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FICSI
Food Industry Capacity and Skill Initiative

Participant Handbook

Sector
Food Processing

Sub-Sector
Generic

Occupation
Quality Analysis/ Assurance

Reference ID: **FIC/Q7606, Version 2.0**
NSQF level 4

Hygiene Coordinator

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Shriram Bharatiya Kala Kendra, 1, Copernicus Marg, Mandi House, New Delhi-110001

Email: admin@ficsi.in

Website: www.ficsi.in

Phone: +91-97112 60230, +91-97112 60240

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for

SKILLING CONTENT: PARTICIPANT HANDBOOK

Complying to National Occupational Standards of

Job Role/ Qualification Pack: **'Hygiene coordinator'**

QP No. **'FIC/Q7606, NSQF Level 4'**

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

FICSI is thankful to all organisations and individuals who have helped us in preparation of this participant handbook.

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About this book

This book is designed for providing skill training and/or upgrading the knowledge and basic skills to take up the job of Hygiene Coordinator in 'Food Processing' sector. All the activities carried out by a specialist are covered in this course. Upon successful completion of this course, the candidate will be eligible to work as an Hygiene Coordinator. This Participant Handbook is designed to enable training for the specific Qualification Pack (QP). Each National Occupational Standards (NOS) is covered across Unit/s.

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

- FIC/N7615: Prepare for cleaning and sanitation of food processing facility
- FIC/N7616: Supervise Hygiene Practices
- FIC/N9904: Basic Food Safety Standards
- FIC/N9901: Ensuring Food Safety and Personal Hygiene
- FIC/N9901: Managing Accidents and Emergencies
- FIC/N9902: Working Effectively in an Organization
- SGJ/N1702: Material Conservation
- SGJ/N1702: Energy and Electricity Conservation
- SGJ/N1702: Waste Management and Recycling
- DGT/VSQ/N0102: Employability Skills

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FIC/N7615

Key Learning Outcomes

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

1. Describe the food processing industry and its sub-sectors in brief.
2. Discuss the roles and responsibilities of a Hygiene Coordinator
3. Discuss about the food processing industry and multi-sectoral sub-sector in brief
4. Discuss the career opportunities available to a Hygiene Coordinator in the food processing industry
5. Explain the terminologies used.
6. List the sequence of operations to be performed in the job
7. State the personal hygiene and sanitation guidelines.
8. State the food safety hygiene standards to follow in a work environment.

UNIT 1.1: Introduction to the Training Programme

Unit Objectives

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

1. Explain the purpose of training
2. Discuss the National Occupational Standards and Qualification Pack

1.1.1 Purpose and Benefits of the Training Programme

This training programme is developed to impart specific skills to individuals who wish to be a hygiene Coordinator. The training programme is based upon the National Occupational Standards for the food processing sector. The National Occupational Standards have been described in the following subsection of this chapter.

The training programme will enable an individual to:

1.Prepare for cleaning and sanitation of the work area.
2.Supervise hygiene practices.
3.Ensure Food Safety at the Workplace.
4.Implement Health and Safety practices at the workplace.
5.Work Effectively in an organization.
6.Optimize Resource Utilization at the Workplace.

After successful completion of training and passing the assessment, participants will be issued a certificate.

Fig. 1.1.1. Skill cards

1.1.2 Introduction to QP and NOS

This training programme is intended for imparting basic skill and knowledge relevant to the job role, required to perform at a food processing industry. This programme is based on qualification pack called Hygiene Coordinator. The Qualification Pack Code for an Ice Cream Processing Technician is FIC/Q7606. This is also called a QP.

A QP consists of a set of National Occupational Standards (NOS). NOS specify the standard competency a worker must achieve when carrying out a function at the workplace.

Under Hygiene Coordinator QP, there are five NOSs which detail the functions to be performed at work site as a Hygiene Coordinator.

NOS Code	Major Function/Task
FIC/N7615	Prepare for cleaning and sanitation of the work area
FIC/N7616	Supervise hygiene practices
FIC/N9904	Ensure Food Safety at the Workplace
FIC/N9001	Implement Health and Safety practices at the workplace
FIC/N9902	Work Effectively in an organization
SGJ/N1702	Optimize Resource Utilization at the Workplace
DGT/VSQ/N0102	Employability Skills

UNIT 1.2: Introduction to the Food Processing Industry

Unit Objectives

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

1. Define food processing
2. List the various sectors of the food processing industry
3. Describe the various stages of food processing for converting raw materials to food products

1.2.1 Food Processing

Agriculture is the backbone of the Indian economy. The produce from various agriculture-based occupations is primarily used for consumption within the country. It is exported to different parts of the world as well. Agricultural produce is also used as raw material in the food processing industry.

Food processing is the method used to convert raw materials into food products. They could be processed foods, ready-to-eat foods, food additives or foods used to prepare other food products. Besides food processing, the food industry also relies on food preservation as an important method to store food products for longer periods of time.

The food processing industry in India is divided into several sub-sectors. They are:

Fig. 1.2.1. Sub-sectors of food processing industry

The Indian food industry is a star sector in India with a bright prospect for growth and development. Indian food and grocery market is the sixth-largest in the world. Food industry, particularly the food processing sector in India, has shown immense potential due to its quick-paced growth. Food processing ranks fifth in the country in terms of its production, growth, export, and consumption. One of the recent trend that is seen in this sector is ordering food online. Even though this segment is still in its early stages of development, it is growing at an increasingly fast pace.

Food industry is implementing stringent food safety and quality measures in order to attract more investors and ensure the safety of its existing consumers. All these factors will have a positive impact on the way the sector functions and also on the job market in the country.

Women have always been associated with preparing food for the family or the household, but in modern times women are breaking this stereotype and turning entrepreneurs in this sector. Women are also becoming professional chefs and bakers, and contributing to the economy and towards the sector.

1.2.2 Journey of Food from Harvest to Consumer

The following chart shows the journey food material goes through to become a final, consumable product to various customers.

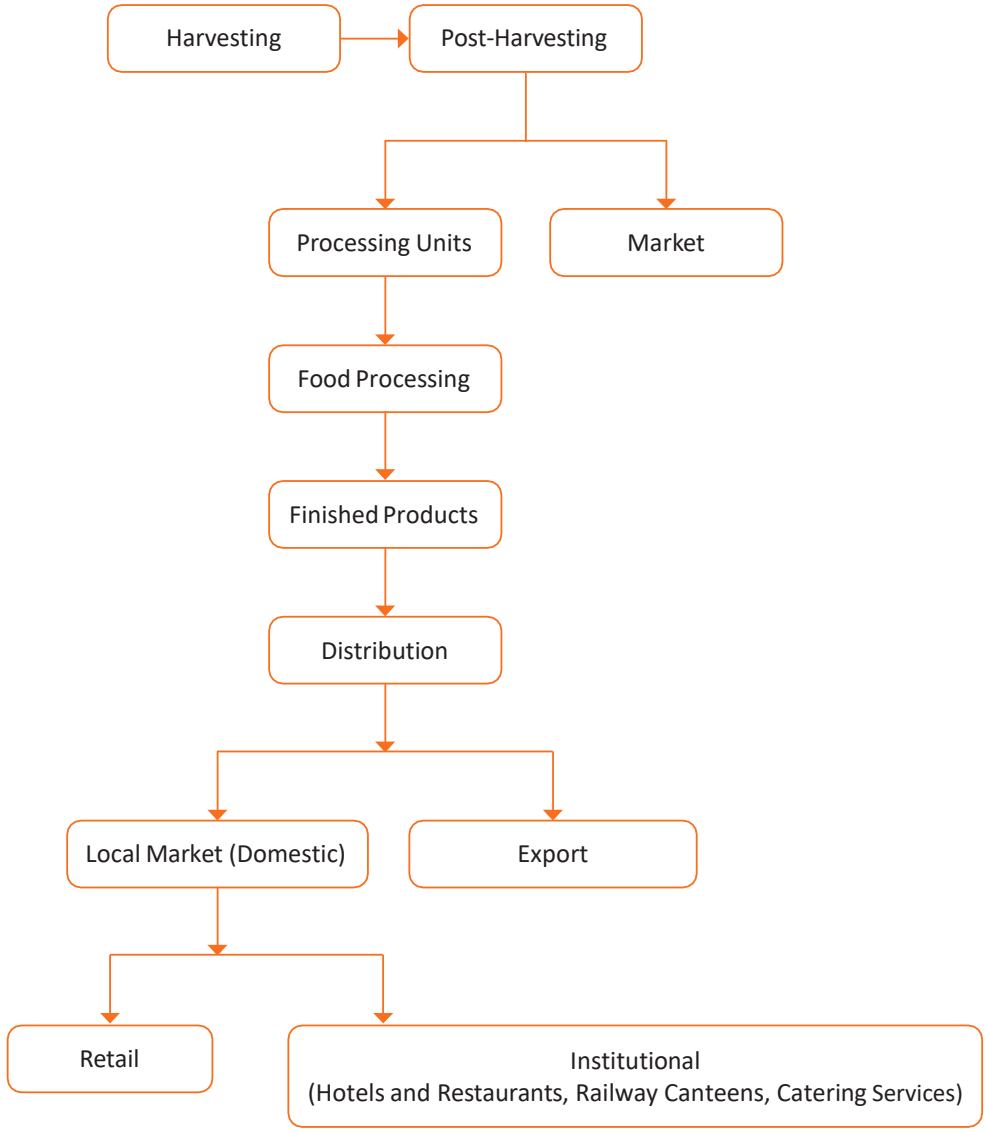


Fig. 1.2.2. Journey of harvested food

Notes

Scan the QR Codes to Watch the related Videos

1.Scope of food processing in India with National and International perspective-
https://www.youtube.com/watch?v=5VlYw38hCxU

2. Overview of Food Processing Industry-
https://www.youtube.com/watch?v=J-2EiMVNtpM

2. Prepare for cleaning and sanitation of food processing facility

Unit 2.1 Prepare the work area and facilitate

FIC/N7615

Key Learning Outcomes

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

1. Apply procedures to perform tasks for supervision of food processing workplace to ensure desired levels of cleanliness and sanitation in and around the work area.
2. Identify workplace requirements and supervise the quality of hygiene practices to ensure timely completion of task

Unit 2.1 Prepare For the Cleaning and Sanitation Activities

Unit Objectives

At the end of this unit, participants 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?

