Health and Safety Committee, will strive to take all reasonable steps to reduce workplace hazards to as low as reasonably achievable.

Supervisors and managers are held accountable for the health and safety of all employees under their supervision. This includes responsibility for applicable training and instruction, appropriate followup on reported health and safety concerns, and implementation of recommended corrective action.

FBO is committed to providing all necessary training and instruction to ensure that appropriate work practices are followed on the job, and to promote their use off the job.

Health, safety, the environment and loss control in the workplace are everyone's responsibility. Company expects that everyone will join in our efforts to provide a healthy and safe working environment on a continuous day to day basis.

Importance of Preventive Health Checkups

No matter what age group you are a part of, regular preventive health tests are essential for each one of us.

Whether one is feeling fit from within or is still in his early years of life, a preventive health checkup is an important practice that one must inculcate in his or her daily life.

- It can detect developing disease and prevent them
- Increase better chances for treatment and cure
- Can identify health issues early and prevent them
- It helps to improve lifestyle and increase productivity at work.

FSSAI Format for health check up

PERFORMA FOR MEDICAL FITNESS CERTIFICATE FOR FOOD HANDLERS
(FOR THE YEAR)

(See Para No. 10.1.2, Part- II, Schedule - 4 of FSS Regulation, 2011)

It is certified that Shri/Smt./Miss.....
employed with M/s....., coming in direct
contact with food items has been carefully examined* by me on date
Based on the medical examination conducted, he/she is found free from any
infectious or communicable diseases and the person is fit to work in the above
mentioned food establishment.

Name and Signature with Seal
of Registered Medical Practitioner /
Civil Surgeon

***Medical Examination to be conducted:** _____

1. Physical Examination
2. Eye Test
3. Skin Examination
4. Compliance with schedule of Vaccine to be inoculated against enteric group of diseases
5. Any test required to confirm any communicable or infectious disease which the person suspected to be suffering from on clinical examination.

Fig. 1.4.6: Format for health check up

Medical examination to be concluded –

1. Physical examination
2. Eye Test
3. Skin examination
4. *Compliance with schedule of vaccine to be inoculated against enteric group of diseases
5. Any test required to confirm any communicable or infectious disease which the person suspected to be suffering from on clinical examination

* Vaccine to be inoculated against enteric group of diseases shall be decided by the medical practitioners in accord to remove the ping to the list as declared by the municipal corporation of that area.

Summary

- Food safety refers to routines in the preparation, handling and storage of food meant to prevent food borne illness and making food safe for human consumption. Safe food handling practices and procedures are thus implemented at every stage of the food production life cycle in order to curb these risks and prevent harm to consumers.
- It is important to be aware of food allergens in food industry as this is the risk associated with the unintended presence of allergen due to cross contamination and should take this a matter of serious concern. Food allergies can cause serious and even deadly reactions.
- The presence of unwanted materials such as dust and particles during the manufacturing and transportation time is called contamination. The term contaminants include any unwanted matter that is found in the product. These contaminants affect the quality of the product or the process.
- Refrigerated transportation is a shipping cargo with advanced temperature adjustment features. It is built and designed mainly for climate-sensitive goods such as vegetables, fruits, meat, all-prep meals, bread, etc. in which the freight is loaded with ice and salt to maintain the food's quality at a particular temperature.
- The retail food industry plays a significant role in assuring a safe food supply for its consumers. At the retail level, activities to control food safety risks can be divided into four key areas: the supplier and source of foods and food ingredients; in-store practices and procedures; education and training of employees and food handlers; and consumer engagement.
- Good Manufacturing Practices (GMPs) are the basic operational and environmental conditions required to produce safe foods. They ensure that ingredients, products and packaging materials are handled safely and that food products are processed in a suitable environment.
- Maintaining a clean work environment is critical in preventing foodborne illness. Bacteria can grow on unsanitary surfaces and then contaminate food. Just because a work surface looks clean does not mean that it is sanitary. Always ensure that you clean and sanitize a work area before starting to prepare food.
- The rule for stock rotation is FIFO (first in, first out) to make sure that older food is used first. This will help to prevent wastage. Older product will have nearer shelf life expiry, so older product should be moved out first, but new products will have time to move out since expiry is so far. That's why a rule of FEFO does also exist which means First Expiry First Out. It is called Good Distribution Practice.
- The expression "food hygiene" is often associated to personal hygiene, being many times limited to the care of washing hands. The concept of food hygiene really refers to the general cleanliness state of the food handlers' body and clothes.
- Health and Safety is a term that generally covers the legal requirements that fall under the Health and Safety at Work Act etc. 1974. The term Health and Safety is generally used to describe Occupational Health and Safety, and relates to the prevention of accidents and ill health to employees and those who may be affected by their work.

Exercise

A. Answer the following questions briefly.

1. _____ refers to routines in the preparation, handling and storage of food meant to prevent food borne illness and making food safe for human consumption.
 - a. Food Safety
 - b. Fire Safety
2. _____ is a factor or agent which may lead to undesirable effects like illness or injury in the absence of its control, whereas, risk refers to the probability that the effect will occur.
 - a. Threat
 - b. Hazard
3. The presence of _____ materials such as dust and particles during the manufacturing and transportation time is called contamination.
 - a. wanted
 - b. unwanted
4. _____ is one of the most important factors in the preservation of food because microorganisms have been found to grow in almost all temperature.
 - a. Storage temperature
 - b. Hazard temperature
5. Selling fresh and _____ produce is essential in groceries and retail food businesses.
 - a. low-quality
 - b. high- quality

B. Answer the following questions by choosing the correct option:

1. What are the most common types of contaminant?
2. Outline the layout and design of food establishment premises.
3. Explain VACCP
4. What are the facilities provided by water supply?
5. What are the two components of the sanitation plan?

Notes

Scan the QR Codes to Watch the related Videos



Personal Hygiene



General Requirement on
Hygiene & Sanitation-
Practices for all FBO's

5. Managing Accidents and Emergencies



- Unit 5.1 - Hazard, Risk and Accidents
- Unit 5.2 - Standard Practices and Precautions
- Unit 5.3 - Uses of Electrical Equipment
- Unit 5.4 - Usage of Personal Protective Equipment
- Unit 5.5 - Organisational Protocols
- Unit 5.6 - Dealing with Toxics
- Unit 5.7 - Fire Prevention and Fire Extinguishers
- Unit 5.8 - Artificial Respiration and CPR
- Unit 5.9 - Rescue and Evacuation In Case Of Fire
- Unit 5.10 - First Aid
- Unit 5.11 - Potential Injuries and Ill Health
- Unit 5.12 - Precautions in Mobility
- Unit 5.13 - Significance of various types of hazard and safety signs



Key Learning Outcomes

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

1. Recognize the types of hazards, risks as well as accidents
2. Categorize the standard precautions and practices
3. Examine the utilization of the electrical equipment
4. Explore the usage of personal protective equipment
5. Recognize the organizational protocols
6. Monitor the ways to handle the toxics
7. Identify fire prevention and fire extinguisher
8. Evaluate CPR as well as the artificial respiration
9. Discuss the evacuation and rescue
10. Catalogue the first aids
11. Understand the ill health as well as potential injuries
12. Demonstrate the precautions in mobility
13. Discuss the significance of various types of hazard and safety signs

UNIT 5.1: Hazard, Risk and Accidents

Unit Objectives

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

1. Identify the types of hazards, risks as well as accidents

5.1.1 Types of Hazards, Risks and Accidents

Hazard is considered a sort of incident or source that can fundamentally harm something, whether in a living or non-living state. It states to be significant to identify the hazard and the amount of risk or impact it would create on its surroundings. Thus, an individual must be prepared from the initial stages to manage such occurrences.

It is important to control workplace hazards by eliminating and identifying the capable risks. This is required as it is capable of causing accidents or hazards, along with finding the access based on the ways to isolate the risk which can lead to the hazard.

To ensure the safety of an individual and the workplace surrounding, an individual requires to regularly participating in the safety drill, which is conducted at their specific times.

Types of Hazards:

- **Safety Hazard:** A safety hazard is among the most common dangers found in every workplace. A safety hazard is capable of causing specific serious injuries or damage to the industrial workers. The safety hazards perform a practical part on the employees who have regularly contacted the heavy equipment or machinery throughout their working hours.

Some of the safety hazards which lead to accidents in the workplace tend to include:

- Anything capable of causing a fall, such as floor holes or opening walls, slippery surfaces, unprotected edges, and ladders which is unsafely situated.
- Heavy-duty mechanisms, which is seen to be usually present in every industry, such as construction, manufacturing, mining and so on, can sometimes be the cause behind the accident. It is due to loose machinery parts, sharp edges, hot surfaces causing severe cuts, burns and wounds.
- **Chemical Hazards:** Chemical substances are seen to include but are also not restricted to acidic substances, petroleum products, reagents, acids, flammable liquids and many more.
 - Acidic substances are firmly alkaline in their state as they tend to possess properties to damage the accidental arrival in contact with the other substances by forming a chemical reaction.
 - The petroleum products generate gasoline such as Butane, Propane, Kerosene, and LPG as they are incredibly flammable hazards and can damage on a larger scale.
 - Acids occur to be more hazardous, relying on their corrosive materials. The common acid includes Hydrochloric Acid, Sulphuric Acid, and Nitric Acid.
- **Biological Hazards:** Biological hazard is also known as the biohazard and is connected to the biological substances that lead to sickness and illness in humans during its occurrence in direct contact.

Sources through which the biological hazard might include are:

- Bacteria, viruses, insects, plants and humans are capable of being the hazard carrier that adversely impacts their health, causing skin irritation and can also lead to serious infections, like Tuberculosis, AIDS, and carcinogenic infection.

- Toxins from biological sources stand to be extensively poisonous in their state as they are manufactured by harmful animals and plants, such as snake venom toxins and botulinum toxins.
- The most recent example of the biological hazard is the outbreak of Covid-19.
- **Physical Hazard:** A physical hazard is the least common hazard at the workplace and is not limited only to physical presence. Extreme weather conditions or unfavourable working environments are the major causes of physical hazards.

Physical hazard has a prolonging effect on the health of the workers. These types of hazards are generally unrecognizable, like:

- The temperature can also be a cause of danger for the workers who attempt to work indoor as well as outdoors, having the factors such as overexposure to heat and cold leading to some serious illness like heat stroke, sweaty palm increasing the risk of accident, frostbit hypothermia which can eventually lead to death also.
- Harmful radiation like micro-waves, radio-waves, electro-magnetic waves, and so on.

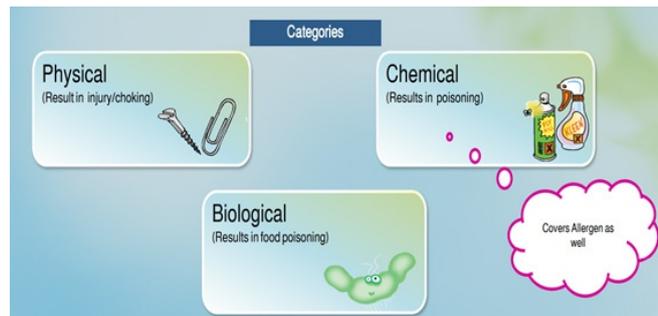


Fig. 5.1.1: Examples of physical, Chemical, Biological hazards

- **Ergonomic Hazard:** An ergonomic hazard is a type of hazard that adversely affects the workers' physical health, having continuous work leading to lower back pain, joint pains, muscles ache, and ligaments pain.

Ergonomic hazards may include:

- Poor sitting or standing postures.
- Improperly adjusted chairs and workstation height.
- Too much vibration or loud noise in the workplace.
- Frequent lifting of heavyweights.
- Prolong working conditions demanding physical force
- **Work Organization Hazard:** Work organization hazard usually defines the issues related to the workplace such as;
 - Excessive workload
 - Inappropriate behaviour of peers
 - Bullying
 - Lack of mental support
 - Work-related stress



Fig. 5.1.2: Sources of different types of hazards

5.1.2 Hazard Identification and Risk Assessment

Risk Assessment (RA) and environment review (ER) were done for hazard and environmental impact. It is done from different stages, from evaluating a new operation, modification to the existing facilities, maintenance work and others.

RA identify all safety and health hazards – Including Operational, mechanical, electrical, chemical, biological and ergonomic for ER indicate the environmental aspects and impacts taken into consideration.

Review and update of R.A and ER to be done under following circumstances: -

- Amendments/addition in legal, corporate and other voluntary requirements.
- Change in process or product handled or new developments/ modifications in activities/ products/ services.
- Occurrence of the accident, emergency
- While initiating any corrective and preventive actions
- While purchasing and erecting any new equipment/ machinery/ building

UNIT 5.2: Standard Practices and Precautions

Unit Objectives

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

1. Categorize the standard precautions and practices

5.2.2 Standard Practices and Precautions

- Hand hygiene- Physical, Chemical or Biological hazard
 - Usage of personal protective equipment- Safety hazard
 - Respiratory hygiene/ Cough Etiquette- Biological hazard
 - Sharp Safety- Safety hazard
 - Safe injection practices- Biological or Physical hazard
 - Sterile instruments and Devices- Biological or Physical hazard
 - Avoiding ergonomic hazard
- **Hand hygiene:** Washing hands regularly is a significant step towards cleanliness, protecting us from various diseases and infections. Washing hands can keep us healthy well as it protects us from viruses capable of travelling from one person to another person. Germs and bacteria are the only host which comes from touching the nose, eyes with dirty hands, or eating/cooking food with smeary hands.
 - **Usage of Personal Protective Equipment**
 - Personal protective equipment, or PPE, protects its user against any physical harm or hazards that the workplace environment may present. It is important because it exists as a preventative measure for industries that are known to be more hazardous, like manufacturing and mining. Some of the personal protective equipment are: gloves, masks and eyewear.
 - **Respiratory Hygiene / Cough Etiquette:** One should follow the below guidelines to maintain respiratory hygiene.
 - Covering the mouth and nose with a cloth or elbow while coughing or sneezing.
 - Throw the used tissues in a separate bin.
 - Washing of the hands or sanitizing before touching the nose or mouth
 - **Sharp Safety:** Sharp objects such as needles, lancets, and surgical knives must be handled with utmost care to prevent injury or spread of infection.
 - **Avoiding ergonomic hazard:** Headsets, monitor stands, and adjustable chairs are just some devices that can be easily integrated into a workspace to diminish the risk of injury from repetitive motions. Awkward locating refers to positions in the body when a person deviates significantly from a neutral position while performing tasks.

UNIT 5.3: Uses of Electrical Equipment

Unit Objectives

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

1. Examine the utilization of the electrical equipment

5.3.1 The Utilization of the Electrical Equipment

Electrical equipment is generally that equipment that requires electrical supplies for their operations. It generally consists of several small components in an enclosed form and is controlled by a power switch. It tends to include:

- Electric switchboard
- Distribution board
- Circuit breakers and disconnects
- Electricity meter
- Transformer



Fig. 5.3.1: Different type of electrical equipment's

Hazards Related to Electrical Equipment's

The five hazards described here are very common and easily preventable.

- Working on live circuits
- Skipping Lockout/Tagout. It is also known as LOTO, which disconnects electricity and avoids electrical hazards.
- Forgetting PPE.
- Improper grounding.
- Damaged extension cords.



Fig. 5.3.2: Electrical hazard symbols

UNIT 5.4: Usage of Personal Protective Equipment

Unit Objectives

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

1. Explore the usage of personal protective equipment

5.4.1 The Usage of Personal Protective Equipment

Personal protective equipment is majorly used to protect oneself from serious accidents or illnesses originating from the workplace's physical, biological, chemical, and mechanical hazards.

Personal protective equipment includes:



Fig. 5.4.1: The usage of personal protective equipment

Importance of PPE in Food Industry

Protective Clothing Reduces Injury and Contamination Risks. In the food manufacturing units, workers are at a surprising risk of exposure to harsh and toxic chemicals, which can cause further contamination of the food product. Also, PPE importance can be identified during working at height to avoid slip, trip and fall.