Fig 2.1.5 Floor cleaning

- 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.

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				
Front Doors (each shift, and as needed during shift)	Spot clean glass,				
Ice bucket (every 4 hrs. and as needed)	Wash,	Warm soapy water and 200 ppm sanitize			
Prep Counters (always be each use)	Wa , ri , 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.

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:

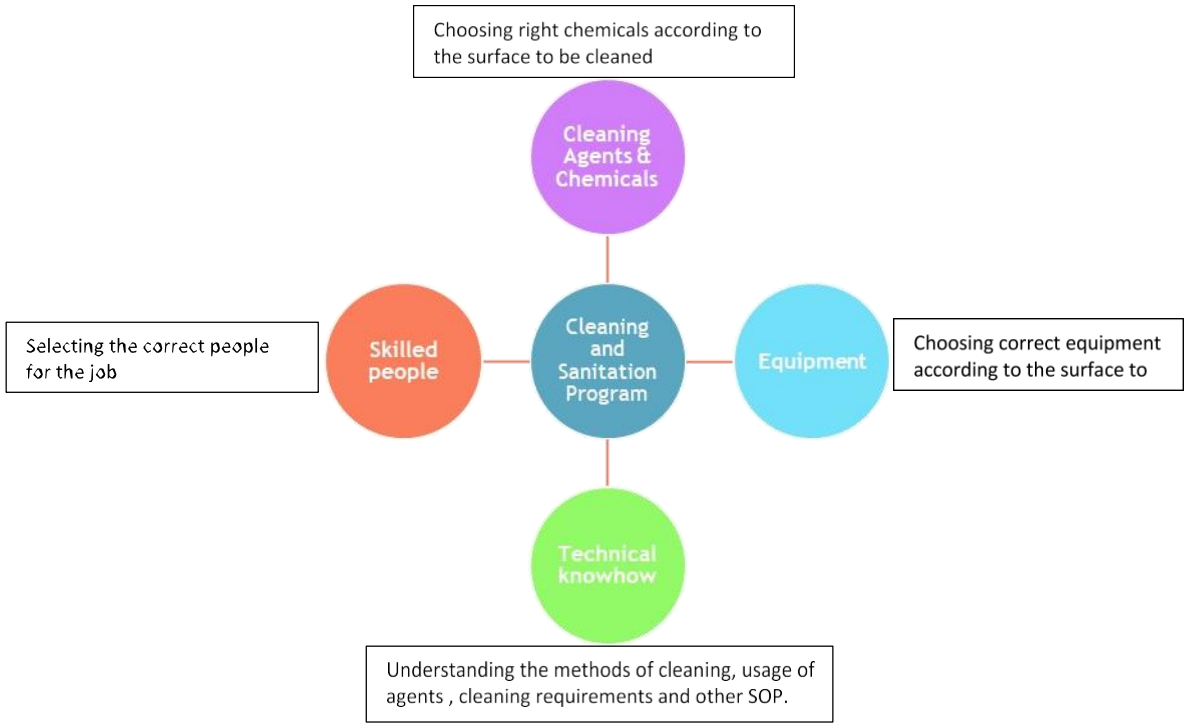


Fig 2.1.10 Important factors of Cleaning and Sanitation process

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.

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 dir 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

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 t hick 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

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:

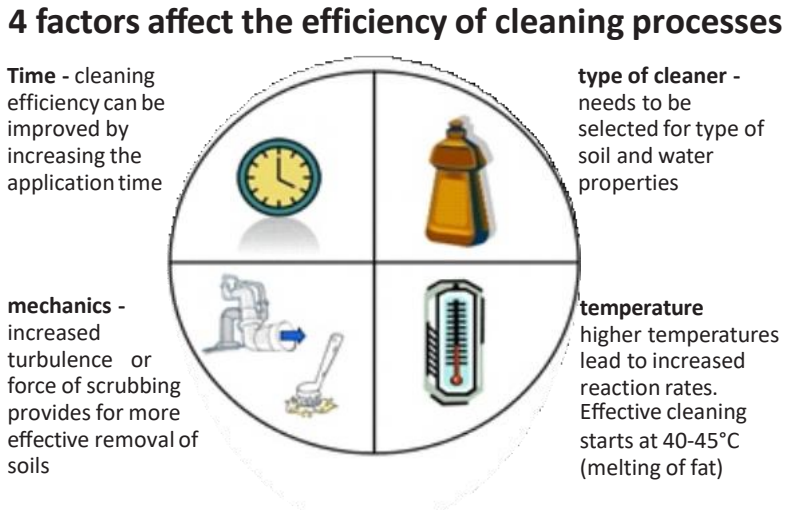


Figure 2.1.30 Factors affecting the efficiency of cleaning Processes

- 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

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.

3 Steps Processing	5 Steps Processing	7 Steps Processing
1. Pre-rinse	1. Pre-rinse	1. Pre-rinse
2. Detergent rinse	2. Detergent rinse	2. Detergent rinse
3. Final rinse	3. Rinse	3. Rinse
	4. Detergent rinse	4. Detergent rinse
	5. Final rinse	5. Rinse
		6. Dinsinfector
		7. Final rinse

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.

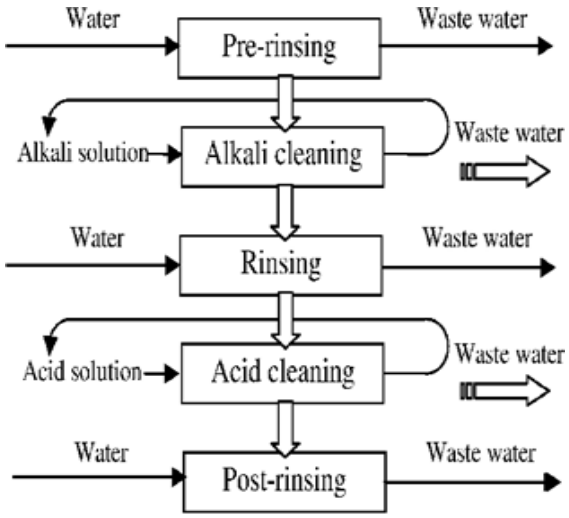


Figure 2.1.32 Sample of Sequencing of Cleaning Procedure

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

Figure 2.1.33 Pre-Rins

Step 2: Start Cleaning Process

- Cleaning can be done using any of the steps:

Figure 2.1.34 Apply Soap

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

Figure 2.1.35 Foaming

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

Figure 2.1.36 Manual Cleaning

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

Figure 2.1.37 Tips to do CIP cleaning

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 2.1.38 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

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

Figure 2.1.47 Some commonly used signage a cleaning worker should understand

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.

Figure 2.1.50 Electrical safety

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.

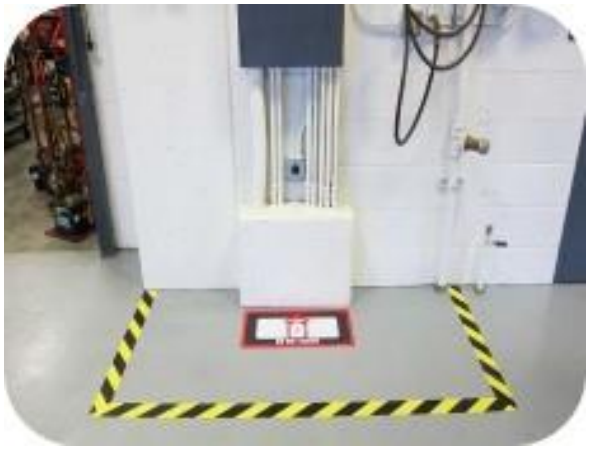


Figure 2.1.51 Electrical safety signs

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 plat 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.

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.

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. 5hours
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. t'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.

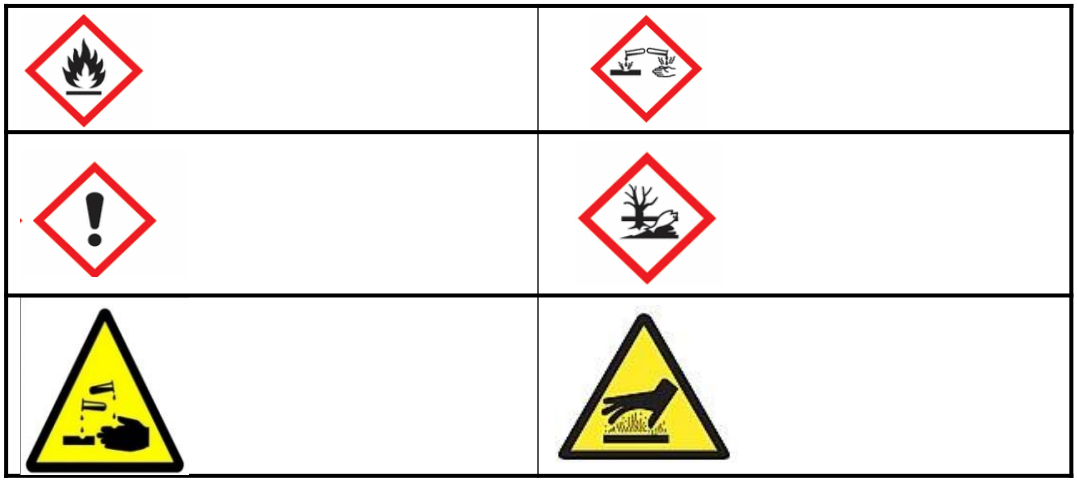
_____
_____
_____
_____
_____
_____

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?	

Notes

Scan the QR Codes to Watch the related Videos

1.Sanitation Training and Education-

https://www.youtube.com/watch?v=BFABjcFD8IM

3. Supervise Hygiene Practices

Unit 3.1 - Monitor and Supervise the Cleaning and Sanitation Tasks

FIC/N7616

Terminal Outcomes

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

1. Supervision and quality review of hygiene practices involving inspection of work,
2. Handling of resource.
3. Handling escalations.
4. Ensuring timely completion of task as per requirement.

Unit 3.1 Monitor and Supervise the Cleaning and Sanitation Tasks

Unit Objectives

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

- Elucidate the information to be populated in monthly report for reporting to the concerned authority.
- Show how to prepare monthly reports, maintenance schedule and checklists.
- Explain the various types of signages to be erected in and around the areas to be cleaned.
- Exemplify the understanding of the signages at the designated areas.
- Supervise and quality review of hygiene practices as per schedule IV of FSSAI.
- Share the procedure to store materials post completion of tasks appropriately importance of adhering to the maintenance schedule and updating it post completion of tasks.

3.1.1 Monitoring and Supervision by a Hygiene Coordinator

Monitoring and supervision play a crucial role in ensuring that cleaning and sanitation practices are carried out effectively, efficiently, and in compliance with regulatory requirements. It helps to maintain a safe and healthy environment, improve quality assurance, and reduce costs. Monitor and supervise are essential in ensuring the effectiveness of cleaning and sanitation practices.

Essential Steps for Monitoring and Supervision

To effectively monitor and supervise cleaning and sanitation tasks in a food processing unit, follow these steps:

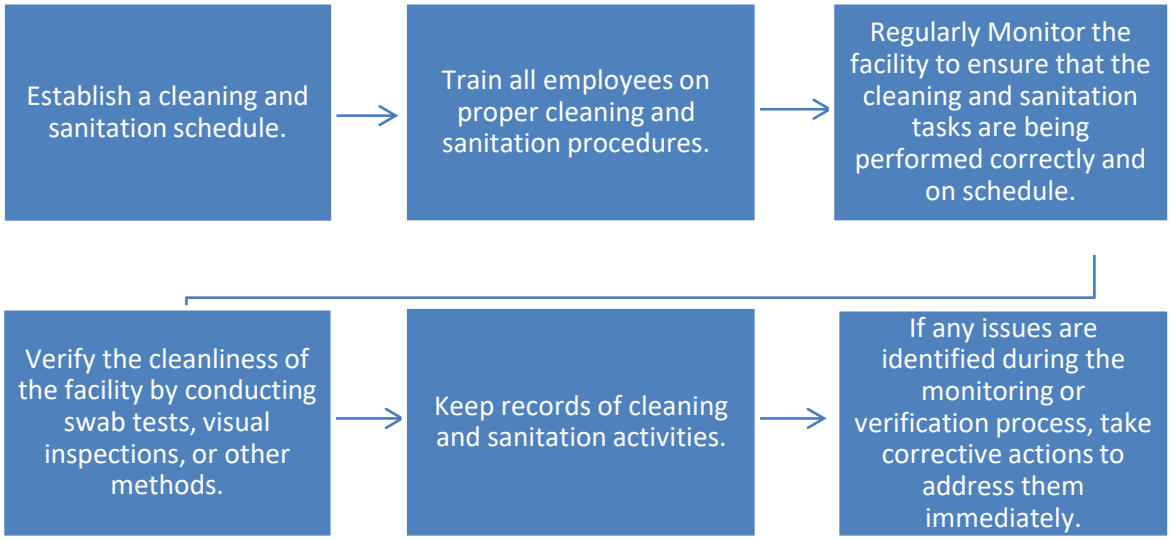


Fig. 3.1.1 Essential Steps for Monitoring and Supervision

Role of Hygiene Coordinator in Monitoring and Supervision

The primary role of a hygiene coordinator is to ensure that the food processing unit complies with all hygiene and safety regulations. This includes monitoring and supervising all activities in the food processing unit to ensure that they comply with good manufacturing practices (GMP) and Hazard Analysis and Critical Control Points (HACCP) regulations.

Some of the specific role and responsibilities that a hygiene coordinator may perform in a food processing unit include:

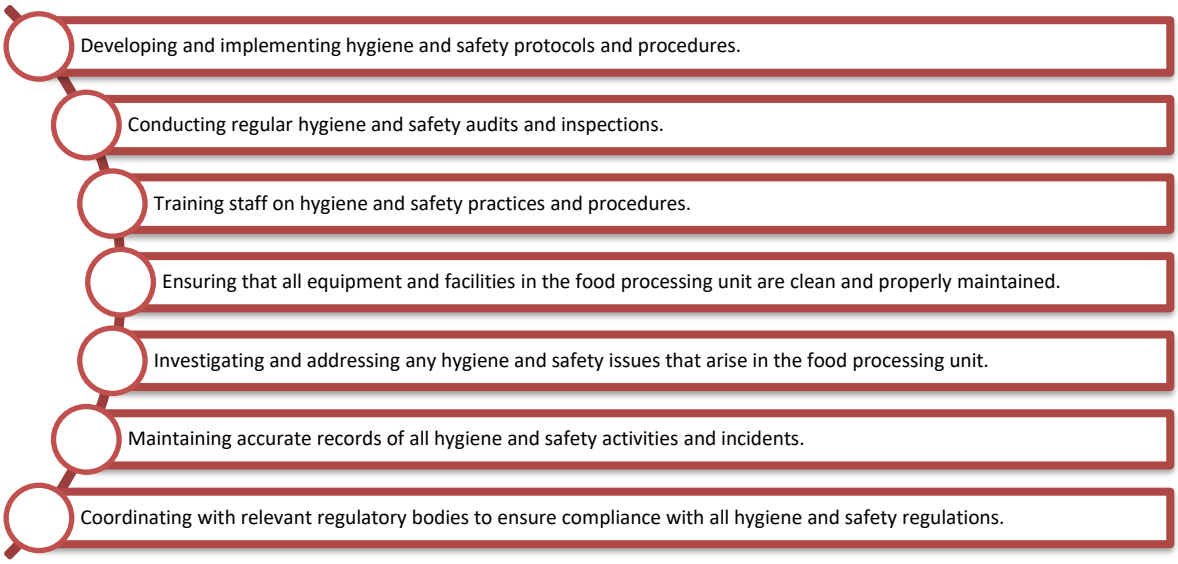


Fig. 3.1.2 Role and Responsibilities of a Hygiene Coordinator

3.1.2 Career Opportunities available for a Hygiene Coordinator

As a hygiene coordinator in a food processing unit, there are various career opportunities available, including:

1. **Senior Hygiene Coordinator:** This is a supervisory position that involves overseeing the hygiene coordinators and ensuring that the production area is maintained to a high standard of hygiene.
2. **Hygiene Manager:** As a hygiene coordinator, one can move up to a hygiene manager role, responsible for managing the overall hygiene practices and programs in the facility.
3. **Sanitation Manager:** A hygiene coordinator can also move into a sanitation manager role, overseeing the sanitation processes and procedures in the facility, including the cleaning and disinfecting of non-food contact surfaces.
4. **Training and Development Manager:** There is also an opportunity to develop a career in training and development, where the person can train and educate other employees on best hygiene practices and procedures.
5. **Occupational Health and Safety Manager:** As a hygiene coordinator, one can also transition to an occupational health and safety role, ensuring that the facility is safe and healthy for all employees.