UNIT 5.5: Organisational Protocols

Unit Objectives

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

1. Recognizing the organizational protocols

5.5.1 The Organizational Protocols

Accidents are unplanned experiences resulting in injuries, illness, death, and loss of property and/or production. While there is no way to avoid accidents, some actions, plans, and preparations are capable of being taken to diminish them.

Knowledge of the Hazards

- Be aware of the environment. Look around and recognize workplace risks that are capable of causing harm.
- Look for manners to diminish or eliminate hazards and implement them.
- Report unsafe areas or practices.
- Dress for the weather.
- Use the EHS (Environmental Health & Safety) Job Hazard Analysis devices to recognize hazards linked with job sorts.

Originate a Safe Work Sector

- Keep an orderly job place. Poor housekeeping is capable of causing safety hazards and serious health. The workplace's layout requires to have accurate egress routes as well as be debris' free.
- Take breaks as well as mobilize around regularly all through the day. Short breaks (moving around and standing up) can make a big distinction in combating the threats of residing in a static position all day long.
- Pay attention to workstation ergonomics.

Use Safe Lifting Techniques

- Follow the following safe lifting practices:
 - Lift from a position of power
 - Keep the load close
 - Use a staggered stance
 - Cable/Rope/Slings in good repair
 - Hoist chain/Rope free of kinks and twist
 - Hooks not deformed or damaged and safety latches intact
 - Display of testing date, capacity and safe working load
 - Do not attempt to twist while lifting
- Training in body mechanics can reduce strain injuries and keep employees safe during moving and lifting.
- Regular Interaction
 - Notify supervisors regarding the safety hazards
 - Speaking up as well as being included in safety strategizing.
 - Constantly cultivate a safety level
- Training as well as Education
 - Make sure for everyone who possesses the appropriate safety training linking to the job's

threats.

- Take benefit of Environmental Safety and Health online training events.
- Each employee's responsibility is to take an active role in maintaining safety.

Emergency Preparedness Plan

Nowadays, many organizations, including the food industry, also implement their emergency preparedness plan, which includes hazards identified during their past years of operation; possible weather or climatic condition; spillages during operational activities, etc. Hazards can be classified as low, moderate and significant impact on the organization based on the geolocation of the unit.

Incident Reporting and Investigation

Incident

It is an event that causes damage to equipment material or other property. It may or may not be accompanied by human injury. It can be categorized as: -

- **No Injury Incident / Dangerous Occurrences**

Fire– An incident in which a fire broke out which has the potential of causing burn injury to humans or damage to property.

Near Miss– An incident that has the potential for causing an injury to humans or damage to property but narrowly escapes

- **Industrial / Injury incident:** An incident is a sudden and unforeseen event, attributable to any cause, which happens to the person, arising out of or in this course of his or her work and resulting in an employment injury to that person.
- **Major Incident** An incident results in a human fatality, permanent disability or extensive loss of equipment or materials.
- **Lost Time Incident-** Human injury incident prevents the person from doing his work for more than 48 Hrs.
- **Minor Incident**– An incident that causes minor injury to a human which may prevent him from undertaking his work up to 48 Hrs.
- **First Aid Case**– An injury incident that requires a person to go to a dispensary for a one-time treatment and/or any follow-up visit for observation of minor scratches, cuts, burn, splinters or other minor industrial injuries which do not ordinarily require medical care.
- **Unsafe Act:** The violation of a commonly accepted safe procedure or practice which resulted in the incident or was against the safety guidelines. Examples are operating without authority, operating at an unsafe speed, making safety devices inoperative, posture or unsafe position, failure to use personal protective equipment. Etc
- **Unsafe condition:** The condition which has the potential to cause injury/harm & damage to property material/ environment or process, improper guarding, defective tools/ equipment, hazardous arrangement or process, Improper ventilation, high temperature/dust Noise.

Incident Investigation

- Persons investigating any incident should collect all information, evidence regarding the situation under which the incident; this shall also include the condition of the persons, physical and mental conditions.
- The investigation should be based on fact-finding, and immediate causes of incidents are listed in two groups (Unsafe Condition and Unsafe Act). The investigating team shall find out and note down. The investigation team shall attempt to list all unsafe conditions and all unsafe behaviours on personnel.

UNIT 5.6: Dealing with Toxics

Unit Objectives

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

1. Monitor the ways to handle the toxics

5.6.1 The Ways to Handle the Toxics

Toxics are chemical substances that can cause serious harm to the person if he/she comes directly in its contact. One should be extra careful while handling such substances and an organisation must have clear labelling, separate storage rooms and proper guidelines for its usage.

- **Exposure hazards:**
 - **Contact or Absorption:** It can cause when a person comes in direct contact with toxic substances. It can result in drying or defatting of skin, skin irritation, or redness.
 - **Inhalation** occurs when a person inhales the fumes or vapour of toxic substances. It can cause shortness of breath, sore throat, coughing, an effect on the nervous system, and irritation during the breath.
 - **Ingestion:** It occurs when people accidentally consume toxic material. It can result in diarrhoea, vomiting, indigestion, effect on the functioning of the liver and kidney.
- **Storage requirement:**
 - Toxic substances must be stored in designated storage compartments only.
 - It should be stored under the optimum condition as prescribed. Always take the material in desired quantity and never put the used or remaining material in the original container.
 - One should always look for an alternative before using the toxic agent.
 - Only authorised
 - Personnel should be given access to the storage compartment.
- **Labelling requirement:**
 - Toxic substances or materials should be labelled in clear and readable format and proper usage instructions.
 - Work areas should be labelled properly where toxic substances are used regularly or excessively.
 - Always label the emergency contact number near the storage and the work area.
- **Spill and accident procedures:**
 - In case of a spill or accident, immediately alert the people in that area and inform the supervisors.
 - Evacuate the area and seize the entry.
 - Inform the relevant authority in case of leakage or spillage in larger quantities.
 - The trained professional of designated staff should only perform cleaning of toxic spillage.
 - Usage of absorbent while cleaning the corrosive or other harmful liquid.
 - Usage of neutralizing agent while cleaning the acidic, toxic substances.
 - Never touch the toxic substance with naked hands.

- **Waste management:**

- Toxic waste must be segregated separately in accordance with its nature.
- It should be managed separately from other wastes.
- Flammable chemicals, acids should be disposed of carefully and separately in order to prevent any type of accident or injury.
- Never dispose of the toxic substance in an open area.
- It should always be disposed of in a leak-proof and airtight container.



Fig. 5.6.1: Waste disposal process for a different type of waste

UNIT 5.7: Fire Prevention and Fire Extinguishers

Unit Objectives

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

1. Identify fire prevention and fire extinguisher

5.7.1 Fire Prevention and Fire Extinguisher

Prevention from fire is necessary to avoid excessive damage. Their major goal remains to educate the workers on the ways to prevent the environment from fire.

To prevent the workplace from fire, we must enforce the following measures:

- Workers should be highly trained for the mock drill.
- No smoking signs around the highly flammable liquid and gases.

Causes of fire

- **Flammable and combustible liquids:** This requires proper storage and handling in order to prevent the occurrence of fire which must be stored under a well labelled and closed container to avoid any accident.
- **Liquefied Petroleum Gases:** LPG gas has a low density and is heavier than air. It usually accumulates in low lying areas so that the workers are warned if they tend to find any leakage or hole in the cylinders. Moreover, they must not use fire; instead of that, they are capable of utilizing soapy water and finding out the bubbles.

Prevention of the Casualties from Fire

- **Fire Alarm Devices:** These are the devices used to warn people during fire and smoke or any other types of fire emergencies. These alarms are automatically activated once smoke and heat are detected. It should be installed on the telephone desk and the employer's entrance in order to evacuate promptly.
- **Fire Extinguisher:** It is a lifesaver device that is used to control small fires as well as in emergency situations. It should not be used in indented fire issues if it is reached to the walls, ceiling or where there is no route for escape.

Placement of fire extinguishers at workplace or organization must include.

- The fire extinguisher should always be placed or mounted on a wall and should be properly marked.
- Employees should be well trained with PASS methods or firefighting.
- The fire extinguisher should always be kept at the ease of location to all employees.
- Vehicles should also carry out one ABC rated extinguisher in case of emergency.
- All extinguishers should be well marked and labelled and should be clearly visible.
- All extinguishers should be inspected on a monthly basis, and their place it has not tampered with.
- For the point of safety, all extinguishers should be examined yearly or required to be refilled in order to ensure operability.
- A tag should also be attached to ensure its maintenance or refilling date and the signature of the authorized person.

- **Fire Extinguisher Classes:**

There are four types/classes of fire extinguishers, which are most common, i.e., A, B, C and D, where every class is capable of putting out a varied sort of fire.

- Class A extinguishers would be capable of putting out fires in ordinary combustibles such as wood and paper.
- Class B extinguishers are utilized for flammable liquids like grease, gasoline and oil.
- Class C extinguishers are used only for electrically energized fires.
- Class D extinguishers are used on flammable metals.

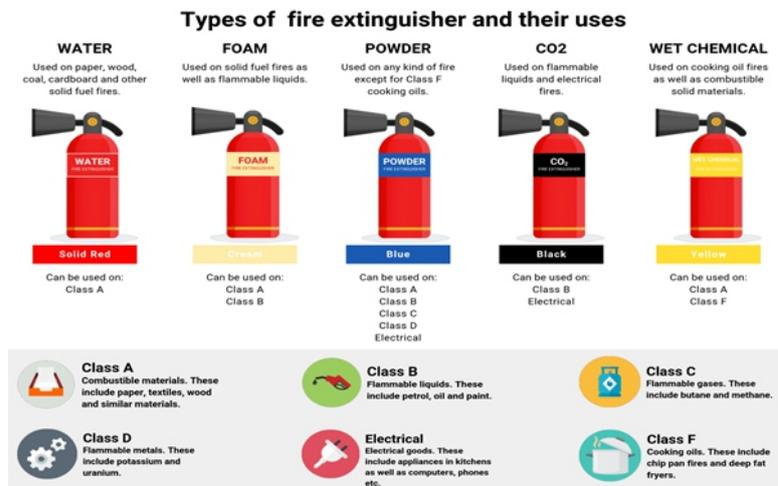


Fig. 5.7.1: Types of fire extinguishers

Uses of Fire Extinguishers

Once it is installed in the workplace or industry, it is important for every employee to get familiar with the usage and the direction of fire extinguishers so as to be well prepared for the sudden occurrence of any hazardous incidents and accidents. Fire extinguishers are relatively easy to use in case of small fires by using some simple technique called PASS.



Fig. 5.7.2: Pass technique for Fire Extinguisher use

Fire Hydrant/ Fire Hydrant Pump

Fire hydrant consists of a system of pipework connected directly to the water supply mainly to water to every hydrant outlet as well as is attempted to present water for the firemen in order to fight a fire. The water is seen to be discharged into the fire engine, from which it is then pumped and sprayed over the fire. Where the water supply is not inadequate or reliable, hydrant pumps requires to be presented to pressurize the mains of the fire.

UNIT 5.8: Artificial Respiration and CPR

Unit Objectives

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

1. Evaluate CPR as well as the artificial respiration

5.8.1 CPR As Well As the Artificial Respiration

Artificial respiration and CPR is an act (or) technique used for stimulating respiration when there is a sudden stoppage of breathing or lung functioning.

Techniques used to provide artificial respiration are:

- Mouth-to-mouth breathing
- Prone-pressure method
- Cardiopulmonary resuscitation (CPR) or external chest compression

There are two types of ways to provide Artificial respiration. They are:

- Manual and,
- Mechanical

Manual ways consist of:

- Mouth-to-mouth breathing
- Prone Pressure Method
- Back Pressure Arm-Lift

Mouth-To-Mouth Breathing

The steps to perform in this specific process are:



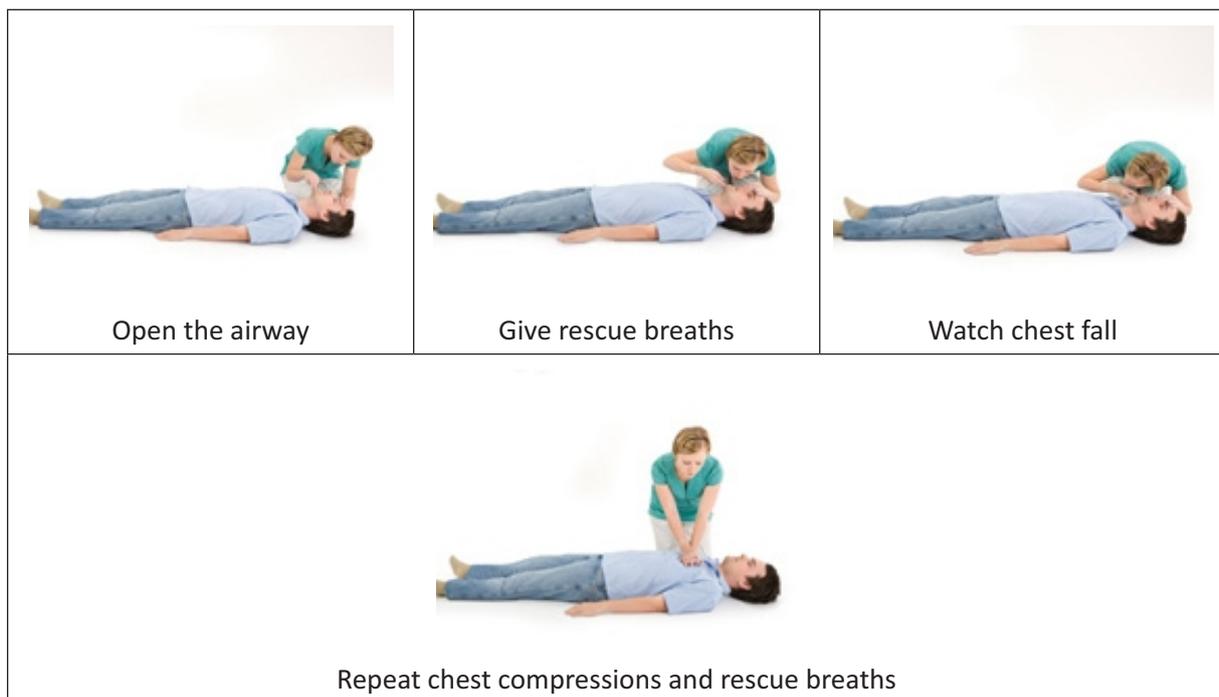


Table 5.8.1: CPR steps

Prone Pressure Method

This method, additionally known as the Schafer method, stands to be a type of artificial respiration which is used for a patient in case of drowning. In this, the patient is placed in a prone or placed in a face-down position allowing rhythmically pressure with the help of hand on the thorax by means of which the water present would get expelled from the lungs allowing air to enter by clearing the passage in order to breath.

Back Pressure Arm-Lift

This particular method is used as an alternative when other methods are not possible or are not working out.