3.1.3 Cleaning and Sanitization in Food Processing Unit

Cleaning and sanitising maintain a clean and hygienic atmosphere. Both clean surfaces and items, yet they have different purposes.

Cleaning involves removing apparent filth, grime, and debris. Soap, water, and detergents can achieve this. Cleaning surfaces removes dirt, debris, and pathogens.

Sanitizing a surface reduces germs and bacteria to a safe level. Chemical disinfectants like bleach or hydrogen peroxide are used to sanitise. Sanitization prevents sickness and infection, particularly in hospitals, schools, and restaurants.

Both cleaning and sanitisation processes are essential to maintain the safety and quality of food and prevent the spread of foodborne illnesses. Both processes are important for maintaining a clean and healthy environment, but they serve different purposes and may require different tools and techniques. They both should be performed regularly, following specific procedures and protocols to ensure effective results and compliance with food safety regulations.

Cleaning of Non-Food Contact Surfaces

Cleaning non-food contact surfaces in a food processing unit is a crucial step in maintaining food safety and preventing cross-contamination.
In a food processing facility, cleaning and sanitising agents remove dirt, grime, and other pollutants from indirect touch surfaces. To reduce contamination and maintain food safety, non-food contact surfaces must be adequately cleansed and disinfected. To avoid cross-contamination, cleaning solutions should match the surface being cleaned, and equipment should be properly maintained and stored.

Proper cleaning and maintenance of non-contact food surfaces are essential to maintaining a clean and safe food processing environment. Here are some examples of non-contact food surfaces that require cleaning:

1. **Walls and ceilings:** These surfaces can collect dirt, dust, and debris and must be cleaned regularly to prevent contamination of the food processing area.
2. **Floors:** Floors in the food processing area can collect food residue, dirt, and other debris, which can create a breeding ground for bacteria. Regular cleaning and sanitizing of floors are essential to maintain a clean and hygienic environment.
3. **Equipment exteriors:** The exteriors of food processing equipment such as mixers, grinders, and conveyors can collect dust, dirt, and other debris, which can harbor bacteria. Regular cleaning and sanitizing of equipment exteriors are necessary to maintain a clean and safe processing environment.
4. **Air ducts and vents:** Air ducts and vents can collect dust and debris, which can become a source of contamination if not cleaned regularly.
5. **Drainage systems:** The drainage systems in the food processing unit can collect food residue, debris, and water, which can harbour bacteria. Regular cleaning and sanitizing of drainage systems are necessary to prevent contamination of the processing area.

The following are some guidelines for cleaning non-food contact surfaces in a food processing unit:

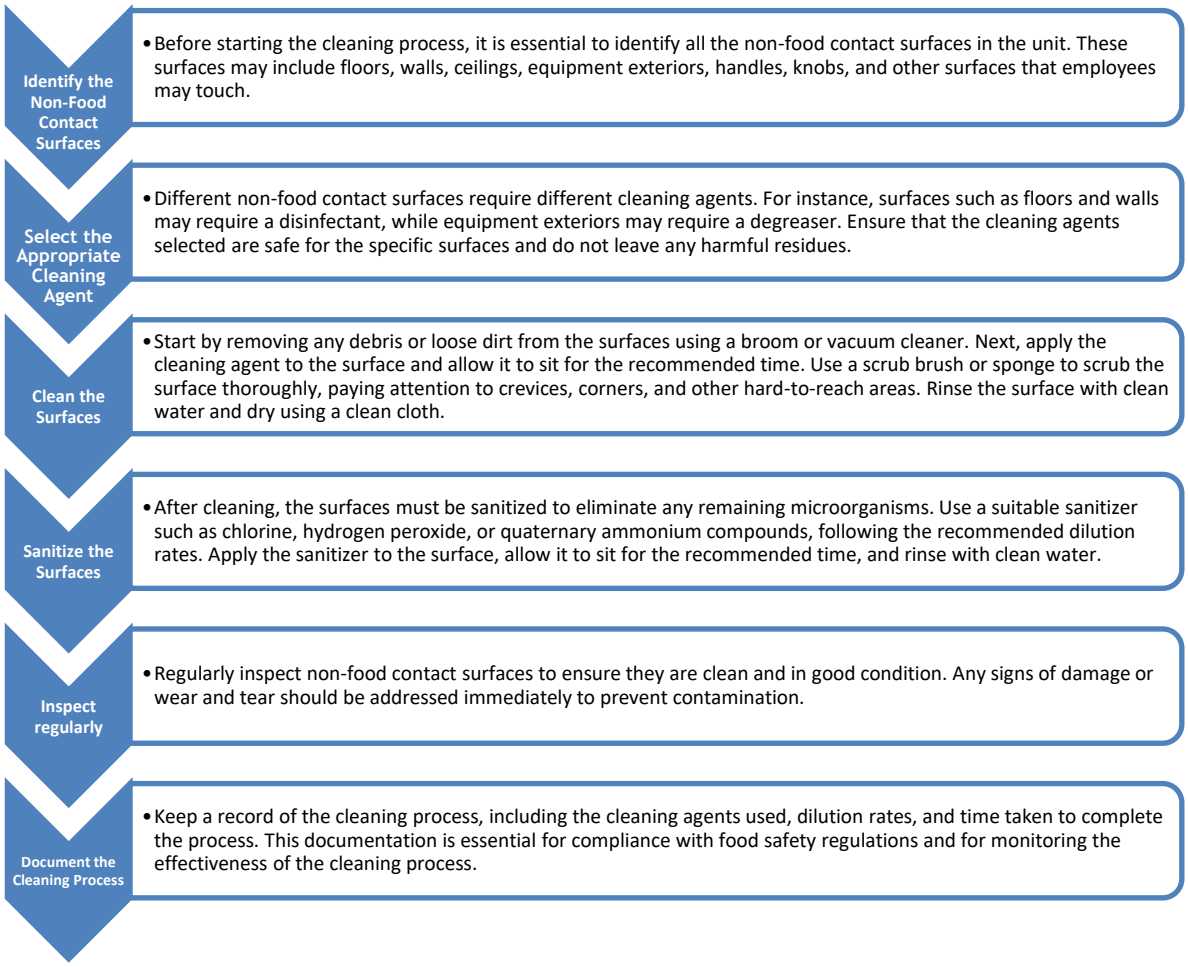


Fig. 3.1.3 Guidelines for cleaning non-food contact surfaces in a food processing unit

Cleaning of Food Contact Surfaces

Cleaning of food contact surfaces refers to the process of removing dirt, grime, and food residue from surfaces that come into direct contact with food. Here are some examples of cleaning food contact surfaces:

1. **Manual cleaning:** This involves using a brush or cloth with soap and water to scrub surfaces such as utensils, cutting boards, and countertops.
2. **Mechanical cleaning:** This involves using equipment such as a dishwasher or high-pressure washer to clean surfaces.
3. **Chemical cleaning:** This involves using chemicals such as sanitizers or disinfectants to kill bacteria and other harmful microorganisms on surfaces.
4. **Steam cleaning:** This involves using high-temperature steam to sanitize surfaces and kill bacteria and other harmful microorganisms.
5. **Dry cleaning:** This involves using a vacuum cleaner or other equipment to remove dry food particles and debris from surfaces.

It's essential to clean food contact surfaces regularly to prevent the growth of bacteria and other microorganisms that can cause foodborne illness. Proper cleaning and sanitation of food contact surfaces can help ensure the safety and quality of food products.

3.1.4 Steps for Cleaning and Sanitizing

The specific sequence of operations for cleaning and sanitizing may vary depending on the specific situation, but a general sequence of operations for cleaning and sanitizing may include:

Step 1	Preparing the cleaning solution: Dilute the cleaning chemical according to the manufacturer's instructions. The hygiene coordinator trains the cleaning staff on the appropriate use of the cleaning solutions. Based on the cleaning requirement, he explains the workers to selects the appropriate chemicals or cleaning agents. The measurement and mixing procedure of solution depends on the manufacturer's instruction. It is advisable to prepare and store the solution.	
Step 2	Removing loose debris: Sweep or wipe the non-food contact surfaces to remove any loose debris.	

Step 3	Applying the cleaning solution: Apply the cleaning solution to the non-food contact surfaces, making sure to cover all areas.	
Step 4	Agitating the cleaning solution: Use a scrub brush or sponge to agitate the cleaning solution, loosening any dirt or grime. Also, Allow the cleaning solution to sit on the surface for the recommended time, as per the manufacturer's instructions.	
Step 5	Rinsing the surface: Rinse the surface thoroughly with water to remove all the cleaning solution.	
Step 6	Inspecting the surface: Inspect the surface for any remaining dirt or grime. If any are present, repeat the cleaning process.	
Step 7	Applying sanitizer: Apply the sanitizing solution to the non-food contact surfaces, making sure to cover all areas. Allow the sanitizer to sit on the surface for the recommended time, as per the manufacturer's instructions. Then, Rinse the surface thoroughly with water to remove all the sanitizing solution.	
Step 8	Drying the surface: Dry the surface using a clean, dry cloth or paper towel.	

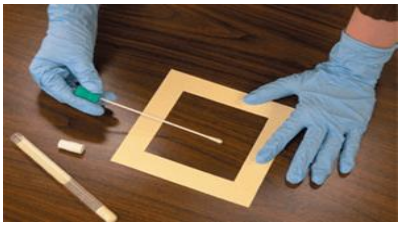
Step 9	Verifying the cleanliness: Verify the cleanliness of the surface by conducting a swab test or visual inspection.	
Step 10	Recording the cleaning: Record the cleaning and sanitizing process in the cleaning logbook.	

Table 3.1.1 Steps for Cleaning and Sanitizing

It's important to follow the specific cleaning and sanitizing procedures recommended by the industry or regulatory agency, and to use appropriate personal protective equipment (PPE) when handling cleaning and sanitizing agents.

3.1.5 Basic Terminologies used in Cleaning and Sanitizing

Terminology	Description
Cleaning	The process of removing dirt, debris, and other unwanted substances from surfaces or objects, typically using soap and water.
Sanitation	The process of reducing the number of microorganisms to a safe level, typically through the use of chemical agents or heat.
Disinfection	The process of killing or eliminating microorganisms such as bacteria and viruses from surfaces, usually by using chemicals.
Sterilization	The process of completely eliminating all microorganisms from a surface, usually by using high heat or chemicals.
Contamination	The presence or introduction of harmful substances, microorganisms, or other unwanted materials in an environment.
Cross-contamination	The transfer of harmful substances or microorganisms from one surface or area to another, often through shared tools, equipment, or personnel.
Cleaning Agent	A substance used to remove dirt, grime, and other unwanted substances from surfaces or objects, such as soap, detergent, or bleach.
Sanitizing Agent	A chemical agent used to reduce the number of microorganisms to a safe level, such as chlorine or hydrogen peroxide.
Dilution	The process of mixing a cleaning or sanitizing solution with water to create a proper concentration for use.
Cleaning Schedule	A predetermined plan outlining the frequency and method for cleaning and sanitizing specific areas or objects.
Inspection	The act of examining an area or object to ensure that it is clean and sanitary, and that all necessary cleaning and sanitization tasks have been completed.

Terminology	Description
Personal Protective Equipment (PPE)	Protective clothing or equipment worn by workers to minimize their exposure to harmful substances or microorganisms during cleaning and sanitation tasks.
Chemical Safety	The safe handling and use of cleaning and sanitizing chemicals, including the proper storage, labelling, and disposal of these substances.
Standard Operating Procedures (SOPs)	Written instructions that outline the steps and procedures for carrying out cleaning and sanitation tasks, including the use of PPE, chemicals, and equipment.
Quality Control	A process of monitoring and evaluating the effectiveness of cleaning and sanitation tasks, often through regular inspections, testing, and feedback from employees and customers.

Table 3.1.2 Basic Terminologies used in Cleaning and Sanitizing

3.1.6 Signages

The signages that may be present in designated areas for cleaning and sanitizing non-food contact surfaces. In food processing unit, the following types of signages are used:

1. **Directional Signage:** This type of signage is used to direct people towards the area that needs to be cleaned. It helps to guide cleaners towards the specific location and ensure that they do not get lost while carrying out the cleaning activities.

Fig. 3.1.4 Directional Signages

2. **Cautionary Signage:** Cautionary signage is used to warn people of potential hazards in the cleaning area. It is important to display this type of signage in areas where there may be a risk of slipping, tripping, or falling.

Fig. 3.1.5 Cautionary Signages

3. **Prohibitory Signage:** Prohibitory signage is used to inform people of areas that are strictly off-limits. It is important to ensure that people do not enter these areas while cleaning is taking place. This type of signage is usually used in areas that are sensitive or hazardous, such as electrical rooms or chemical storage areas.

Fig. 3.1.6 Prohibitory Signages

4. **Informational Signage:** Informational signage is used to provide information about the cleaning process or to give instructions to people in the area. It is important to ensure that people are aware of the cleaning process and know how to respond to any instructions that may be given.

Fig. 3.1.7 Informational Signages

5. **Safety Signage:** Safety signage is used to remind people of safety procedures and protocols that must be followed when working in the area. It is important to ensure that people are aware of the safety measures that are in place and that they follow them to avoid any accidents or injuries.

Fig. 3.1.8 Safety Signages

By using appropriate signages, it ensures that the cleaning and sanitizing tasks for non-food contact surfaces are done effectively and safely.

The signages that may be present in designated areas for cleaning and sanitizing non-food contact surfaces.

Signage	Description	Image
Cleaning in Progress	This sign indicates that the area is currently being cleaned and to proceed with caution.	
Wet Floor	This sign is commonly used to warn people of a wet floor and to prevent slips and falls.	
Sanitized Zone	This sign identifies an area that has been thoroughly sanitized and should be kept clean.	
Cleaning Supplies Only	This sign indicates that only cleaning supplies should be stored in the designated area and that it is not a storage area for other items.	
Personal Protective Equipment (PPE)	This sign is used to remind workers that PPE, such as gloves and masks, must be worn when handling cleaning chemicals.	

Table 3.1.3 Designated Areas for Cleaning and Sanitizing Non-Food Contact Surfaces

By using appropriate signages, it ensures that the cleaning and sanitizing tasks for non-food contact surfaces are done effectively and safely.

3.1.7 GHP (Good Hygiene Practices) and GMP (Good Manufacturing Practices)

GHP (Good Hygiene Practices) and GMP (Good Manufacturing Practices) are essential in food processing units to ensure that the food produced is safe for human consumption.

GHP refers to the measures taken to maintain cleanliness, sanitation, and hygiene throughout the food processing unit. It includes proper personal hygiene of employees, sanitation of equipment and facilities, and maintenance of the environment to prevent contamination of food. GHP is essential to prevent the growth of harmful microorganisms, such as bacteria and viruses, which can cause foodborne illnesses.

GMP refers to the procedures, protocols, and systems implemented to ensure the quality and safety of the products produced. It includes the use of quality ingredients, proper storage of raw materials and finished products, and following specific manufacturing processes to ensure the consistency and safety of the products. GMP helps to prevent product contamination and ensures that products are produced in a safe and controlled environment.

The significance of GHP and GMP in food processing units is that they ensure the safety and quality of the food products produced. It helps to protect the health of consumers by preventing the spread of foodborne illnesses and ensuring that the products meet regulatory requirements. Implementing GHP and GMP also helps to maintain the reputation of the food processing unit and increase consumer confidence in the products produced.

Good Manufacturing Practices in Food Processing Unit

Good Manufacturing Practices (GMP) are critical for maintaining food safety and preventing contamination in food processing units. Following GMPs in the location, layout, and facilities of a food processing unit is essential for ensuring food safety and preventing contamination. The food processing unit should be designed to facilitate effective cleaning and sanitization practices and should be regularly cleaned and maintained to prevent the buildup of bacteria and other contaminants.

Here are some specific GMP considerations related to the location, layout, and facilities of a food processing unit in terms of cleaning and sanitization:

1. **Location**: The location of a food processing unit should be carefully chosen to reduce the risk of contamination. The unit should be situated away from sources of potential contamination, such as industrial areas, landfills, and animal farms. The surrounding environment should be clean, free from pests and other contaminants.

Fig. 3.1.9 FPU Location with Clean Surroundings

(Source: https://www.newmillcapital.com/real_estate/180000-sqft-food-processing-plant)

2. **Layout:** The layout of the food processing unit should be designed to facilitate effective cleaning and sanitization practices. The equipment and fixtures should be placed in a way that allows for easy access and thorough cleaning. The layout should also allow for efficient movement of people, products, and equipment.

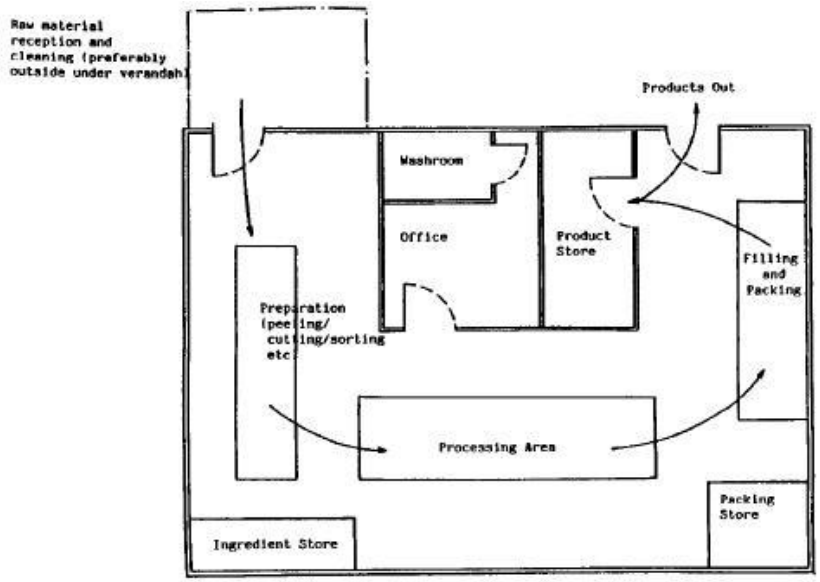


Fig. 3.1.10 An ideal Layout of FPU for maintaining better Cleaning and Sanitisation

(Source: https://www.appropedia.org/Food_processing_building_design_%28Practical_Action_Brief%29#/media/File:Food_design.JPG)

3. **Building design:** The building design should facilitate efficient and effective cleaning and sanitization practices. The building should be constructed from materials that are non-porous and easily cleaned. The layout should allow for easy movement of people and equipment. The building should also have adequate drainage to prevent the build-up of water and moisture. Layout & Design of the food production unit should be uni-directional to prevent backward flow of materials during processing. This is required in order to prevent cross contamination. The following should are considered while designing the building.

    a. **Separation of areas:** The food preparation, storage, and serving areas should be separated from each other to prevent cross-contamination. There should be clear demarcations between these areas, and the flow of food should be in one direction.

    b. **Adequate space:** There should be enough space to ensure that food is prepared and served in a hygienic manner. There should be adequate space for equipment, employees, and customers.