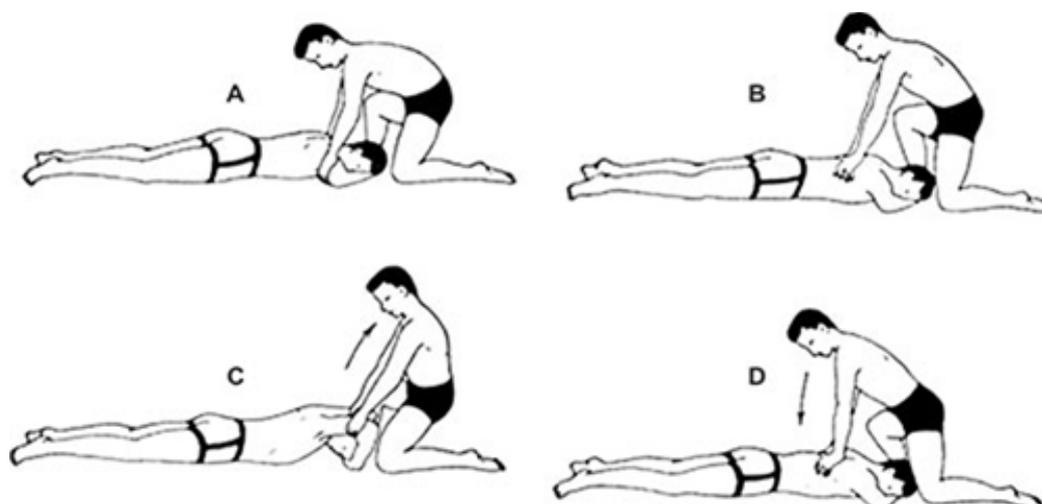


Fig. 5.8.1: Back Pressure Arm-Lift

A Mechanical Method of Artificial Respiration

These types of artificial respiration methods are generally performed by highly trained professionals such as a doctor, nurses, and paramedic forces. The mechanical method often uses machine-like ventilators. Another device that is used in the mechanical method is a bag valve mask. It has the self-inflate and deflates mechanism as well as has an air supply that is controlled by the valve.

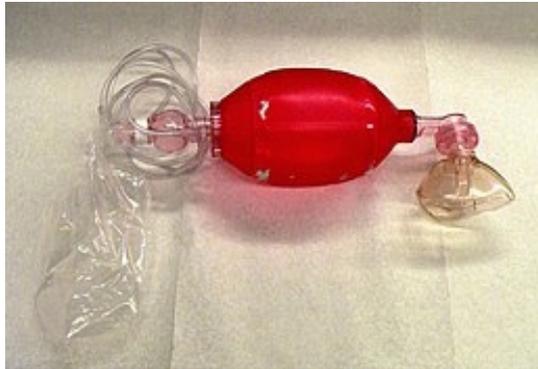


Fig. 5.8.2: Big Valve mask



Fig. 5.8.3: Ventilator

UNIT 5.9: Rescue and Evacuation In Case Of Fire

Unit Objectives

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

1. Discuss the evacuation and rescue during a fire incident

5.9.1 The Evacuation and Rescue during a Fire Incident

A "Fire Emergency Evacuation Plan (FEEP)" stands a scripted document that involves the activity to be adapted by all staff in the event of a fire and the sequences for calling the fire brigade.

Staff Fire Notice High fire threats or extensive premises that would be required a more illustrated emergency evacuation strategy which takes account of the findings of the assessment of fire risk, e.g. the staff importantly at threat and their spots. In addition, notices providing transparent and concise routine's instructions to be followed in the instance of fire that requires to be appropriately showcased.

In some instances, the individuals requires to be nominated individuals in order to conduct the fire action plan as well as provide them enough training in firefighting as well as procedures for evacuation. The following items require to be taken into consideration where appropriate:

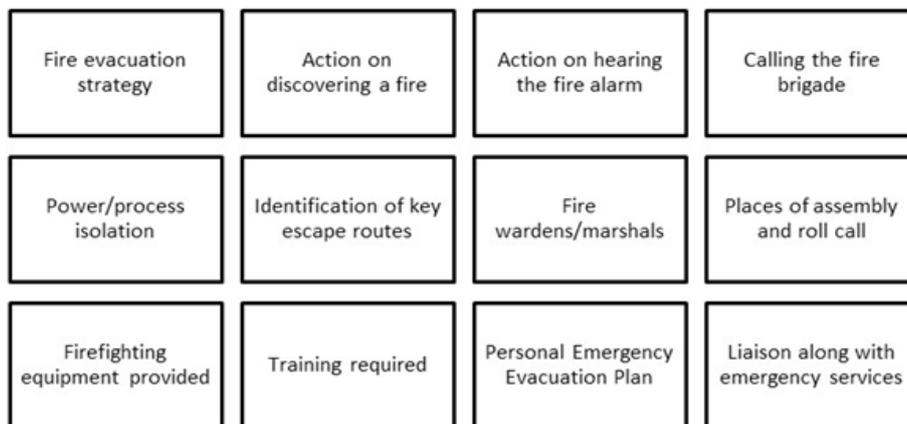


Fig. 5.9.1: Staff Fire Notice

Fire Evacuation Plan

You require taking into consideration of how you would tend to arrange the premises' evacuation in the light of your risk evaluation as well as the other fire precautions that the individuals possesses or intended to put in spot.

Simultaneous Evacuation

In most premises, the evacuation in the instance of fire would easily be by means of each one responding to the warning signal given when a fire is discovered, then making their way, by regards of escape, to a spot of safety away from the boundaries. This is referred as a simultaneous evacuation and would generally be initiated by the sounding of the normal alarm over the system of fire warning.

Vertical Phased Evacuation

In certain larger complex premises, the emergency arrangements are designed to allow people who are not at immediate risk from fire to delay initiating their evacuation. It might be accurate to start the evacuation by initially performing the evacuation by only the sector closest to the fire as well as warning other individuals to stand by. This is generally done by suddenly evacuating the floor where the fire is spotted as well as the floor located above. The other floors are then evacuated among the individuals to neglect congestion on the escape paths. The rest of the individuals are then evacuated if it is important to do so. The fire warning system requires to be capable of providing two distinctly different signals (warning and evacuation) or giving accurate voice messages. Horizontal phased evacuation in hospitals as well as care homes: the floor may be divided into a number of fire-resisting compartments, and the occupants are moved from the compartment involved in the fire to the adjacent compartment as well as, if required, moved again. Depending on the fire situation, it might eventually be significant to take into consideration vertical evacuation.

Other Fire Precautions

- systems of voice alarm
- fire control points
- compartmentation of the premises using fire-resisting construction
- sprinklers in buildings where the top floor is 30 meters or more above ground standards

Staff Alarm Evacuation (Silent Alarm)

In certain instances, it might not be accurate for a normal alarm to start immediate evacuation (Cinemas and Theatres). This could be as of the number of members of the public provided and the requirement for the staff in order to put pre-arranged strategies for the safe evacuation of the premises into action. In the mentioned situations, a staff alarm is capable of being provided (by fire records, personal pagers, discreet sounders, or a coded phrase on a public address system etc.). Following the staff alarm, a more normal alarm signal is capable of being provided, as well as a phased or simultaneous evacuation initiated. The general alarm might be activated automatically if manual initiation has not taken place within a pre-determined time.

Defend in Place

This strategy might be taken into consideration in blocks of flats where each flat is a minimum 60-minute fire-resisting compartment. It might additionally be considered in hospitals or nursing homes where patients are connected to life-supporting equipment as well as is not capable of being moved. The concept authorises the occupants to stay put as well as authorise the fire facility to extinguish the fire. If the fire spreads as well as it is not capable of being controlled, then they would tend to initiate an entire evacuation. In the instance of patients connected to life-supporting equipment, a decision has to be made which choice stands to be the best, stay or move; in either manner, the patient would be at grave threat.

You should only strategise in order to utilise defend-in-place, phased evacuation schemes or a alarm system for the staff if the individuals have sought the suggestion of a competent individual as well as the fire and rescue service.

Action on Hearing the Fire Alarm

On discovering a fire, it is the duty of every person to sound the nearest fire alarm immediately. The plan should include the method of raising the alarm in the case of fire.

People, on hearing the alarm, should proceed to pre-determined positions to assist members of the public and staff in leaving the building by the nearest safe route.

Lifts and escalators should not be used due to possible electrical failure unless they are part of a Personal Emergency Evacuation Plan.

Calling the fire brigade

The Fire Service should also be informed to combat from fire.

Power/Process Isolation

Close Down Procedure – Adopt your own 'Close Down' procedure as appropriate.



Fig. 5.9.2: Fire evacuation process

UNIT 5.10: First Aid

Unit Objectives

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

1. Cataloguing the first aids

5.10.1 First Aids

First aid, as the name suggests, stands to be the first and immediate care or assistance provided to the person in case of either minor, serious injury or illness. First-aid provided on time can save the life in case of life and death kind of situation as well as additionally assists to control the condition from worsening further.

First aid is often controlled by the 3 P's principle:

- Prevent further injury
- Preserve life
- Promote recovery

It is necessary that each floor or manager should have the first aid box handy with them and can be easily accessed by the employees in case of emergency or need.



Fig. 5.10.1: First Aid Kit

UNIT 5.11: Potential Injuries and Ill Health

Unit Objectives

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

1. Understanding the ill health as well as potential injuries

5.11.1 The Ill Health As Well As Potential Injuries

The major role of work is based on enhancing self-esteem, wellbeing and social mobility. However, work-related accidents or illnesses can impact the employees' health in longer or shorter terms and may result in economic as well as social repercussions for the employer.

It is mandatory for an employer to have precautionary measures in place to avoid such incidents. A few common work-related injuries and illnesses are:

- **Slips, trips and falls:** One of the most common causes of injury are slippery surface, fall from ladder or height. It can be avoided through a safety grill or safety bars.
- **Muscle strains:** Muscle strain occurs at the workplace due to lifting heavy items regularly and long-standing or sitting hours. This can be prevented easily through exercise, training and guidance.
- **Being hit by falling objects:** Employees working in warehouses often encounter injuries caused by fall-ing objects. It can be controlled by providing adequate storage and encouraging staff to store the item safely.
- **Cuts and lacerations:** It generally occurs by inappropriately handling sharp objects and is capable of being controlled by delivering the proper training to the staff, wearing proper protection and providing safety equipment to the workers.
- **Inhaling toxic fumes:** Workers who are dealing with chemicals are more likely to become a victim of an injury caused by toxic materials like inhaling dangerous gases or fumes. It is mandatory for the em-ployer to provide adequate safety gear to its worker who regularly meets such kinds of substances.
- **Crashes and collisions:** It can happen in warehouses and construction sites due to vehicle movement, and prevention can be done through necessary safety measures such as PPE, sufficient light, safety alert etc.
- **Exposure to loud noise:** Industrial deafness can occur to employees working in loud noise areas, and it can be avoided by wearing earplugs or earmuffs.
- **Fights at work:** Disagreement or tension may lead to fighting at work. It is a must to have an employee grievance department in order to deal with such cases.

UNIT 5.12: Precautions in Mobility

Unit Objectives

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

1. Demonstration of the precautions in mobility

5.12.1 The Precautions in Mobility

For the safety of the workers or employees at the workplace or any industry, one should always take the necessary precautions.

All manufacturing owners need to comply with the legal requirements to order to ensure that their industry and workplace is safe to work for everyone, from the customers to employees, suppliers, visitors, contractors and others.

In order to provide better productivity for a workplace, the management of the organization:

- Should minimize illness and injury of employees.
- Should reduce the risk of accidents.
- Should maximize productivity.
- Should reduce the cost of injuries and workers compensation.
- Should meet their legal requirements and responsibilities.
- Should retain their staff for better performance.

Precautions at the workplace may include.

- Keep every corner organised, clean and clutter-free
- Usage of mats on slippery floors
- Properly stored combustible material
- Ensure proper training while handling equipment and machinery

It is very important to have medical facilities and proper first aid for the employees working with heavy equipment and machinery.

1. **Clothes for each different appropriate task:** The people who are working with tools or with machinery must have proper clothing while operating the machinery. They must wear the right size of gloves according to the type of work and must wear safety shoes as well as all protective equipment while handling the tools, machinery and chemicals.

Different industries have different types of personal protective equipment based on their mode of work. Those are:

- **The food processing industry:** In this particular industry, they do not require special types of uniforms unless they require antibacterial head caps, clothing or aprons in order to prevent bacterial contamination.
2. **Implementation of emergency procedures:** This procedure usually contains emergencies that do not announce themselves, and there can be the expectation of fire and accidents. For this, there is a need to be prepared beforehand for such emergencies in order to ensure the safety of the employees, workers, visitors as well for business.

3. Reduce workplace stress: The common cause of stress during work is working for long hours, insecurity of job and conflicts between employees, which can sometimes lead to depression, difficulties during work and affects the concentration of the employees. Employers must avoid excessive workload on their employees as it may lead to employee's frustration which will provide a direct impact on employee productivity.

In order to promote a healthy and stress-free environment at the workplace, it is the employers' duty to take care of both the physical and emotional well-being of its employees by conducting regular training on time management, outdoor activities, small group discussion and many more.

UNIT 5.13: Significance of Various Types of Hazard and Safety Signs

Unit Objectives

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

1. Understanding the impact of various types of hazard and safety signs

5.13.1 The Impact of Various Types of Hazard and Safety Signs

Safety Hazard Significance

A hazard is a process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation. Hazards may be natural, anthropogenic or socio-natural in origin.

Safety hazards are number one on the list of 6 types of workplace hazards. These hazards play an effect on employees who work directly with machinery or on construction sites. Safety hazards are the most common workplace risks. They include:

- Anything that can cause spills or trips such as cords running across the floor or ice
- Anything that can cause falls, such as working from heights, including ladders, scaffolds, roofs, or any elevated work area.
- Unguarded and moving machinery parts that a worker can accidentally touch.
- Electrical hazards like frayed cords, missing ground pins, and improper wiring
- Confined spaces.

Safety Hazards Symbol

Safety symbols, hazard symbols or safety labels are meaningful and recognizable graphical symbols that warn of or identify hazards associated with the location or item.



Fig. 5.13.1: Role of hazard in Risk assessment

Chemical Hazard Significance

A chemical hazard is a (non-biological) substance that has the potential to cause harm to life or health. Chemicals are widely used in the home and in many other places.[1] Exposure to chemicals can cause acute or long-term detrimental health effects. In the workplace, exposure to chemical hazards is a type of occupational hazard. The use of personal protective equipment (PPE) may substantially reduce the risk of damage from contact with hazardous materials.

Chemical Hazards Symbol

Hazard pictographs are a type of labelling system that alerts people at a glance that there are hazardous chemicals present. The symbols help identify whether the chemicals that are going to be in use may potentially cause physical harm or harm to the environment.

These pictographs are also subdivided into classes and categories for each classification. The assignment for each chemical depends on its type and severity.

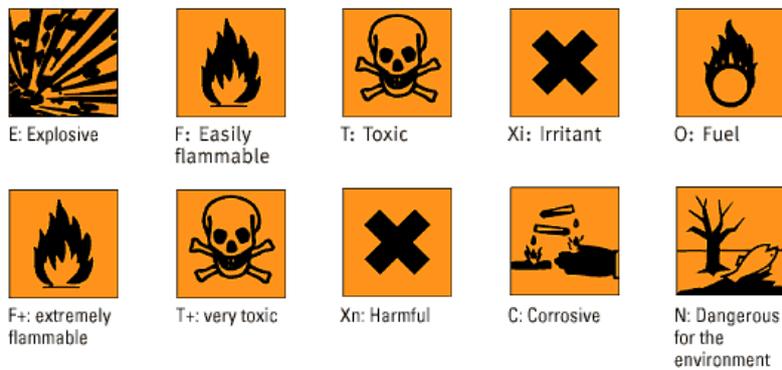


Fig. 5.13.2: Chemical hazard safety signs

Biological Hazard Significance

Biological health hazards include bacteria, viruses, parasites and moulds or fungi. They can pose a threat to human health when they are inhaled, eaten or come in contact with skin.

Biological Hazards Symbol

The biohazard symbol is used or displayed only to signify the actual or potential presence of a biological hazard. Appropriate wording may be used in association with the symbol to indicate the nature or identity of the hazard, the name of the individual responsible for its control, precautionary information, etc., but never should this information be superimposed on the symbol.



Fig. 5.13.3: Biological hazard safety signs

Ergonomic Hazard Significance

Poor ergonomics contributes to muscle strain, muscle imbalances, and fatigue. Many muscle strains result from performing the same motion over and over again. These become repetitive stress injuries, which are some of the most common workplace injuries.