4. **Flooring:** The flooring should be made of materials that are easy to clean and do not absorb moisture, such as epoxy or concrete. The flooring should be slip-resistant and sloped towards floor drains to facilitate easy cleaning and drainage. Flooring should be free from cracks, gaps, and other crevices where debris can accumulate.

(a)

(b)

Fig. 3.1.11 (a) Easy to clean floor, (b) Floor with cracks Cracks allow bacteria and moulds to accumulate.

5. **Walls and Ceilings:** The walls and ceilings should be smooth and made of materials that are easy to clean and do not harbor bacteria or other microorganisms. Wall finishes such as ceramic tiles, epoxy, or stainless steel are ideal. The walls and ceilings should be sloped towards the floor to prevent water from accumulating in corners.

(a)

(b)

Fig. 3.1.12 (a) Smooth wall and Ceiling, (b) Flacky walls allow fungal growth

6. **Doors and windows:** Doors and windows should be designed to prevent the entry of pests, dust, and other contaminants. They should be smooth, non-porous, and easy to clean. Doors should have tight-fitting seals to prevent the entry of outside air. Windows should be made of shatter-resistant, non-porous materials, and should be designed to allow for easy cleaning.

(a)

(b)

Fig. 3.1.13 (a) Smooth and easy cleaning surface door, (b) Netlons and mesh in window to avoid pest entry

7. **Drainage:** Effective drainage systems in food processing units help prevent the accumulation of water, food debris, and other contaminants that can cause bacterial growth and compromise the safety and quality of the food products. A well-designed drainage system should be easy to clean and maintain, with sloped floors and properly placed drains and channels to ensure that water and other liquids are quickly and efficiently removed from the processing area. The drains should be covered to prevent insects and rodents from entering the processing area.

(a)

(b)

(c)

Fig. 3.1.14 (a) Floors should be sloped to ensure easy drainage, (b) Drains should be covered to prevent insects and rodents, (c) Floor with proper drainage

3.1.8 Importance of Training of Cleaning and Sanitization Workers

Cleaning and sanitation workers play a critical role in ensuring the safety and hygiene of food processing units. They are responsible for maintaining a clean and hygienic environment, preventing the spread of contaminants, and ensuring compliance with regulatory standards. Sanitation workers must be well-trained to meet food processing standards.

Food processing facilities need sanitation personnel training for these reasons:

Fig. 3.1.15 Reason for Training Requirement of Cleaning and Sanitation Workers

Identification of the need of Training requirement

As a hygiene supervisor, it is your responsibility to ensure that sanitation workers are trained and knowledgeable about proper hygiene and safety practices. Here are the steps to identify the training needs of sanitation workers and plan the trainings:

1. **Assess the current knowledge and skills of sanitation workers:** Before planning any training, it is important to know the level of knowledge and skills that the sanitation workers already possess. You can conduct a training needs assessment to evaluate their current understanding of hygiene practices, safety measures, and use of cleaning tools and chemicals.
2. **Identify gaps in knowledge and skills:** After assessing the current knowledge and skills of sanitation workers, identify the areas where they need improvement. This could include areas such as the proper use of cleaning tools and equipment, personal hygiene practices, and safety measures for handling chemicals and hazardous waste.
3. **Develop a training plan:** Based on the identified gaps in knowledge and skills, develop a training plan that outlines the topics to be covered, the methods of delivery, the duration of the training, and the expected outcomes.
4. **Determine the training delivery method:** Depending on the training topics, one can choose from a range of delivery methods, such as classroom training, on-the-job training, or e-learning. Choose the method that is most appropriate for the topic and the learning style of the cleaning and sanitation workers.
5. **Schedule the training:** Once the hygiene coordinator have developed a training plan and determined the delivery method, schedule the training sessions at a time that is convenient for all the sanitation workers. Make sure that everyone is aware of the training schedule and the expected outcomes.
6. **Deliver the training:** When delivering the training, make sure to use interactive and engaging techniques that are appropriate for the training method. Allow time for questions and discussion to ensure that the sanitation workers have a clear understanding of the topic.
7. **Evaluate the training:** After the training, evaluate the effectiveness of the training by soliciting feedback from the sanitation workers. Use this feedback to improve the training for future sessions.
8. **Follow up with the sanitation workers:** Once the training is completed, follow up with the sanitation workers to ensure that they are applying the knowledge and skills they have learned on the job. This will help to reinforce the training and ensure that the sanitation workers are maintaining the required hygiene and safety practices.

By following these steps, the hygiene coordinator can identify the training needs of sanitation workers and plan effective training sessions to improve their knowledge and skills.

3.1.9 Communication with Different Departments

Effective communication and obtaining approvals from individuals and departments affected by cleaning and sanitation work are crucial to ensuring a successful and safe cleaning operation. A hygiene coordinator is responsible for the supervision and communicating with various departments in Food Processing Units. The steps to communicate are:

1. Communicate the plan: Communicate the plan to the stakeholders and provide them with the details of the cleaning and sanitation work. Explain the reasons for the cleaning work and the benefits it will provide.
2. Seek approvals: Seek approvals from the stakeholders affected by the cleaning and sanitation work. This includes obtaining approvals from department heads and managers, as well as individual employees who may be impacted by the work.
3. Address concerns and questions: Address any concerns or questions that the stakeholders may have regarding the cleaning and sanitation work. Be open to feedback and suggestions, and try to resolve any issues that arise.
4. Document the approvals: Document the approvals obtained from the stakeholders, including the dates and signatures of those who gave their approval.
5. Follow up and review: Follow up with the stakeholders after the cleaning and sanitation work is completed, and review the results to ensure that the work was completed as planned and that the stakeholders are satisfied.

Effective communication and obtaining approvals from individuals and departments affected by cleaning and sanitation work are crucial to ensuring that the work is completed safely and successfully

3.1.10 Documentation of Accurate Information by Hygiene Coordinator

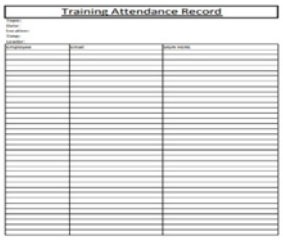
Accurate information is essential for maintaining a safe, efficient, and compliant cleaning and sanitation program. Thus, the hygiene coordinator's documentation of policies, equipment, chemicals, processes, inventory schedules, product labelling, etc. is crucial. Here are some ways in which accurate information can make a positive impact:

1. **Ensuring safety:** Accurate information about equipment, chemicals, and procedures is crucial to ensure the safety of employees, customers, and anyone else on the premises. Knowing which chemicals to use on which surfaces and how to use them correctly can prevent accidents, injuries, and even fatalities.
2. **Preventing contamination:** Proper inventory schedules and product labels help to prevent contamination of food products, surfaces, and equipment. Accurate information on the use of cleaning agents and sanitizers helps to ensure that all surfaces are free from harmful bacteria and other contaminants.
3. **Promoting efficiency:** Accurate information allows the hygiene coordinator to develop and implement efficient cleaning and sanitation procedures. This includes the use of appropriate equipment and cleaning agents, as well as the scheduling of cleaning tasks to minimize downtime and maximize productivity.
4. **Compliance with regulations:** Accurate documentation of policies, procedures, and inventory schedules helps ensure that the organization complies with all relevant regulations and guidelines. This includes local, state, and federal regulations related to food safety and hygiene.

5. **Reducing waste:** Accurate information allows the hygiene coordinator to order and use only the amount of cleaning agents and equipment needed, reducing waste and saving the organization money.

Documentation by a Hygiene Coordinator

As a hygiene coordinator in a food processing unit, some of the documentation that may need to be filled includes:

Document	Description	Image
Training documents	The hygiene coordinator is responsible for maintaining training records of all employees involved in food processing and handling. This should include details of the training provided, the date of training, and the name of the employee who received the training.	
Cleaning plan	A cleaning plan is a document that outlines the cleaning procedures, cleaning frequency, and cleaning materials to be used in the food processing unit. The hygiene coordinator is responsible for developing and maintaining this document.	
Cleaning schedule	A cleaning schedule is a document that specifies when cleaning tasks are to be performed, what cleaning tasks need to be performed, and who is responsible for performing them. The hygiene coordinator is responsible for maintaining this document and ensuring that all cleaning tasks are completed as scheduled.	

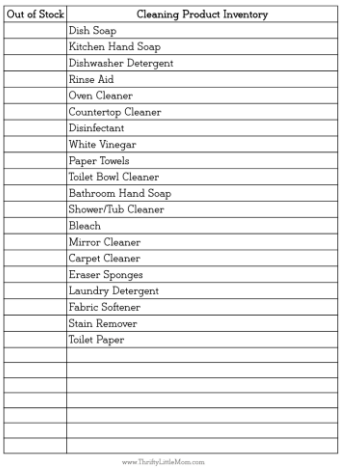
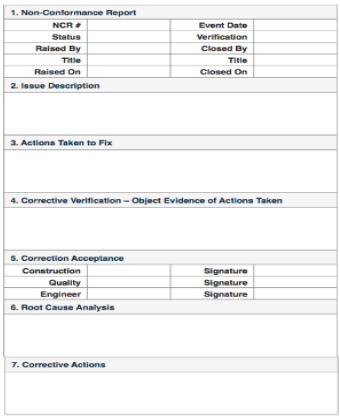
Document	Description	Image
Inventory documents	**Chemical stock:** The hygiene coordinator is responsible for maintaining an inventory of cleaning and sanitation chemicals, including the name of the chemical, the quantity in stock, the date of purchase, and the date of expiry. **Tools required:** The hygiene coordinator is responsible for maintaining an inventory of tools required for cleaning and sanitation, including the name of the tool, the quantity in stock, and the condition of the tool.	 Out of Stock | Cleaning Product Inventory Dish Soap Kitchen Hand Soap Dishwasher Detergent Rinse Aid Oven Cleaner Countertop Cleaner Disinfectant White Vinegar Paper Towels Toilet Bowl Cleaner Bathroom Hand Soap Shower/Tub Cleaner Bleach Mirror Cleaner Carpet Cleaner Eraser Sponges Laundry Detergent Fabric Softener Stain Remover Toilet Paper
Non-conformance and Corrective Action records:	The hygiene coordinator is responsible for maintaining records of any non-conformance issues identified during cleaning and sanitation activities or environmental monitoring. They should also document the corrective actions taken to address these issues.	 1. Non-Conformance Report NCR # | Event Date Status | Verification Raised By | Closed By Title | Title Raised On | Closed On 2. Issue Description 3. Actions Taken to Fix 4. Corrective Verification – Object Evidence of Actions Taken 5. Correction Acceptance Construction | Signature Quality | Signature Engineer | Signature 6. Root Cause Analysis 7. Corrective Actions

Table 3.1.4 Documentation to be maintained by a Hygiene Coordinator

These are just a few examples of the documentation that a hygiene coordinator may need to fill as part of their responsibilities in a food processing unit. The specific documentation requirements may vary depending on the company's policies and regulatory requirements.

Cleaning Reports

A hygiene coordinator is responsible to prepare monthly reports, cleaning schedules, and checklists for monitoring and supervising cleaning and sanitation tasks, follow these steps:

1. Identify the areas that need to be cleaned and sanitized.
2. Determine the frequency and type of cleaning required for each area. For example, restrooms may need to be cleaned and sanitized multiple times a day, while workspaces may only need to be cleaned once a week.
3. Develop a cleaning schedule for each area, outlining when cleaning and sanitation tasks will be performed and by whom.

4. Create checklists for each cleaning and sanitation task. These should include specific instructions for cleaning and sanitizing each area, as well as any safety precautions that should be taken.
5. Assign cleaning and sanitation tasks to specific individuals or teams, and ensure that they are trained on proper cleaning and sanitizing techniques.
6. Monitor the cleaning and sanitation tasks regularly to ensure that they are being performed correctly and on schedule.
7. Use the checklists to document completed tasks and identify areas that may need additional attention.
8. Compile the data collected from the checklists into monthly reports, which can be used to track progress and identify any areas that need improvement.

Adjust the cleaning schedule and checklists as needed based on feedback and data collected during monitoring. The following are general maintenance schedule and checklist to be utilized for monitoring cleaning and sanitation in a food processing unit:

Cleaning Schedule:

1. Daily cleaning tasks (e.g., wiping down surfaces, cleaning floors)
2. Weekly cleaning tasks (e.g., deep cleaning, sanitizing high-touch areas)
3. Monthly cleaning tasks (e.g., cleaning equipment, deep cleaning of restrooms)
4. Quarterly or semi-annual deep cleaning tasks (e.g., carpet cleaning, window washing)

Checklists:

1. Daily cleaning checklist (e.g., wipe down counters, empty trash, sweep floors)
2. Weekly cleaning checklist (e.g., deep clean bathrooms, sanitize high-touch areas)
3. Monthly cleaning checklist (e.g., clean equipment, restock supplies)
4. Quarterly or semi-annual cleaning checklist (e.g., clean carpets, wash windows)

When monitoring and supervising cleaning and sanitation tasks, it is important to ensure that the tasks are being performed correctly and consistently, that staff are properly trained, and that supplies and equipment are in good condition. It is also important to address any issues or concerns that arise and make necessary adjustments to the cleaning and sanitation plan.

2.5.1 Food Safety

Cleaning tools and equipment play a crucial role in maintaining the cleanliness and hygienein Food Processing Units. However, these tools and equipment must be inspected and maintained regularly to ensure they are safe to use and do not pose any health hazards to the users or the environment. The following are some of the reasons why inspecting cleaning tools and equipment is essential:

1. **Prevents accidents and injuries:** Damaged or malfunctioning equipment can cause accidents and injuries to the user, resulting in loss of productivity, medical expenses, and even lawsuits. Regular inspection ensures that the equipment is in good condition, reducing the risk of accidents.
2. **Improves efficiency and productivity:** Properly maintained equipment performs better, which saves time and increases productivity. It also reduces the need for frequent repairs or replacements, which can be costly and time-consuming.

3. **Ensures hygiene and cleanliness:** Dirty or contaminated equipment can spread germs and bacteria, leading to infections and illnesses. Regular cleaning and disinfecting of the tools and equipment ensures that they are hygienic and safe for use.
4. **Complies with regulations and standards:** Many industries have specific regulations and standards regarding the use and maintenance of cleaning tools and equipment. Inspecting and maintaining the equipment ensures compliance with these regulations, avoiding fines and legal actions.

3.1.12 Storing Cleaning and Sanitation Tools and Materials

The general procedure to store cleaning materials post completion of tasks appropriately is:

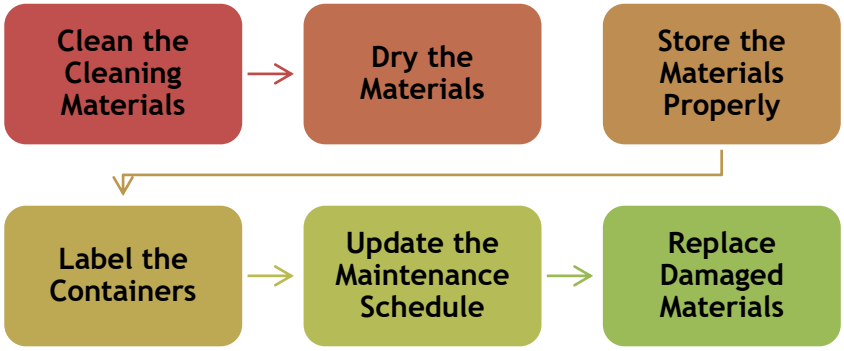


Fig. 3.1.16 Process of Store Cleaning Materials

1. **Determine the scope of the audit/review:** It is important to clearly define the area that will be audited or reviewed, including the timeframe, specific objectives, and the stakeholders involved.
2. **Develop a checklist:** Create a checklist of items to be covered during the audit or review. The checklist should cover key performance indicators, goals, and objectives, as well as any risks or concerns.
3. .

Audit Checklist for Cleaning and Sanitation				
S.No.	**Requirements**	**Yes**	**No**	**Details of Action Taken**
1	Have all Non-Food Contact surfaces been properly identified and marked for cleaning and sanitation?			
2	Is the cleaning schedule for Non-Food Contact surfaces clearly defined and adhered to?			
3	Are the cleaning procedures for Non-Food Contact surfaces properly documented and followed?			
4	Are the cleaning supplies and equipment properly stored and maintained?			
5	Is there a system in place for reporting and addressing Non-Food Contact surface cleaning and sanitation issues?			

Audit Checklist for Cleaning and Sanitation				
S.No.	**Requirements**	**Yes**	**No**	**Details of Action Taken**
6	Is there a verification process to ensure that Non-Food Contact surfaces have been adequately cleaned and sanitized?			
7	Are staff members properly trained on the cleaning and sanitation of Non-Food Contact surfaces?			
8	Are there any areas or surfaces that require additional attention or cleaning procedures?			
9	Are all cleaning and sanitation practices in compliance with regulatory requirements and industry standards?			
10	Are there any areas or practices that need improvement or modification to ensure proper cleaning and sanitation of Non-Food Contact surfaces?			