Ergonomics alone won't eliminate this type of injury. However, proper ergonomics will significantly reduce fatigue and strain.

Ergonomic Hazard Symptoms

Signs and symptoms of ergonomic injuries include pain which may be dull and aching, sharp and stabbing or a burning sensation—tingling or numbness; swelling, inflammation, stiffness. Muscle weakness or discomfort; extremities are turning white or cold.

Work Organization Hazard Significance

A few examples of work organization hazards and it is effective they are defined below.

- Falls and Falling Objects- It can result in serious injury or fatality
- Fire Hazards- It can result in loss, serious injury or fatality
- Electrical Hazards- It can result in loss, serious injury or fatality

Work Organization Hazard Symbol

There are multiple signs or symbols used in an organization to alert the people in their workstations.



Fig. 5.13.4: Work organization related hazard safety signs

Summary

- Hazard can be identified as an extended-term as it is capable of causing severe disruption to the environment or surroundings.
- Risk Assessment (RA) and environment review (ER) were done for hazard and environmental impact. It is done from different stages, from evaluating a new operation, modification to the existing facilities, maintenance work and others.
- Electrical equipment is generally that equipment that requires electrical supplies for their operations.
- Personal protective equipment is majorly used to protect oneself from serious accidents or illnesses originating from the workplace's physical, biological, chemical, and mechanical hazards.
- Accidents are unplanned experiences resulting in injuries, illness, death, and loss of property and/or production. While there is no way to avoid accidents, some actions, plans, and preparations are capable of being taken to diminish them.
- The "Occupational Safety and Health Administration (OSHA)" needs to implement the organization with a fire prevention event in order to prevent injuries and accidents from the occurrence of fire in the workplace. Prevention from fire is necessary to avoid excessive damage.
- Fire hydrant consists of a system of pipework connected directly to the water supply mainly to water to every hydrant outlet as well as is attempted to present water for the firemen in order to fight a fire. The water is seen to be discharged into the fire engine, from which it is then pumped and sprayed over the fire.
- Artificial respiration and CPR is an act (or) technique used for stimulating respiration when there is a sudden stoppage of breathing or lung functioning. It requires metabolic processes to exchange the gases which tend to be present in the body by external or pulmonary ventilation.
- Fire drills can be initiated with a defined frequency in a surprising manner to ensure employees are well aware of the fire evacuation process. Attendance can be taken in assembly points, and briefing also can be arranged to further train the staff.
- First aid, as the name suggests, stands to be the first and immediate care or assistance provided to the person in case of either minor, serious injury or illness. First-aid provided on time can save the life in case of life and death kind of situation as well as additionally assists to control the condition from worsening further.
- The major role of work is based on enhancing self-esteem, wellbeing and social mobility. However, work-related accidents or illnesses can impact the employees' health in longer or shorter terms and may result in economic as well as social repercussions for the employer.
- A hazard is a process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation. Hazards may be natural, anthropogenic or socio-natural in origin.
- Poor ergonomics contributes to muscle strain, muscle imbalances, and fatigue. Many muscle strains result from performing the same motion over and over again. These become repetitive stress injuries, which are some of the most common workplace injuries.

6. Working Effectively in an Organization



- Unit 6.1 - Organizational Policies
- Unit 6.2 - Legislations, standard, policies, and procedures
- Unit 6.3 - Reporting Structure
- Unit 6.4 - Inter-Dependent Functions
- Unit 6.5 - Harassment and Discrimination
- Unit 6.6 - Prioritising Tasks
- Unit 6.7 - Communication Skills
- Unit 6.8 - Teamwork
- Unit 6.9 - Ethics and Discipline
- Unit 6.10 - Grievances Solution
- Unit 6.11 - Interpersonal Conflicts
- Unit 6.12 - Disabilities and Challenges
- Unit 6.13 - Gender Sensitivity and Discrimination
- Unit 6.14 - Applicable Legislation, Grievance Redressal Mechanisms
- Unit 6.15 - Transacting With Others without Personal Bias



Key Learning Outcomes

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

1. Categorize the organizational policies
2. Catalogue the Legislations, standards, policies, and procedures
3. Analyse the reporting structure
4. List the inter-dependent functions
5. Discuss the impact of harassment and discrimination
6. Monitor the ways of prioritising the task
7. Record the types of communication skills
8. Evaluate the ways of carrying out teamwork
9. Highlight the ethics and discipline
10. Illustration of the grievance's solution
11. Recognize the interpersonal conflicts
12. Identify the disabilities and challenges
13. Outline the gender sensitivity and discrimination
14. Discuss the applicable legislations, grievance redressal mechanisms
15. Analyse the process of transacting with others without personal bias

UNIT 6.1: Organizational Policies

Unit Objectives

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

1. Categorize the organizational policies

6.1.1 The Organizational Policies

Organizational policy or work place policy is a type of statement which provides the outlining of any organization that practices out the procedures. This eventually leads to its business which covers and everything, starting from the operations to concerns and compliances along with the employee's legislation. It also protects the organization from risks and hazards. It consists of a group of statements that could showcase the purpose for one or more guidelines and actions that are required to be taken against it in order to achieve the goals. The statements are required to be written in simple formats for providing efficiency, depending on the type of issues in which the length of policy is stated.

Benefits of Organizational Policies:

- It stands to be in line with organizational values
- It tends to have the list of complaints with the employment and associated legal requirement
- It provides proper clarity on the roles and responsibilities
- It ensures that an organization operates efficiently and in the specified business manner
- It helps in strengthening the staff position during or in the legal situation
- It enforces consistency and uniformity in the operational procedure and in the processes of decision making
- It saves time for the employees while the problems can be resolved rapidly and effectively through the existing policy

Types of organizational or workplace policies:

- Workplace health and safety policy
- Non-discrimination and anti-harassment policies
- Equal opportunity policy
- Employee code of conduct policy
- Leave policy
- Employee time-stamping policy
- Employee disciplinary and termination policy
- Employee grievance policy
- Social media policy
- E-mail policy
- Mobile phone policy
- Temporary policy

1. **Workplace health and safety policy:** It is very essential for a recruiter to provide safe and healthy work environments to their employees since the hazards might arrive without alarming anybody about the risks.
2. **Non-discrimination and Anti-harassment policy:** The principle behind this policy highlights its providing of guarantees in which human rights are exercised without any discrimination. These discriminations stand to be against individuals on the basis of their race, colour, gender, age, language, national origin, religion, gender identity, sexual orientation, property, marital status, family status, and citizenship. The proposal of this policy is mainly to inhibit any kind of harassment, whether it could be verbal or nonverbal and any kind of physical conduct which is designed to threaten the co-workers and to intimidate the employees or any person working on behalf.
3. **Equal opportunity policy:** This policy ensures that the employees are hired irrespective of their gender, religion, colour, age, caste, marital status, or physical ability.
4. **Employee code of conduct policy:** The policy sets the guidelines for all the employees and various stakeholders in which they are expected to follow in their professional and personal behaviour at the workplace.
5. **Leave policy:** This policy recognises that employees require time off from their works in order to maintain the work-life balance. It also understands the various other needs, like personal commitment, medical exigencies, relaxes time and so on of the employees.
6. **Employee time-stamping policy:** This policy describes the rules and regulations related to the working hours of an employee. It additionally assists the guidelines related to their reporting time, work duration/hours and breaks time.
7. **Employee disciplinary and termination policy:** The major objective of the mentioned policy is to define the procedures and protocols in case of any breach of the company's policy, employee misconduct or any in-disciplinary behaviour.
8. **Employee grievance policy:** The aim of this policy is to make sure that every employee has a formal way to raise their concern or complaint to their senior management. It has a clear structure and point of contact details in a case in which the employee wants to raise a concern.
9. **Social media policy:** It is expected from every employee who is engaged or involved in social media sites, like Facebook, Instagram, and Twitter, LinkedIn and several other similar platforms, to understand and follow the guidelines of the company's social media policy. This mainly stands to be the concern for the company if their action or engagement involves the company name. Failing to do so can put their employment with the company at risk.
10. **E-mail policy:** This policy describes the guidelines and uses of corporate e-mails to meet business requirements. One should follow the corporate standards, including copyrights, logos and signatures, while sending the e-mail within or outside the organization.
11. **Mobile phone policy:** This policy implies restrictions or limitations on the usage of mobile phones at the workplace.
12. **Temporary Policies:** These policies are added to the main body of company's policy guides and could be changed or removed as needed example during the COVID-19 pandemic organization implemented policy to handle social distancing, masking, disinfecting and other safety procedures for keeping employee's and workplace safe for smooth running of organization or business.

UNIT 6.2: Legislations, standard, policies, and procedures

Unit Objectives

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

1. Catalogue the Legislations, standards, policies, and procedures

6.2.1 The Legislations, Standards, Policies, and Procedures

It is the legal requirement of an organisation to comply with the local laws as well as regulations and keep them updated time-to-time. The HR department is mainly responsible for continuously updating the regulations and making sure that it is communicated across the organisation. It also states that the laws and regulations of local authorities take over the organisational policy when required.

Standard practices at a workplace must have:

- Employers to define clear expectations from their employees.
- Provide a chance to utilise one's skills to perform a task.
- Support one's employees
- Motivate employees to collaborate and participate in decision making
- Welcoming nature for the feedback from the organization's employees.
- Investment in the employees learning and development process.
- Feedback received from employees and attempts to make a great workplace.

Policies and procedures at the workplace:

A policy is a general set of guidelines that are designed in line with the company's objective for dealing with an issue. Policies communicate the connection between the organization's vision and values.

A procedure sets out the specific task or action plan for implementing or carrying out a policy. Procedure tells employee's how to deal with a situation and when.

Importance of Policies and Procedure:

- It makes sure of the smooth functioning of the business and its day-to-day tasks.
- It clearly sets out the instruction for the employees which is expected from them.
- Having policy and procedure in place become handy at times while dealing with any kind of issue.
- It improves the overall image of an organisation in the market.
- It sends out a clear message to its external stakeholders and helps the organisation to build trust among its stakeholders.
- It enhances the goodwill of an organisation and, in turn, increases the market value.

The difference between policy and procedure is described below:

POLICY

The formal guidance needed to coordinate and execute activity throughout the district. When effectively deployed, policy statements help focus attention and resources on high priority issues - aligning and merging efforts to achieve the district's vision. Policy provides the operational framework within which the district functions.

- Widespread application
- Changes less frequently
- Usually expressed in broad terms
- States "what" and/or "why"
- Answers operational issues

PROCEDURE

The operational processes required to implement district policy. Operating practices can be formal or informal, specific to a department or building or applicable across the entire district. If policy is "what" the district does operationally, then its procedures are "how" it intends to carry out those operating policy expressions.

- Narrow application
- Prone to change
- Often stated in detail
- States "how", "when", and/or "who"
- Describes process

Fig. 6.2.1: Difference between Policy and Procedure

UNIT 6.3: Reporting Structure

Unit Objectives

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

1. Analyse the reporting structure

6.3.1 The Reporting Structure

Reporting structure refers to the relationship between the employees' position in terms of authority –“who reports to whom”. The reporting structure acts as a command it is hierarchal within every employee report to another employee who resides to be one level higher in their authority or position within the organisation including communication and decision channels.

Types of Reporting Structure

- **Vertical Structure:** The vertical organizational structure is a pyramid like top-down management structure. It creates a powerful hierarchical structure that emerges from top highest level of leadership CEO/owner followed by middle management then regular employees at bottom. Every employee has the authority to do their individual task or jobs. Every employee has to report to their supervisors in case of any issue. Here decision making often work from top to bottom, but work approval will work from bottom to top.
- **Horizontal Structure:** The flat structure or horizontal structure is an organizational structure having only a few layers of management into which the managers have a very wide span to control with one or more subordinates as it does not have many chains of command. The top layer of the structure is the owner of the business, whereas the second layer contains team leaders or managers who will report to the business owner. The third layer of team members is supervised by the team leaders or the managers of the second layer.

The company's reporting structure is generally prepared to keep the company's strategic goals and missions in mind. The authorities and work are delegated among the employees of the various departments according to various business functions.

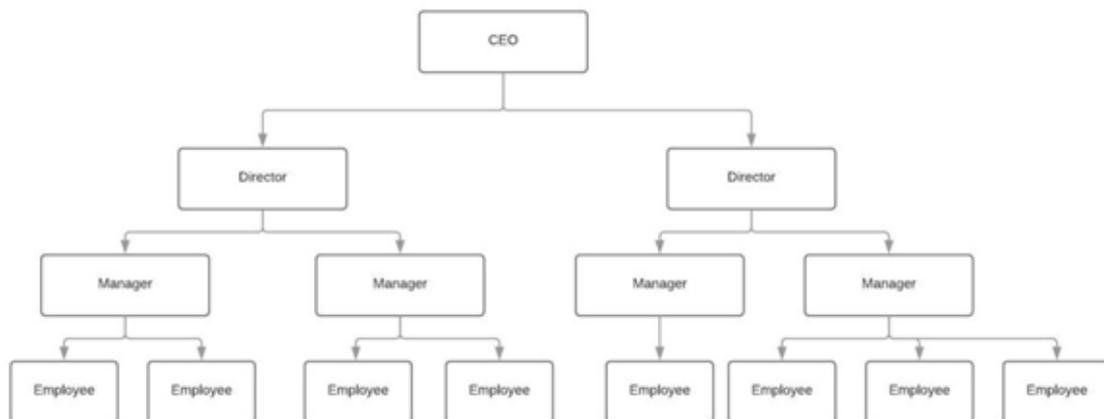


Fig. 6.3.1: Company's Reporting Structure

UNIT 6.4: Inter-Dependent Functions

Unit Objectives

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

1. List the inter-dependent functions

6.4.1 The Inter-Dependent Functions

Interdependence stands to be the key aspect of creating a healthy work environment and a sense of unity among the workers in order to achieve a common organizational goal. Teams of employees working together in hierarchy of organizational structure tend to demonstrate high chances of success rather than working individually. It also ensures the everyone is in line with the company's overall progress and are working towards the same objective.

The two main components of Inter-dependence are:

1. Collaboration
2. Delegation

Types of Inter-dependence:

- **Pooled inter-dependence:** In an organisation, each vertical or or horizontal department may not directly interact and do not directly depend on each other and perform completely separate functions having their own set of tasks, which stands to be different from each other, but they offer a contribution to the overall goal of an organisation as well. This type of inter-dependence is known as pooled inter-dependence. It means if any department fails to achieve its objective, the entire project or goal will collapse.
- **Sequential inter-dependence:** Sequential interdependence is a kind of inter-dependence when one department is witnessed to depend upon the functioning of the other department. As an instance, the procurement department must purchase the raw materials in order to ensure the proper functioning of the production department.
- **Reciprocal inter-dependence:** Similar to Sequential inter-dependence, Reciprocal inter-dependence also defines output of one department becomes input of other department in order to efficiently complete the task or project.

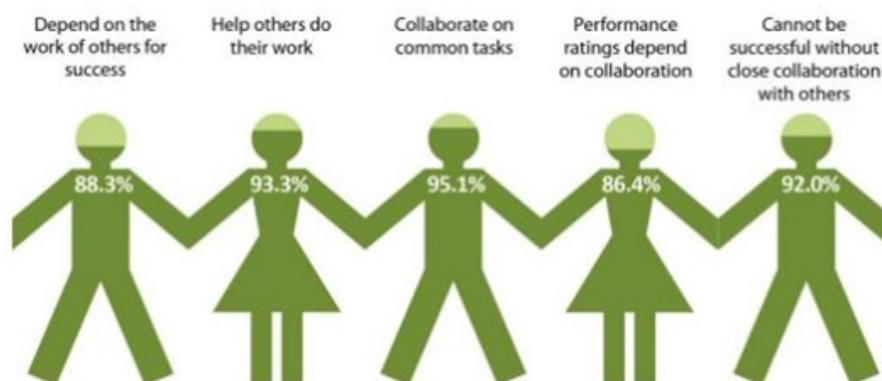


Fig. 6.4.1: Process of the concept of Inter-dependence

UNIT 6.5: Harassment and Discrimination

Unit Objectives

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

1. Discuss the impact of harassment and discrimination

6.5.1 The Impact of Harassment and Discrimination

Any objectionable behaviour of someone towards an individual during professional or personal communication, whether on verbal or non-verbal terms, is referred to as harassment.

Harassment can include behaviours, such as:

- Telling abusive jokes about a particular group of members.
- Forwarding obvious or sexually suggestive emails or texts.
- Making disrespectful comments or taunts about a person's appearance and disability.
- Asking unwanted questions about someone's life.
- Displaying ethnic offensive screen savers.

Discrimination refers to a treatment when one person or a group of members are treated unfairly based on the factors such as race, colour, gender, sexual orientation, age, religion, and disability.

Discrimination that occurs in the workplace is of different types:

It occurs when an individual is discriminated against a number of factors. In addition to the reasons, job applicants and workers are also discriminated against because of their relationship with any other person.

The different types of workplace discrimination are.

- Gender Discrimination
- Age Discrimination
- Race Discrimination
- Skin colour Discrimination
- Mental and physical disability
- Genetic information
- Religion Discrimination

Pregnancy and parenthood: Harassment and Discrimination at workplace is illegal and unethical. It is not only treating your employee's equally the right thing to do but also avoiding any type of harassment and discrimination can also improve company's reputation and will also improve working environment in organization.

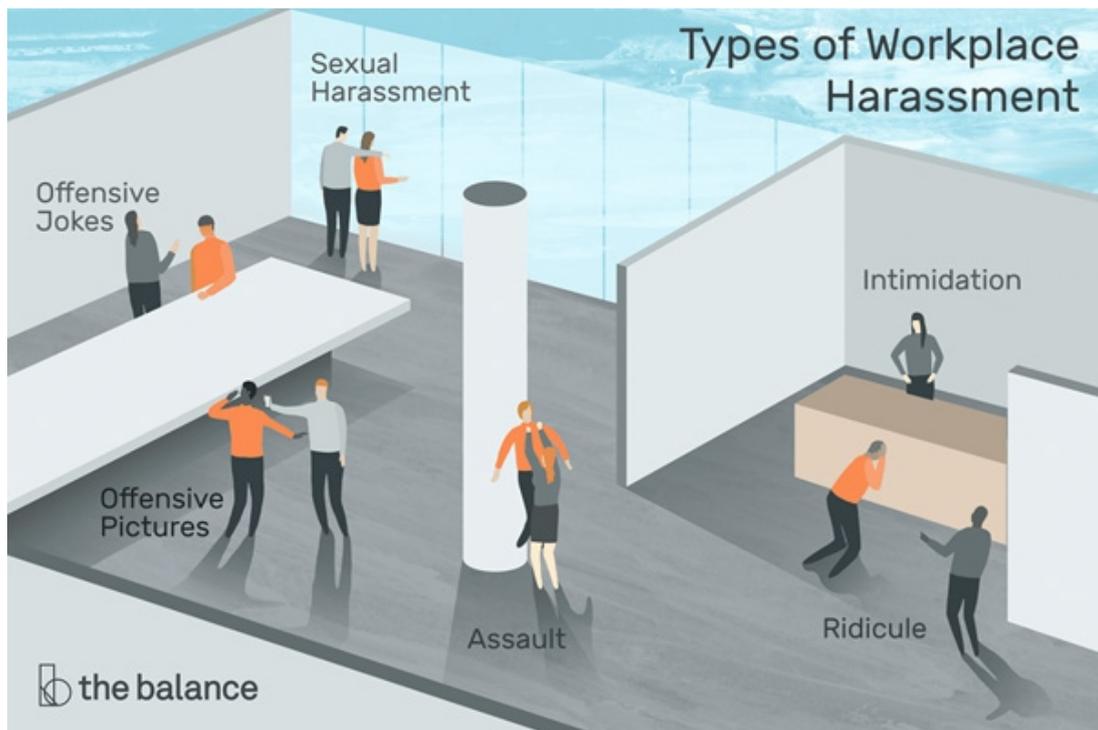


Fig. 6.5.1: Types of Workplace Harassment

UNIT 6.6: Prioritising Tasks

Unit Objectives

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

1. Monitor the ways of prioritising the task

6.6.1 The Ways of Prioritising the Task

Prioritizing a task or work is a process of having an understanding of which task requires to be achieved first by determining the level of importance and urgency of task, thing or event. However, each task or work appears to be equally vital. Prioritization also helps the employees to attain more work or tasks in a less amount of time. It is very important for the employees and workers to prioritize their work in order to be productive rather than being reactive, which will indirectly decrease their efficiency of providing productive work.

How to Prioritize Task on Workplace When Everything's Important?

Seven strategies for prioritizing tasks at the workplace:

- Having a list that contains all tasks or works in one place
- Identify what's important
- Highlight what is necessary
- Prioritize based on importance
- Avoid competing with priorities
- Consideration of the efforts made in the tasks
- Constantly reviewing task and be realistic

UNIT 6.7: Communication Skills

Unit Objectives

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

1. Record the types of communication skills

6.7.1 The Types of Communication Skills

Communication skill mainly addresses to the ability of the ways in order to communicate effectively with managers, colleagues and staff. It is an essential part for every industry. Communication is the act of transferring information from one place to another. It may be vocally (using voice), written (using printed or digital media such as books, magazines, websites or emails, visually (using logos, maps, chats or graphs), nonverbally (using body language, gestures, tone and pitch of voice). In practice it is often a combination of several of these. Productive communication skills in the workplace can reduce conflicts, lower the risk of projects indirectly and thus would make the work more agreeable.

In today's scenario having technical skills is not only enough to get the work done in the workplace. Completing the task must require the support of the whole team, and without proper communication, things will remain stringent in order to get better communication in the workplace. Communication skills are absolutely necessary for successful communication both in the workplace and in private life.



Fig. 6.7.1: Essential Communication Skills

- **Body Language (non-verbal):** When there is a discussion about body language, it refers to the ways by an individual presents themselves while interacting with someone. It includes body posture, hand movements or gestures, the type of eye contact that is made, and the voice tone.
- **Listening:** Communication in the workplace is not entirely about speaking; it mainly represents atwo-way channel. Onehas to pay close attention while talking, as this allows the team members to ask and clarify their doubts as well asinquiries to ensure that they are on the same page or track.
- **Clarity and Conciseness:** One of the major ingredients for effective communication in the workplace is clarity, which mainly stands to be responsible to expresses the attempt of conveying an individual's message in the simple way possible. Before you start a conversation, type an email or being a discussion, have in mind what the purpose of the communication is and what information you hope to obtain as a result.
- **Friendliness:** In order to engage with the team members in an open or honest discussion, a person needs a friendly tone, a personal question, or simply a smile. It is important because the team members would not hesitate to contact the individual as they would be easily approachable for the conversation.



Fig. 6.7.2: 7 Key Active Listening Skills

- **Empathy:** Showing compassion or empathy even when the individual disagrees with an employer, co-worker, or employee state to be very important as it helps in understanding their point of view and also respects their decision.
- **Confidence:** It is an important step to be confident when an individual tends to interact with others. As in all interactions, confidence (but not overconfidence) is crucial part. Conveying with confidence will give you peoples, faith in your abilities and will take you seriously.
- **Respect:** The employee must respect their co-workers' roles, skill set and ideas in order to meet the company's overall goal as a team.

The team must communicate with each other in a respectful manner every time. Conveying them with respect through email by taking the time in order to edit their message is also required. If the individual would send them a sloppy written, confusing email, the recipient will think them to be disrespectful and also encourage them to think through the person's communication.

Summarizing the concept:

Effective and clear communication at the workplace ensures that the healthy work environment supports the overall team development, engagement of employees, innovative idea, which in turn help the overall company's growth, enhancing the goodwill and trust of its customers.

UNIT 6.8: Teamwork

Unit Objectives

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

1. Evaluate the ways of carrying out a teamwork

6.8.1 The Ways of Carrying Out Teamwork

Teamwork is a cumulative effort done by a team or a group of members in order to acquire a common goal or to complete a given work or task in the most effective and powerful way. Good teamwork helps in building a strong relationship as well as provides morale in the workplace, which makes the workers more productive, leading to an increased profit.

Tips to improve teamwork in the organization:

- **Encourage informal social events:** In an informal environment, employees feel free to communicate with each other, and they also try to understand the personal behaviour of everyone.
- **Clarify Roles:** In order to work efficiently at the workplace, every employee should have a proper understanding of their roles and responsibilities according to their work demand.
- **Specify long-term as well short-term goals:** Specifying goals help in streamlining the communication and makes the teamwork more purposeful.
- **Reward and recognition:** It is necessary for an employer to recognise the best performing employees as it will keep them motivated and also provide a sense of accomplishment.
- **Avoid micro-management:** One of the significant drawbacks of micromanagement is that the employee tends to focus on the small or less relevant thing which they think is required to please the immediate supervisor.
- **Establish Effective Communications:** It is not necessary that an employee needs to be friends with all the co-workers, but the thing which is necessary states the establishing and practising of effective/good communication.
- **Respect Individuality:** Every individual has their own personality, skill and preferential ways of working, which is a necessity of the employer in order to recognise these.
- **Seek feedback:** Seek feedback not only from the managerial staff but also from the ground level staff in order to gain the proper insights and scopes of improvement.

UNIT 6.9: Ethics and Discipline

Unit Objectives

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

1. Highlight the ethics and discipline

6.9.1 The Ethics and Discipline

Work ethics refers to the ways by which the employees govern themselves and their attitude towards their work. It also refers to morality in the workplace.

A person having a good work ethic tends to create a healthy workplace environment for him/her as well as for their fellow co-workers.

It is mandatory for an employer to develop strong work ethics among the employees. It can be done in various ways.

- Setting clear goals and objectives
- Mentoring
- Set example
- Need of right work environment
- Encourage professionalism
- Discipline
- Listen to your employees
- Feedback
- Rewards and recognition
- Remove obstacles
- Discipline at Workplace

UNIT 6.10: Grievances Solution

Unit Objectives

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

1. Illustration of the grievance's solution

6.10.1 The Grievance's Solution

Grievance's Solutions

A grievance can prove to be quite harmful if not dealt with in time. It may lead to frustration among the employees, and they can start losing their trust from the employers.

Work-related grievances and complaints from staff need to be tackled with proper care and are also known to be a time taking procedure.

It is the liability of the HR department that employee grievances are addressed quickly and in an effective manner.

There are five ways in order to address the grievances effectively:

- **Prompt and timely Action:** The staff or department expert in handling the grievances must be highly trained in managing the employee grievances effectively and in a time-bound manner.
- **Grievance acceptance:** The supervisor or expert must accept the employee grievance and also should respect their genuine feelings.
- **Collect information:** Management should not wait for the grievances to be reported. Instead, it should take preventive steps in order to avoid it. In order to curb it, the management must discuss, collect information, communicate regarding various issues at the workplace.
- **Cross verify the grievance cause:** Once the information and cause of grievance are collected about the reported incident, the information must be cross-checked from various other sources.
- **Decision making:** On successful identification of the causes, the management must develop a series of steps in order to resolve it along with the next course of action.
- **Review and implement:** The management should not wait for a longer time once they have a rational and effective resolution. It is necessary to involve the concerning employee(s) in confidence before implementing the decision.

UNIT 6.11: Interpersonal Conflicts

Unit Objectives

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

1. Recognize the interpersonal conflicts

6.11.1 The Interpersonal Conflicts

Interpersonal Conflicts

Interpersonal conflicts refer to any type of conflict among two or more people. The idea mainly refers to the situation when a person or group of employees try to interfere in some other employee's work.

Ways to Resolve Conflict at the Workplace

- Communicate
- Listen carefully
- Show empathy
- Never hold back any grudges
- Effective communication skill

UNIT 6.12: Disabilities and Challenges

Unit Objectives

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

1. Identify the disabilities and challenges

6.12.1 The Disabilities and Challenges

People with disabilities are far more impacted by personal and environmental barriers than normal people. By the end of this module, you will be able to get clarity on the rights of disabled people in the workplace.

These challenges to employment can range from a variety of physical and social ones. These can include:

- Physical barriers
- Nature of co-workers and stereotyping
- Communication barriers
- Policy barriers

Physical Barriers

They can take the form of structural issues in an environment that retrogrades the basic functioning of disabled people. As an instance, the lack of a wheelchair ramp or an elevator can hamper basic tasks for disabled people or not allow them access to modern equipment that would authorize them to perform tasks.

Nature of Co-Workers and Stereotyping

Judgements and assumptions against people with disabilities are pretty much the norms of our present-day society. They tend to prevent disabled people from getting hired or having a positive experience in the workplace. For example, a person might be denied useful resources because their employer believes that they don't tend to possess a learning ability. This is common for people suffering from autism, ADHD or several other 'invisible' disabilities.

Communication Barriers

Communication barriers can create an inefficacy to effectively write, speak, read or understand the necessary requirements for a job. Some examples would involve the inability to use a phone due to hearing disability, lack of braille prints for blind people, and usage of languages that are too technical for people with cognitive impairments.

Policy Barriers

Policy barriers can also be a defining factor for the challenged people to get a job in a cooperative workplace. These include giving people not enough time to complete their tasks.

UNIT 6.13: Gender Sensitivity and Discrimination

Unit Objectives

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

1. Identify the disabilities and challenges

6.13.1 The Disabilities and Challenges

Gender sensitivity has also been an ongoing dialogue inside the workplace. The workplace has frequently been referred to as an “inhospitable place” for women due to the multiple decisions taken by the HRs (i.e., policies, decisions and their enactment, training, wage).

Ways to Build Gender Sensitivity and Eliminate Discrimination

- Recognizing the workplace’s “Gender Equality Maker (GEM).”
- By being open and informative about it
- Altering existing policies to make room for gender diversity and equality
- Strict implementation of the policies

Recognize the Workplace’s Gender Equality Maker

Being gender-sensitive is just one of the many necessary steps to be taken in order to have a gender-fluid workplace. Recognizing your company’s current status in its diversity can be helpful and would point you in the right direction.

By Being Open and Informative About It

An open atmosphere in a workplace would help a company and its employees to excel in all directions. Understanding their needs and fulfilling them accordingly would help the employers and workers in a similar manner to achieve a gender-balanced environment.

For example, having group discussions with men, women, and LGBTQ+ would help people to understand their needs and concerns.

Altering Existing Policies to Make Room for Gender Diversity and Equality

The “Equal Remuneration Act of 1976” of India has prohibited differential pay to men and women employees for conducting the same work or work of the same nature.

Strict Implementation

Rules and regulations are only followed up with when implemented strictly. There are lots of rules and policies that can be put in place in order to check inequality and help a workplace to go from being gender-sensitive to gender transformative. One example which can be taken under consideration is the ensuring of nearly everyone to be confident and open to a leadership role if offered, while the others could portray equal pay amongst colleagues in the same position. Lastly, for sexual harassment, implementing strict rules against this kind of behaviour is paramount and shows that a corporation is heading in the right direction. Companies must realise that employees are working in a safe environment and do not need to be anxious about a harassment encounter.

UNIT 6.14: Applicable Legislation, Grievance Redressal Mechanisms

Unit Objectives

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

1. Discuss the applicable legislations, grievance redressal mechanisms

6.14.1 The Applicable Legislations, Grievance Redressal Mechanisms

The Indian Constitution guarantees equality and prohibits discrimination on the grounds of religion, race, caste, sex, birthplace, and residence.

Discrimination against or profiling individuals can occur at two stages – pre-recruitment and post-recruitment. The former entails rejecting potential candidates on the basis of their gender, religion, caste, marital status, pregnancy etc. Post-recruitment discrimination manifests in lesser pay, fewer benefits and/or leave or even termination, based on the same grounds.

The Constitution guarantees equality of opportunity for every citizen in matters relating to employment or appointment to any office under the state.

“Equal Remuneration Act, 1976” needs the employers to pay equal remuneration to the employees for the same task or work of a similar nature without having any discrimination on the basis of sex.

Grievance Redressal Mechanism

A transparent, quick, robust and confidential grievance redressal system can effectively help in order to handle conflicts in the workplace and potentially go a long way in bringing harmony to the workplace. Some of the better places to work are identified to have an efficient worker-based grievance redressal mechanism.

In India, certain central and state-specific labour laws require the employer to adopt certain grievance redressal mechanisms at the workplace.

- **Internal Commite for Complaints:** According to the sexual harassment of women at workplace "(Prevention, Prohibition and Redressal) Act, 2013" of India (POSH Act), each workplace possessing at least ten employees is required to constitute an Internal Complaints Committee (IC). The IC is required to investigate complaints of sexual harassment of women at the workplace and also provide recommendations to the employers.
- **Grievance Redressal Committee:** According to section 9C of the Industrial Disputes Act, 1947 of India (IDA), each employer recruiting at least twenty workmen, is needed to structure a Grievance Redressal Committee (GRC) for resolution of the conflicts arising out of grievances of the people.
- **Works Committee:** The labour authorities might, under section 3 of the IDA, order an initiation possessing at least one hundred workmen to set up a Works Committee (WC).
- **Committee for Employee's Health and Safety:** Certain states in Indian like Maharashtra need employers to employ at least one hundred workers to structure a Health, Safety and Welfare Committee (HSW Committee). The responsibility of the HSW Committee includes surveying and identifying any accident-prone, hazardous objects or spots in the boundaries, rectifying such spots, conducting healthcare camps once a year.

UNIT 6.15: Transacting With Others without Personal Bias

Unit Objectives

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

1. To administer with others without personal bias

6.15.1 Personal Bias

When it arrives at making choices at work, it's important to know they are not based on bias. It is essential for organizations to have concrete processes and procedures in place to curb unconscious bias. Nevertheless, there are many stages that can be adopted to check the biases and to create an inclusive environment for the team.

Recognizing an Individual's Own Biases

Recruitment is known to be an area where unconscious bias may come into play as it has been seen that people may unwittingly tend to favour applicants from their own familiar backgrounds.

Focusing on People

Many organizations are so focused on their processes that they lose sight of their own people. Of course, there is a requirement to find time, for example, to write reports, define job descriptions, and set up performance appraisals, but it's important that there is also the establishment of expectations communicate plans, and giving as well as receiving feedback from everyone involved in the team.

Increasing Exposure to Biases

Many organizations assume that their policies on avoiding discrimination are robust and work well, so perhaps they fail to weed out some subtle biases. Declaration of the intentions about valuing a diverse workforce is extensively required. Saying words out loud, or writing them down, sends a clear message to everyone with whom an individual is working, as well as is involved in one's own subconsciousness.

Summary

- Organizational policy or work place policy is a type of statement which provides the outlining of any organization that practices out the procedures. This eventually leads to its business which covers and everything, starting from the operations to concerns and compliances along with the employee's legislation.
- It is the legal requirement of an organisation to comply with the local laws as well as regulations and keep them updated time-to-time. The HR department is mainly responsible for continuously updating the regulations and making sure that it is communicated across the organisation.
- Policies communicate the connection between the organization's vision and values.
- The reporting structure acts as a command it is hierarchal within every employee report to another employee who resides to be one level higher in their authority or position within the organisation including communication and decision channels.
- Teams of employees working together in hierarchy of organizational structure tend to demonstrate high chances of success rather than working individually.
- Prioritizing a task or work is a process of having an understanding of which task requires to be achieved first by determining the level of importance and urgency of task, thing or event.
- Effective and clear communication at the workplace ensures that the healthy work environment supports the overall team development, engagement of employees, innovative idea, which in turn help the overall company's growth, enhancing the goodwill and trust of its customers.
- Discipline at the workplace lays a strong foundation of trust between the employer and its employees. It includes reporting on time, maintaining decorum during working hours and at the workplace, appropriate dressing, proper communication, etc.
- A grievance can prove to be quite harmful if not dealt with in time. It may lead to frustration among the employees, and they can start losing their trust from the employers. In order to handle grievances properly, one should have an adequate set of procedures that lays out a clear step by step process in order to deal with the grievances.
- Women have been witnessed to have fought for their rights and for their place in this world for hundreds of years. However, it's not just women now, and the LGBTQ+ communities are also fighting for their rights and their voices in order to be heard.
- The Indian Constitution guarantees equality and prohibits discrimination on the grounds of religion, race, caste, sex, birthplace, and residence.
- A transparent, quick, robust and confidential grievance redressal system can effectively help in order to handle conflicts in the workplace and potentially go a long way in bringing harmony to the workplace.
- Recruitment is known to be an area where unconscious bias may come into play as it has been seen that people may unwittingly tend to favour applicants from their own familiar backgrounds. But a person can take practical steps in order to reduce this bias.



7. Material Conservation



Unit 7.1 - Material Handling

Unit 7.2 - Workstation Layout, Electrical and Thermal Equipment

Unit 7.3 - Organisational Procedures for Minimising Waste

Unit 7.4 - Practices of Efficient and Inefficient Management

Unit 7.5 - Material and Water Usage



Key Learning Outcomes

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

1. Identify the ways to handle materials.
2. Categorize the workstation layouts, electrical and thermal equipment.
3. List the organizational procedures for minimising waste.
4. Analyse the practices of efficient and inefficient management.
5. Discuss the material and water usage.

UNIT 7.1: Material Handling

Unit Objectives

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

1. Identify the ways to handle materials

7.1.1 The ways to Handle Materials

Material handling

Material handling is also known as the integrated system, which involves such activities of the movement, storage, protection and control of types of materials and products throughout the manufacturing, distribution, consumption and disposal. The major function involves the focus on methods, mechanical equipment, and related control systems to achieve the mentioned functions.

The fundamental objective of using material handling is to ensure that the material is in the right amount and is safely delivered to the desired place at the right time, along with minimum production cost. The cost of material handling has an estimated 20-25% of total manufacturing labour cost.

Principles of Material Handling

- **Planning:** The planning requires to be done in order to achieve the approach of the team with the input of consultants, suppliers and the end-users, from the management, engineering, operations, finance, sales and operations.
- **Standardization:** All the material handling equipment, methods, controls, and software requires to be standardized in such a way that it would be able to perform a wide range of tasks in a broad range of operations.
- **Work:** In material handling, the process requires to be clarified by reducing, shortening and eliminating in order to remove the unnecessary movement that would impact productivity.
- **Ergonomics:** Work and work-related conditions are being adapted to support the ability of a worker, which reduces the repetitive and difficult manual labour as well as safety.
- **Unit Load:** Due to the less use of effort and work required to move several individual items together as a single load (e.g., moving of many items one at a time), a unit load such as containers or pallets is required to be used.
- **Space Utilization:** In order to maximize the effective use of space within a facility, it is extensively crucial to keep the working stations organized and clutter-free to increase the density and availability of the storage area. 5S principle can be implemented for space utilization 5S stands for the 5 steps of this methodology: Sort, Set in Order, Shine, Standardize, Sustain.
- **System:** In material handling, the movement and the storage are required to be coordinated throughout the process in order to form or receive the inspection, storage, packaging, order selection, production, and shipping, return handling, as well as transportation.
- **Environment:** Energy, which is used in potential environmental impact, have been considered in designing the system with recycling and reusability processes implemented whenever possible, as well as for the establishment of practices for safe handling of hazardous materials.
- **Automation:** To develop operational efficiency and consistency, the automated material handling technologies need to be positioned whenever possible.

- **Life Cycle Cost:** For all the equipment used in material handling for a specified system, the analysis of a life cycle cost is required to be conducted. The areas of considerations require possessing the installations, programming, training, operation, maintenance and also repairing.

Material Handling Equipment

The simplest shelf to the most complex light out facilities, warehouse mechanization, is capable of being operated in the dark as it uses a lot of material handling equipment.

There are different kinds of material handling equipment, and they fall under four broad types. Material handling is the unloading and loading or movement of goods within a warehouse, especially with the help of mechanical devices. Thus, material handling equipment refers to the devices that are used in a warehouse's operation by storing and moving the goods.

Type 1: Storage and Handling Equipment

This stands to be usually the simplest type of material handling equipment which includes shelves and racks where an individual is capable of storing their material in the middle of shipping and receiving it. Drawers, bins, flow racks, cantilever racks and stacking frames are additionally included in this category.

Type 2: Bulk Material Handling Equipment

It is the process of storing, transportation and control of materials in loose bulk form. For instance, a silo, a large cylinder that is capable of holding stuff like grain. Other examples include:

- Reclaimers and Stackers:
- Hoppers
- Conveyor Belt
- Grain Elevators
- Dump Trucks
- Rotary Car Dumper
- Screw Conveyor
- Bucket Elevators
- Vacuum lifter

Type 3: Industrial Truck

These are the type of equipment or vehicles that is used to move materials. Sometimes it is run by workers, and sometimes they are automated. "Automated Guided Vehicles (AGVs)" fall under both industrial trucks and engineered systems. Other examples include:

- Forklifts
- Order Pickers
- Hand Trucks
- Pallet Trucks

Type 4: Engineered System

It is the type of material handling equipment that stands to be a more complicated system with multiple components, which are usually automatic. They include AGVs, conveyor belt or robotic delivery system that comes in different sizes and shapes or automated storage systems.

7.1.2 Hazards, Risks and Threats Associated with Handling Different Materials

There are multiple hazards, risks and threats can be identified during receiving, loading & unloading, storage, and transportation for handling different types of materials.

Receiving

Hazards, risks and threats can be identified during receiving of the material. Inspect incoming materials as soon as they are received to ensure established specifications such as product temperature, packaging conditions, etc. are met. A designated employee should verify and document:

- Incoming raw materials – Quality and other kinds of defects can occur during receiving of incoming materials. So, all kind of material should be from an approved supplier. Approved supplier can be verified through supplier visit, document verification and certification from legal bodies.
- Cleanliness of the truck – Foreign body, pest can be identified as a hazard. So, we must ensure that no foreign material, dirt, odours, rodents, insects or other pests are there in the vehicle.
- Temperature of the truck – Every different material requires different type of temperature requirements such as ambient (Normal temperature- 20-25°C), chilled (0-5°C), frozen (-16°C to -23°C) and dry items. Any deviation of temperature requirements can be considered as a hazard. Proper temperature needs to maintain for products according to specifications.
- Condition of door seals – Improper door closing, or door gaps of the vehicle can be one of the risk factors of material. So, it needs to ensure that close-fitting doors with no spaces at sides or bottom.
- General truck conditions or Material handling equipment's – Truck or material handling equipment's can be cause damage of product, infrastructure damage and injury of the person or even fatality.

Loading and Unloading

Loading and unloading process can be considered as hazard due to the potential risk involved to the product, property and person.

- Product damage and spillage can happen during loading and unloading process and it can be considered as a risk.
- Human error during loading or unloading process can cause damage to product, property or the employees. Employees responsible for loading and unloading materials should follow company standards for hygiene and sanitation practices.
- Proper product temperature must be maintained during loading and unloading as well. Movers should be aware of the product temperature requirements. Any kind of deviation regarding temperature can cause product damage. Document verification plays an important part for tracing shipments in case of a recall and should include: Time of receipt, type of product, ingredient and product packaging, labelling, lot number, pallet tag, quantity, size and weight.

Storage

Products should be stored adequately to maintain package/pallet integrity:

- Allow maximum air circulation and stock rotation. Air circulation is important to maintain the temperature, humidity inside the warehouse. Also, HEPA (High efficiency particulate air) filter can be installed to avoid biological hazard.
- Assign different storage areas for different products (ingredients, raw materials, finished products) to avoid cross contamination.

- Material should be used within the manufacturer's specified time period to maintain shelf-life requirements. Appropriate rotation of food and packing materials -- first in, first out (FIFO) -- helps minimize product contamination, damage and spoilage. Allergen control precautions need to be established for the food industry regarding raw materials purchasing, transportation and storage. Ensure suppliers have documented and implemented an allergen control plan. Check labels on incoming ingredients to ensure the supplier has not sent the wrong product, a substitute product or used the wrong label. Ensure vehicles and shipping containers are cleaned before shipping. Clearly label raw materials to indicate they contain food allergens (ex: color-coded containers, tags).
- Pallets used to store materials can cause different hazards. For example- Damaged pallets can result in product damage or fall down of the product; protruded nails can cause product damage or injury.
- Loading strength and design should be based on Health and safety risk assessment. Major accidents can happen due to excessive product storage on each rack or improper design of racking system.

Transportation

Vehicles and containers that transport materials should be used only for the intended purpose and should have both sanitary design and pest control procedures in place. (Ex: truck's doors should be sealed to prevent entry of pests.) Refrigeration equipment in vehicles and temperature measuring devices should be calibrated and in good working order. Mechanical refrigeration should be provided for perishable food products such as meat, fish, poultry, milk and eggs.

Inspection of vehicles

Designated employees should evaluate and document the condition of trucks, containers and carriers of finished products before loading. The following should be verified before loading:

- Cleanliness of the truck should be maintained to avoid any physical, chemical or biological hazards.
- No odours or obvious dirt or debris.
- No evidence of chemical contamination such as fluids, powders, chemical residues
- Correct temperature in the truck.
- Temperature measuring devices will work properly during transportation. Documentation and maintain a log to verify inspection and cleaning tasks. Indicate type of loads, cleaning and sanitation procedures, inspections, etc.

UNIT 7.2: Workstation Layout, Electrical and Thermal Equipment

Unit Objectives

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

1. Categorize the workstation layouts, electrical and thermal equipment

7.2.1 The Workstation Layouts, Electrical and Thermal Equipment

Workstation Layout

Workstation or workplace is also known as the floor space occupied by the workers, as well as by the machines or a group of machines. An ergonomic workplace is a scientific discipline that is concerned with improving the productivity, health, comfort and safety of people in order to promote effective interactions among people, the environment and technology.

During the design of the workstation layout, the following space requirements are taken into considerations:

- Requires having spaces for racks, bins and conveyor stations that either contain the under processed work or receive the work after it has been completed by the machine.
- There should be a rectangular space occupied by the length and width of the machine or group of machines. They need to include the space for the travel of moving parts as well as the projected parts of machines which include shafts, levers, pulleys, handles and wheels.
- There requires being a proper workspace for the workers in order to efficiently complete their tasks.
- Requires having clearance space for feeding the work on and off the machine.
- There needs to be a space for tool racks, workbenches, etc., required by the individual machine, if any.
- There needs to be proper floor space for the power source, or if in case of any electric motor, it has to be placed on the floor or within the working area.

Storage Space Requirement

In any plant layout, the space for workstations allocation requires to be made for the storage of material and space essentially required inside the plants. Every department and area need to be designed in such a way so that they are capable of providing waiting, processing and moving facilities.

The storage space requirement depends on various factors such as:

- Quantitative use of raw material per hour
- Movement of semi-built parts between two machines depending upon the weight and volume.
- Movement of parts between the departments, depending upon the weight and volume.
- The dependence upon the scrap weight and volume
- Vertical heights of the building plants.
- Production capacity of the assembly.

- Floor load-bearing capacity.
- Storage practices.

Once the space requirement for all machines has been estimated, the employer needs to have the provision for the basic amenities like canteen, drinking water, first aid, restrooms, sales department, changing room (for factory worker like machine operators), refreshment place, etc.

Workplace Layout Design:

Employee productivity stands to be directly in proportion to workplace conditions. A good and comfortable workplace always results in high productivity per employee.

Some important aspects which need to be considered while designing the workplace are:

- Cleanliness
- Proper lighting
- Noise
- Tool Is and Material positioning
- Chairs and Workbench
- Machine design

Electrical and Thermal Equipment

In order to build an efficient workplace layout, one needs to consider the electrical and thermal requirements of the workers. Workstations that are well equipped with electrical supply takes care of the power source needs of employees in order to operate the required equipment and tools.

The following points require to be considered while designing an electrical workstation.

- Placement of electricity outlet or strips
- Power/voltage requirement of different equipment
- The number of power outlets required
- Alternative or emergency power source outlets

UNIT 7.3: Organisational Procedures for Minimising Waste

Unit Objectives

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

1. List the organizational procedures for minimising waste.

7.3.1 The Organizational Procedures for Minimising Waste

Types of organisational waste and ways to minimise them:

- **Transportation:** Transportation waste refers to the movement of tools, equipment, inventory, raw material, people etc., more than the actual requirement or consumption. Unnecessary or excessive movement of resources leads to unnecessary work, increased wear and tear, increased damaged and defects.

In order to curb this type of waste, the department which works closely needs to be designated next to each other. The materials required for production has to be placed in easy to reach locations as well as the multiple handling of material needs to be avoided.
- **Inventory:** Inventory is often considered as an asset to any organisation; however, storing inventory stands to be more than the required leads to unnecessary damage, defects and increased lead time during the production process. The main cause of this is over-purchasing of raw material, increased WIP (work in progress) and over-production in comparison to the actual customer needs.

Measure to be taken in order to reduce such kind of waste involves the purchase of raw material as per the demand, avoid overproduction and reduce the work in progress.
- **Motion:** This includes unnecessary movement of tools or equipment, machinery or people. It also includes repetitive movement that doesn't add value to the work or customer, reaching for raw material, unnecessary walking to fetch tools or equipment and readjusting of installed machinery.

Measures to be taken in order to reduce such kind of waste include a well-designed workplace, easy to reach location for tools or equipment, and efficient one-time installation of machinery.
- **Waiting:** It includes equipment or machinery which are kept idle and also the workers waiting for material or equipment. It is majorly caused by unevenness among the various production lines.

This type of waste is capable of being curbed by streamlining the process for continuous workflow as well as training the workers on multiple skills set who are capable of easily adapting to the changing work demands and standardized workflow.
- **Overproduction:** Overproduction means manufacturing a product or material in excessive quantity than the actual demand.

Measures to be taken in order to reduce such kind of waste include, even manufacturing rate between the station or production units and also manufacturing small batch size.



Fig. 7.3.1: Overproduction

- **Defects:** A defect usually refers to a specific product that is of no use. This results in either discarding the product or reworking on them and is capable of incurring the additional operational cost.

Tips

- For having an effective system of food processing implementation of automated statistical process control systems are extensively required
- Maintaining a high level of supply chain visibility is also considered to be important for efficient food processing

UNIT 7.4: Practices of Efficient and Inefficient Management

Unit Objectives

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

1. Analyse the practices of efficient and inefficient management

7.4.1 The Practices of Efficient and Inefficient Management

Inefficient Management Practices

Inefficiency at the workplace often refers to low productive and poor confidence. Inefficiency directly impacts the cost incurred by any organisation.

Following are the key indicators of inefficient management:

- Uneven prioritization of work
- Non-essential work
- Lack of resource planning
- Improper justification of resources
- Inefficient productivity management
- Lack of fruitful collaboration

An efficient manager must answer the below questions in order to identify the inefficient management practices.

1. Who is working on what?
2. Are they working on the highest priority projects?
3. Do they have the resources they need?
4. Do they have the information they need?
5. How is work coming along?
6. Will work be done on time?

Efficient Management Practices

An efficient management practice refers to those practices which can perform the task with minimal wastage of resources. It also refers to the appropriate utilisation of resources leading to profit maximisation. The basic rules of effective management are:

- Consistency
- Goal setting
- Delegation
- Task prioritization
- Effective communication
- Rewards and Recognition
- Training and development
- Management Commitment

UNIT 7.5: Material and Water Usage

Unit Objectives

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

1. Discuss the material and water usage.

7.5.1 The Material and Water Usage

Material Usage

Material refers to those components or raw goods which are used in producing hard goods like machines and equipment for another industry or end consumer as well as soft goods like food items, chemicals, medicines, apparel, etc.

Water Usage

In manufacturing units, water is used for various purposes like fabrication and processing of various materials, cleaning, diluting or as a coolant.

The need and demand for industrial water vary upon the product which is being manufactured. The other factors which need to be taken into consideration are water quality in the region, type of treatment required in order to make water usable.

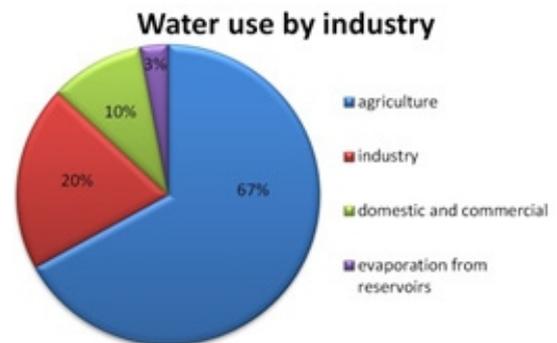


Fig. 7.5.1: Industry-wise water consumption

Industrial usage of water:

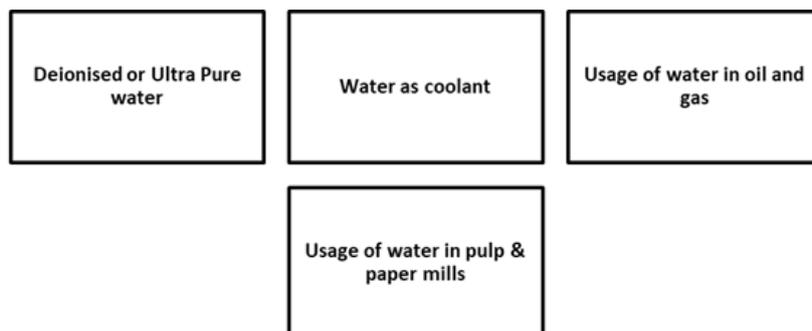


Fig. 7.5.2: Industrial wastage of water

Summary

- Material handling is also known as the integrated system, which involves such activities of the movement, storage, protection and control of types of materials and products throughout the manufacturing, distribution, consumption and disposal.
- Workstation or workplace is also known as the floor space occupied by the workers, as well as by the machines or a group of machines.
- Employee productivity stands to be directly in proportion to workplace conditions.
- An efficient management practice refers to those practices which can perform the task with minimal wastage of resources.

Exercise

A. Answer the following questions briefly.

1. What is the manufacturing labour cost for material handling?
A. 20- 23% B. 20- 25% C. 20- 30% D. 20- 35%
2. What stands to be the full form of AGV?
A. Automated Guided Vehicle
B. Activated Guided Vehicle
C. Accurately Guided Vehicle
D. Action Guided Vehicle
3. _____ is the major component for manufacturing semiconductors and chips, which are widely used in mobile phones, computers and various other electronic goods.
A. Nitrogen B. Silicon C. Hydrogen D. Lithium
4. _____ directly affects the efficiency of the workers.
A. Proper lighting B. Noise C. Cleanliness D. Machine design
5. The appropriate temperature at the workplace usually requires being at _____ degrees Celsius.
A. 22
B. 30
C. 18
D. 16

8. Energy and Electricity Conservation



Unit 8.1 - Define Electricity

Unit 8.2 - Basics of electricity

Unit 8.3 - Energy efficient devices

Unit 8.4 - Standard Practices for Conserving Electricity



Key Learning Outcomes

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

1. Define electricity
2. State the basics of electricity
3. Identify the energy-efficient devices
4. Explain the standard practices to be followed for conserving electricity
5. Illustrate electrical equipment and appliances

UNIT 8.1: Define Electricity

Unit Objectives

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

1. Define electricity

8.1.1 Definition of Electricity

Electricity stands to be a general form of energy observable in a positive and negative form that takes place naturally (as in lightning) or is generated (as in a generator), as well as that is expressed in terms of movement and interaction of electrons.

The existence of an electric charge, which is capable of being either positive or negative, creates an electric field. The movement of electric charges leads to an electric current which further generates a magnetic field.

It is at the heart of many of our present era technologies, being utilized for:

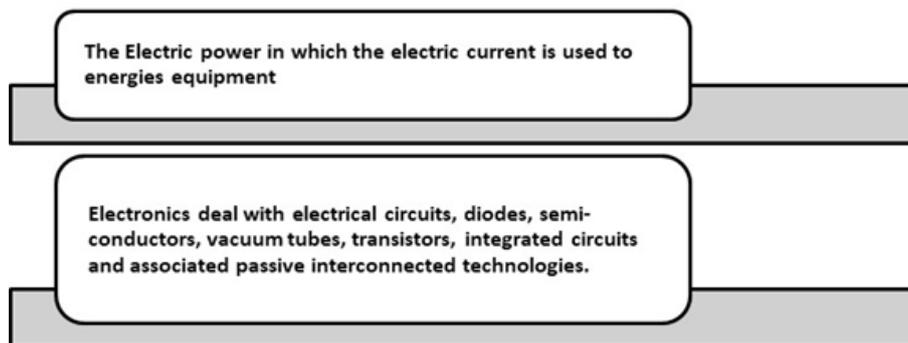


Fig. 8.1.1: Electricity utilization

UNIT 8.2: Basics of electricity

Unit Objectives

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

1. State the basics of electricity

8.2.1 The Basics of Electricity

Electricity is easily put in the flow of electrons in a conductor. Electric current flows in the form of free electrons; thus, the greater the number of free electrons in a material, the better would stand to be its conductivity. On the basis of conductivity, these 'materials' can be classified into three categories:

- **Conductors** – Materials whose conductivity lies between 10^4 to 10^7 -ohm m. For example, Iron, Copper, etc.
- **Semi-conductors** – Materials whose conductivity lies between 10^{-6} to 10^4 -ohm m. For example, Graphite, Silicon, etc.
- **Insulators** – Materials whose conductivity lies between 10^{-20} -to- 10^{-10} -ohm m. For example, Paper, Glass, etc.

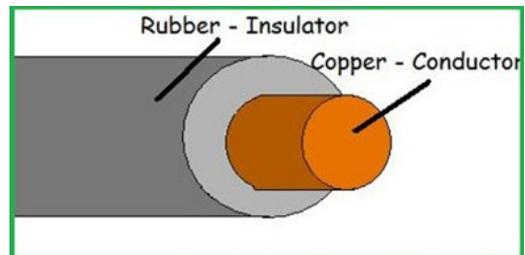


Fig. 8.2.1: Conductor of Electricity

There are three primary electrical parameters:

- Volt
- Ampere
- Ohm

Volt: The amount of external force exerted on free electrons is known as "Electromotive Force (EMF)". Volt is the amount of EMF needed to push a current of one ampere through a conductor with the resistance of one ohm.

Ampere: Ampere defines the rate of flow of electric current. For example, when one coulomb of charge flows through a given point on a conductor in a second, it is defined as a current of one ampere.

Ohm: Ohm is the unit of resistivity of a conductor. Three factors determine the resistivity of a conductor:

- Size of conductor
- Composition of conductor
- Temperature of conductor

UNIT 8.3: Energy Efficient Devices

Unit Objectives

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

1. Identify the energy-efficient devices

8.3.1 Energy-Efficient Devices

The use of energy– efficient devices has proved to be an effective strategy for the economics and planet as a whole, as it cuts down on unnecessary power consumption while also being cost-effective.

From the viewpoint of an energy consumer, the main motivation for saving energy is frequently and simply saving money by decreasing the cost of purchasing energy. From an energy policy viewpoint, there has been a long trend in wider recognition of efficient energy as “first fuel” (meaning the ability to avoid consumption of fossil fuels for energy production).



Fig. 8.3.1: Energy-efficient devices

Energy-Efficient Devices

Devices like LED bulbs, fluorescent lighting or natural skylights reduce the amount of energy required to attain the same amount of illumination compared to using traditional incandescent light bulbs. Modern appliances such as freezers, dishwashers, ovens, stoves, dryers use significantly less energy than their previous generation models and line-ups. For example, modern energy-efficient refrigerators use 40% less energy than their conventional models did in 2001.

Energy Conservation

Energy conservation is broader in comparison to energy efficiency in including active efforts to decrease energy consumption. For example, through behavioural change it has an addition to using energy effectively. Energy conservation is a challenge requiring stringent policy programmers, technological development and behaviour change to go hand in hand. Many energies intermediary organizations, government, non-government, regional, local or at the national level, are working in order to meet this challenge.

8.3.2 Common Ways to Identify Electrical Problems

Electricity appears to be something most of us understand it for granted. When the individuals need it, you turn to the nearest switch or outlet, and there it is, ready to serve you 24/7.

Yet that electric energy faithfully facilitating us is additionally a potential destruction's source.

Several electrical fire dangers are hidden within the walls of your house or offices or other workplaces. Nevertheless, if the individuals have the knowledge the ways to point the warning signs, the individuals are capable of making proactive — and less expensive — repairs that will also help protect your home in the long run. Here are certain manners to spot common issues and what to do about them.

- **Unknown odour:** When you detect an odd smell arriving from an electrical store, unplug anything linked to it, as well as don't utilise it again until a qualified electrician has tended to check it. In addition to this, if the individual's breaker panel or fuse box is emitting an odd odour, call an electrician immediately.
- **ARC faults:** Arc faults tend to take place when an electrical circuit veers off its intended path, frequently via a breach in the wiring. Arc faults stand to be preventable via the installation of a tool referred as an arc-fault circuit interrupter (AFCI).
- **Sparking or warm switches and outlets:** If the individual's light switches stand to be warm to the touch or an store is sparking, call a expertised the electrician immediately to see if your wiring needs repairs or the fixture should be replaced.
- **Buzzing sounds:** If you hear any buzzing, cracking or sizzling sounds when you flip a switch or plug into an outlet, turn off the power to that fixture immediately and consult a professional electrician.
- **Flickering lights:** Flickering lights usually indicate a power surge. These power surges don't necessarily have to come from a catastrophic event — more than likely, your appliances are making demands on the electrical system that it cannot handle.
- **Broken light switches and loose outlets:** If switches or outlets stop working or work only intermittently, it could be a sign of loose wiring — and another potential fire hazard. Loose outlets also create a potential for electrical shock.
- **Hot ceiling fixtures:** Occasionally check the area around your ceiling fixtures for warmth that could indicate a lack of sufficient insulation. Also, exceeding recommended bulb wattages can cause overheating. Either issue poses a potential fire hazard. Consider switching to compact fluorescent light (CFL) or light-emitting diode (LED) bulbs as these don't produce as much heat as incandescent bulbs.
- **Circuit breaker problems:** Circuit breakers are designed to trip when a circuit is overloaded. Tripping prevents overheating and eliminates fire hazards. Occasional tripping probably indicates a simple overload, but if it occurs repeatedly, you need to call in an electrician and have them evaluate your entire electrical system.

UNIT 8.4: Standard Practices for Conserving Electricity

Unit Objectives

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

1. Explain the standard practices for conserving electricity

8.4.1 Standard Practices for Conserving Electricity

Renewable energy sources have received plenty of attention in recent years, but the conservation of electricity is also important for sustainability. Nevertheless, the best results are acquired when clean power is combined with energy conservation, reducing the pressure to invest in newer infrastructure.

Environmental Reasons to Conserve Electricity

All systems of power generation have an environmental influence that must be taken into consideration before an investment decision. This is evident while dealing with fossil fuels since their combustion emits a constant stream of greenhouse gases in the atmosphere. The process of construction also has an environmental impact. Some waste materials are unavoidable, heavy machinery releases emissions and the ecosystem is seen to be disrupted.

Practices for Saving Electricity

For an average consumer, saving electricity can be good for the pocket and in turn, it reduces the increasing stress on the environment. Those savings can be diverted to alternative sources of energy like solar panel arrays, especially in a tropical country like India, where seasons are relatively moderate and 'timed'. Some practices and habits changes which would help in saving electricity are:

- Turning down the refrigerator
- Usage of energy-efficient LED bulbs
- Air drying the dishes and clothes
- Cooking under the right-sized burner
- Washing clothes with cold water
- Using window shades to alter sun rays entering the house
- Turning off electrical appliances, fans, lights when not in use
- Using low flow faucets and showerheads

Summary

- Electricity is a basic form of energy observable in a positive and negative form
- The main motivation for saving energy is frequently and simply saving money by decreasing the cost of purchasing energy.
- Energy conservation is broader in comparison to energy efficiency in including active efforts to decrease energy consumption.
- Renewable energy sources have received plenty of attention in recent years, but the conservation of electricity is also important for sustainability.
- All systems of power generation have an environmental influence that must be taken into consideration before an investment decision.
- Electrical equipment involves any machine powered by electricity.

Exercise

A. Answer the following questions briefly.

- On the basis of conductivity, conductors possess:
 - Materials whose conductivity lies between 10^{-6} to 10^4 -ohm m
 - Materials whose conductivity lies between 10^4 to 10^7 -ohm m
 - Materials whose conductivity lies between 10^{-20} -to- 10^{-10} -ohm m
 - None of the above
- What is the full form of EMF?

A. Electromotive Force	B. Electromagnetic Force
C. Electro mobile Force	D. Electro massive Force
- _____ energy sources have received plenty of attention in recent years, but the conservation of electricity is also important for sustainability.

A. Renewable	B. Non- renewable
C. Sustainable	D. Non-sustainable
- Energy _____ is broader in comparison to energy efficiency in including active efforts to decrease energy consumption.

A. Release	B. Emission
C. Conservation	D. Deletion
- Modern energy efficiency refrigerators use _____ less energy than their conventional models did in 2001.

a. 50%	b. 40%
c. 60%	d. 90%



9. Waste Management and Recycling



Unit 9.1 - Types of waste

Unit 9.2 - Waste Management and Disposal Solutions

Unit 9.3 - Pollution and Remedies



SGJ/N1702

Key Learning Outcomes

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

1. List the types of wastes
2. Describe waste management and disposal solutions
3. Explain pollution and its remedies

UNIT 9.1: Types of waste

Unit Objectives

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

1. List the different types of waste

9.1.1 The Different Types of Wastes

Unwanted, trash, rubbish, excess, superfluous, scrap, extra, rework, unused- there are so many synonyms for waste.

There are different types of waste which are recyclable or non-recyclable. Recycling of waste depends on the scientific progression as well knowledge about different kind of waste handling. Below are lists of different type of waste.

Recyclable waste	Non-recyclable waste
1. Concrete	1. Garbage. Mixture of different of garbage makes it hard to recycle.
2. Steel	2. Food-tainted items (such as: used paper plates or boxes, paper towels, or paper napkins)
3. Aluminium	3. Ceramics and kitchenware.
4. Plastic (PET)	4. Windows and mirrors.
5. Newspapers	5. Plastic wrap.
6. Corrugated Cardboard	6. Packing peanuts and bubble wrap.
7. Plastics (HDPE)	7. Wax boxes.
8. Glass	8. Photographs
9. Mixed Papers	9. Medical waste
10. Used Motor Oil	10. Polystyrene or Styrofoam
11. Used oil from food industry	11. Hazardous chemicals and chemical containers
	12. Plastic toys or sporting goods equipment
	13. Foam egg cartons
	14. Wood
	15. Light bulbs
	16. Yard waste or garden tools

Table 9.1.1: Lists of different types of waste

‘Waste’ is any unwanted material. These are objects that have been discarded, either because they do not function as intended or are simply not required anymore. Waste can come in many forms: solid, liquid or even gaseous (although it’s mostly solid). There are many types of waste, but the two general ones are:

- Municipal Waste
- Hazardous Waste

Municipal Waste

It consists of everyday items discarded by the population. It includes clothes, wires, glass, unwanted food and a multitude of other things. It is further sub-divided into household, commercial and demolition waste.

- Household Waste – Materials like unused food, unwanted paper, empty batteries come under this category.
- Commercial Waste – Waste collected from establishments like businesses, trading factories, schools, etc., comes under this category.
- Demolition Waste – Evident from its name, this type of waste comes from the destruction of buildings or any structure made of concrete, bricks, wood, etc.

Hazardous Waste

It refers to solid, liquid or gaseous waste that has the properties of corrosiveness, ignitability, reactivity and toxicity. Proper disposal and treatment of this waste are necessary as it is unsafe for the well-being and the environment at large. It is further sub-divided into industrial and biomedical waste.



Fig. 9.1.1: Hazardous wastes

- Industrial Waste – Waste produced by industries such as chemicals, pigments, ashes, metals, etc., come under this category.
- Also cafeteria garbage, dirt and gravel, masonry and concrete, scrap metals, trash, oil, solvents.
- Biomedical Waste – Waste coming from medical facilities such as hospitals, medical colleges, research centres etc., come under this category.

PPE kits also consider as biochemical waste (specially now a days)

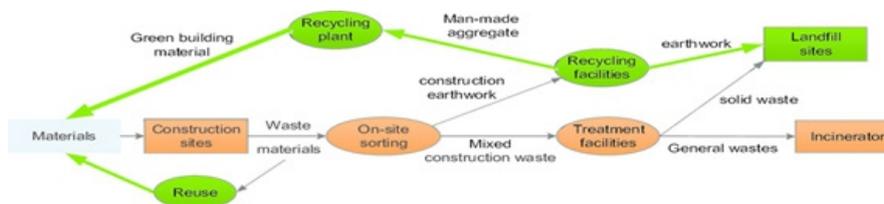


Fig. 9.1.2: Ways to process industrial and biomedical wastes

Significance of Different Coloured Dustbins

Colour coding of waste bin help us to understand which waste can be reuse or recycle and which waste need to dump. It also eliminates the amount waste through segregation process. Disposition process of waste can be defined based on different type of waste. Some waste can be dumped to land fill as it will not impact the soil quality such as food waste (onion, potato skin) as it act as fertilizer whereas industrial waste such as oil, batteries, chemical can't be dumped in land fill as it is hazardous to the soil property. It means if the wastes were separated in the 1st place then it will prevent or reduce any kind of negative impact to the environment due to waste disposition process.

Ideally every place where we discard waste should have three bins.

GREEN – for wet waste, which comes from the kitchen/cooking/food, goes to one bin.

BLUE – Dry recyclable waste such as newspapers, cardboard, packing plastics, bottles, cans, etc., should go to a different bin.

RED – Reject waste, which does not belong to the above two categories, including biowaste like diapers and bandages should go into a third bin.

All over the world, three-way segregation of waste is followed, and it is primarily instituted with some form of colour coding. It works just like the way traffic lights are coded in people's minds.

Govt authorised vendor details for different waste disposal solution-

There are many industries those are known for waste collection and disposal process approved by Indian govt. through registration process.

S No.	Registered PRO	Issued PRO Certificate
1	M/s. Attero Recycling Private Limited, H-59, Sector 63, Noida, UP-201301	11.10.2018
2	M/s. Auctus E Recycling Solutions Pvt. Ltd. A-58, Udyog Kendra-1, Ecotech-III, Village Habibpur, Noida-Dadri Road, Surajpur, Greater Noida (UP) 201306	12.11.2018
3	M/s Earth Sense Recycle Pvt. Ltd., Plot No:37, TSIC Industrial Park, Mankhal, Maheshwaram Mandal, Rangareddy Dist., Telangana-501359	11.10.2018
4	M/s EPR Compliance Pvt. Ltd., 422, The Summit Business Bay, Andheri Kurla Road, Near WEH Metro Station, Andheri (East), Mumbai-93	12.11.2018
5	M/s Hulladek Recycling Pvt. Ltd., 4 D.L. Khan Road, Block B, Flat-401, 4th Floor, Kolkata-700025	12.11.2018
6	M/s Karo Sambhav Private Limited, 408-409, Fourth Floor, Suncity Business Tower, Sector-54, Golf Course Road, Gurugram-122002, Haryana	29.08.2018
7	M/s Mahalaxmi Metalloys India Private Limited, Plot No. 87, 91/92, Sikhera Road Industrial Area, Modinagar, Dist. Ghaziabad (U.P.)201204	23.10.2018
8	M/s Pegasus Support System Pvt. Ltd, F- 6, 1st Floor, 4648/1, 21, Ansari Road, Daryaganj, New Delhi 110002	14.09.2018
9	M/s Pro Connect, G-7, New Market, Near Khasa Kothi Circle, Jaipur-302016 Rajasthan	12.11.2018
10	M/s R2 PRO Pvt. Ltd., B03-Jain Height-Altura, Kalkondrahalli, Sarjapur Road, Banglore-560102	23.10.2018

Fig. 9.1.3 : Examples of waste collecting vendors

UNIT 9.2: Waste Management and Disposal Solutions

Unit Objectives

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

1. Describe waste management and disposal solutions

9.2.1 Waste Management and Disposal Solutions

Waste management includes the activities as well as actions required to manage waste from its inception to its end disposal. This involves the disposal, collection, transport, and treatment of waste, together with regulation and monitoring of the waste management procedure and waste-related laws, technologies, as well as economic mechanisms.

Proper management of waste is significant for building sustainable and liveable cities, yet it remains a challenge for many developing countries and cities. A large portion of the practices of waste management deal with municipal solid waste, which stands to be the bulk of the waste that is produced by household, industrial, and commercial activity.



Fig. 9.2.1: Waste management and disposal solutions

Turn Away from Single-Use Plastics

A few instances of these include plastic straws, sanitary napkins, take-out containers etc. There are plenty of reusable alternatives to them, like glass and metal straws.

One good manner of doing this is by shopping at bulk stores and zero-waste stores that provide products without packaging. A good practice is to carry around a reusable bag, metal straw and a stainless steel bottle to cut the dependencies on polluting stuff.



Fig. 9.2.2: Waste Management Hierarchy

Conventional Technologies

It is apparent that certain technologies are no longer applicable to modern waste reduction as well as recycling, but some organizations continue to rely on them because they appear to be cheap. However, more technologies are evolving or being created to solve waste management problems. These technologies can be used to recycle or up cycle waste, creates alternatives from products that normally produce more waste, or find a way to address the ever-growing problem of waste management.

There is seen to be plenty of this technology, including plastic-free shampoo pods and toothpaste pills, machines that sustainably remove waste from bodies of water.

UNIT 9.3: Pollution and Remedies

Unit Objectives

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

1. Explain pollution and its remedies

9.3.1 Pollution and Its Remedies

Today, the air is becoming foul, water is no longer clean, and forests are being cut down unscrupulously. Pollution in and of itself is difficult to define. The term is derived from the Latin word "polluere", which means 'to contaminate any feature of the environment. It may be broadly said to be 'adding to the environment a capably hazardous source or substance of energy faster than the environment can accommodate in it.

Methods to Counteract Pollution

Pollution prevention is considered as any action that reduces the number of contaminants released into the environment. Implementation of such processes reduces the severity and/or a number of hazards posed to both public health and the environment. If companies produce less waste, they do not have to worry about proper disposal. Some common methods for controlling pollution are:

- Reducing, Reusing, Recycling and Mitigating.
- Water pollution is capable of being controlled by using non-toxic soaps, detergents and cleaning products.
- Limiting the use of artificial fertilizers and pesticides helps in controlling soil and water pollution.
- Promoting and enforcing the use of biological methods for pest control.
- Chimneys should be longer in length so that polluting air is released high up in the atmosphere where it would not harm the surrounding environment.
- Automobiles should be installed with emission and pollution control systems.
- The timely servicing of automobiles also checks for air pollution.
- Carpooling and public transportation should be encouraged.
- Alternative sources of energy like wind, sun, water, geothermal should be harnessed and put to use.

Summary

- 'Waste' is any unwanted or un-useful material.
- Municipal wastes consist of everyday items discarded by the population.
- Hazardous waste refers to solid, liquid or gaseous waste that has the properties of corrosiveness, ignitability, reactivity and toxicity.
- Waste management includes the activities as well as actions required to manage waste from its inception to its end disposal.
- Proper management of waste is significant for building sustainable and liveable cities, yet it remains a challenge for many developing countries and cities.
- The biosphere and ecosystem are self-sustaining, and nature maintains a balance between the land, water, air and living organisms.
- The term "pollution" is derived from the Latin word "polluere", which means 'to contaminate any feature of the environment.
- Pollution prevention is considered as any action that reduces the number of contaminants released into the environment.

Exercise

A. Answer the following questions briefly.

1. Which one stands to be a general type of waste?
 - A. Commercial waste
 - B. Hazardous waste
 - C. Household waste
 - D. Demolition waste
2. Which one is the type of hydrocarbon-eating bacteria that feed on oil?
 - A. Alcanivorax borkumensis
 - B. Bacillus
 - C. Spirillum
 - D. Vibrio
3. _____, reusing, recycling and mitigating helps in pollution reduction.
 - A. Reducing
 - B. Reinstalling
 - C. Redeeming
 - D. Reinvolving

Annexure-I

Chapter No.	Unit No.	Topic Name	Page No.	QR Code
Chapter - 1 Bridge Module	Unit 1.1 Introduction on to Food Processing Industry	1.1.1 Food Processing	16	 <p>Scope of food processing in India with national and international perspective</p>
Chapter - 1 Bridge Module	Unit 1.1 Introduction on to Food Processing Industry	1.1.3 India's Food Processing Industry	16	 <p>Overview of food processing industry</p>
Chapter - 2 Prepare For Cleaning and Sanitation of Food Processing Facility	Unit 2.1 Prepare For the Cleaning and Sanitation Activities	2.1 Prepare For the Cleaning and Sanitation Activities	57	 <p>Sanitation Training and Education</p>
Chapter - 3 Carry out cleaning & sanitation of food processing plant	Unit 3.1 Cleaning of the Plant Equipment, Furniture, Fittings And Fixtures	3.1 Cleaning of the Plant Equipment, Furniture, Fittings And Fixtures	114	 <p>Cleaning procedures of equipment, furniture and fixtures in food premises</p>
Chapter - 3 Carry out cleaning & sanitation of food processing plant	Unit 3.1 Cleaning of the Plant Equipment, Furniture, Fittings And Fixtures	3.1.4 Disinfection	114	 <p>Cleaning and Disinfection</p>
Chapter - 3 Carry out cleaning & sanitation of food processing plant	Unit 3.3 Cleaning of Office Area, Canteen, Washroom Area etc.	3.3.1 Cleaning of the Office Area	114	 <p>Cleaning & Sanitation</p>

<p>Chapter - 4 Ensuring Food Safety and Personal Hygiene</p>	<p>Unit 4.2 Schedule IV requirements of FSSAI</p>	<p>4.2.1 Schedule IV Requirements of FSSAI</p>	<p><u>147</u></p>	 <p>General Requirement on Hygiene & Sanitation- Practices for all FBO's</p>
<p>Chapter - 4 Ensuring Food Safety and Personal Hygiene</p>	<p>Unit 4.3 Personal Hygiene</p>	<p>4.3.1 Personal Hygiene</p>	<p><u>147</u></p>	 <p>Personal Hygiene</p>



Skill India
कौशल भारत - कुशल भारत



सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP



Address: Food Industry Capacity and Skill Initiative (FICSI)
Shriram Bhartiya Kala Kendra (3rd Floor)
1, Copernicus Marg, New Delhi 110001

Email: helpdesk@ficsi.in

Web: <https://www.ficsi.in/>

Phone: +91-9711260230, +91-9711260240

CIN No.: 00000000

Price:



978-1-111-22222-45-7