Table 3.1.5 Sample of Audit Checklist for Cleaning and Sanitation

4. **Assign roles and responsibilities:** Assign roles and responsibilities to the team members who will be conducting the audit or review. This may include the audit leader, team members, and subject matter experts.
5. **Conduct the audit/review:** Conduct the audit or review, following the checklist and addressing any concerns or risks identified. During the review meeting, present the findings, and allow for discussion and feedback from all stakeholders.
6. **Identify action items:** After the audit or review, identify specific action items that need to be taken to address any concerns or risks identified. Assign ownership and due dates for each action item.
7. **Develop an action plan:** Develop an action plan that includes the identified action items, their owners, and due dates. The action plan should also include any resources or support needed to complete the actions.
8. **Monitor progress:** Regularly monitor progress against the action plan and update stakeholders on progress. Adjust the plan as necessary to ensure that actions are completed on time and are effective.

3.1.16 Expert Intervention

As a hygiene coordinator, it is important to be aware of issues that require escalation or expert intervention to ensure the health and safety of individuals in a particular setting. These may include outbreaks of infectious diseases, environmental health hazards, food safety concerns, cleaning and sanitization issues, and personal protective equipment and infection control measures.

Some of the issues that may require escalation or expert intervention include:

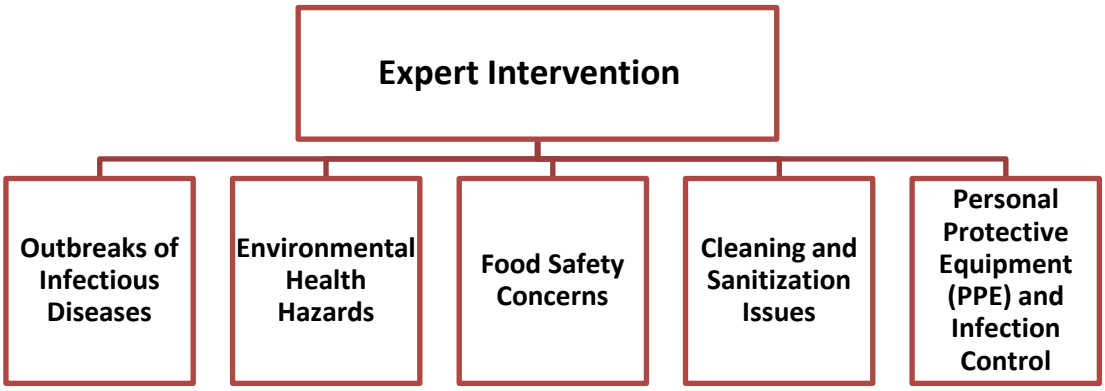


Fig.3.1.18 Issues that may require escalation or expert intervention

1. **Outbreaks of Infectious Diseases:** If there is an outbreak of a contagious disease in a particular setting, the hygiene coordinator should escalate the issue to relevant health authorities, such as the local health department. The hygiene coordinator may also need to work with infectious disease experts to develop a plan to control the spread of the disease and prevent further outbreaks. For example, COVID-19 pandemic, SARS outbreak, Dengue fever outbreak, Measles outbreak, etc.

Fig. 3.1.19 Covid-19 Outbreak in 2020

(Sources: https://www.ebsco.com/blogs/health-notes/ten-most-impactful-infectious-disease-outbreaks-2020)

2. **Environmental Health Hazards:** The hygiene coordinator should be knowledgeable about environmental health hazards, such as exposure to toxic chemicals or poor air quality, and take appropriate measures to mitigate these risks. If the issue is beyond the hygiene coordinator's expertise, it should be escalated to an environmental health expert. Few examples of environmental hazards are Air pollution, Water pollution, Noise pollution, Hazardous waste, etc.

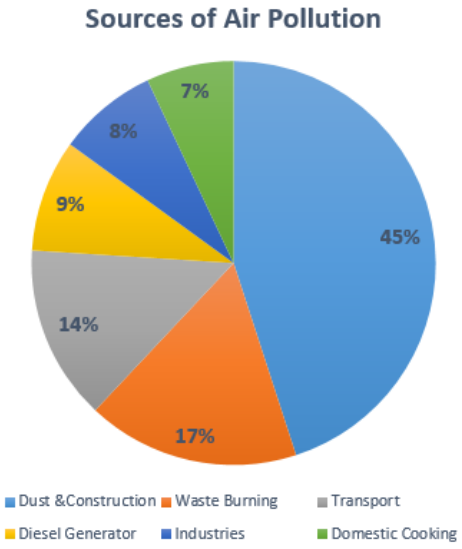


Fig. 3.1.20 Sources of Air Pollution in India

(Source: https://en.wikipedia.org/wiki/Air_pollution_in_India)

3. **Food Safety Concerns:** If there are concerns about food safety, the hygiene coordinator should escalate the issue to the relevant authority and work with food safety experts to identify the cause of the issue and develop a plan to prevent it from happening again. Some common examples of Foodborne illnesses include E. coli, Salmonella, and Listeria.
4. **Cleaning and Sanitization Issues:** The hygiene coordinator should be responsible for ensuring that proper cleaning and sanitization protocols are followed. However, if there are persistent issues with cleaning and sanitization, the issue should be escalated to a cleaning expert or a microbiologist to identify the root cause of the issue and recommend appropriate solutions. For example, Norovirus, Salmonella, Covid-19, etc.
5. **Personal Protective Equipment (PPE) and Infection Control:** The hygiene coordinator should ensure that all individuals in the setting are using appropriate PPE and following infection control protocols. If there are issues with compliance or concerns about the effectiveness of PPE or infection control measures, the hygiene coordinator should escalate the issue to relevant experts for further assessment and recommendations. Some PPE used by hygiene coordinator are gloves, N95 respirators, safety goggles or face shields, etc.

Exercise

A. Short Answer Question

1. State full form of GHP and GMP.
2. What are the essential steps for monitoring and supervision by a hygiene coordinator?
3. What are the various career opportunities available for a hygiene coordinator in food processing unit?

B. Fill in the Blanks

(Hint: Standard Operating Procedures (SOPs), Dilution, Sanitizing Agent, Clean and Hygienic)

1. Cleaning and sanitising maintain a _____ atmosphere.
2. A _____ is chemical agent used to reduce the number of microorganisms to a safe level, such as chlorine or hydrogen peroxide.
3. The process of mixing a cleaning or sanitizing solution with water to create a proper concentration for use is known as _____.
4. The _____ are the written instructions that outline the steps and procedures for carrying out cleaning and sanitation tasks, including the use of PPE, chemicals, and equipment

C. Explain the Steps to be followed for Cleaning and Sanitizing of Non-food Contact Surfaces in a Food Processing Unit.

Notes

Scan the QR Codes to Watch the related Videos

1.Cleaning Procedures of Equipment-

https://www.youtube.com/watch?v=Bzfv32XUDns

2. Cleaning and Disinfection-

https://www.youtube.com/watch?v=vBMuX8XzRY0

3. Cleaning and Sanitation-

https://www.youtube.com/watch?v=QWpU7DAfNcs

4. Basic Food Safety Standards

Unit 4.1 - Food Hazards and Contamination- Causes and Prevention

Unit 4.2 - Food Safety – Standard Operating Procedures

Unit 4.3 - Food Safety Audits– Measures & Management

Unit 4.4 - Food Production Process– Record and Documentation

(FIC/N9904)

Key Learning Outcomes

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

1. Describe the various hazards and contaminations present in food processing industry
2. Explain the various food safety standards to be followed during the production process
3. Prepare sample reports regarding food safety regulations, inspections, faults observation, etc.
4. Discuss the importance of workplace food safety audits

Unit 4.1 Food Hazards and Contamination- Causes and Prevention

Unit Objectives

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

1. List the types of biological, chemical, and physical hazards present in the food processing industry
2. Discuss various types of food contaminations, their causes, and ways to prevent them
3. State the importance of ensuring that the materials (such as raw materials, processed materials, finished goods, etc.) are adequately isolated to prevent them from contamination
4. Discuss various types of allergens and their management at the workplace

4.1.1 Food Safety Hazards

A food safety hazard can be defined as anything that could contaminate the food and has the potential to cause adverse health consequences to consumers. Hazards may be introduced into the food product at any time during harvesting, formulation and processing, packaging and labelling, transportation, storage, preparation, and serving. Food hazards can be categorized into the following types:

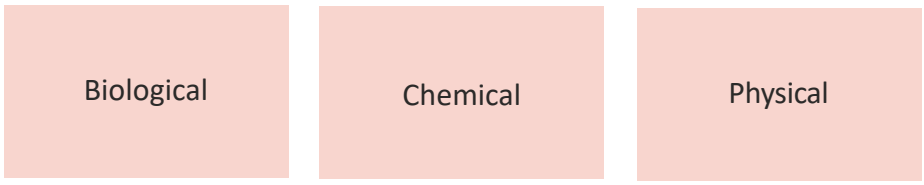


Fig 6.1 Types of Food Safety Hazards

Biological Hazards

Biological hazards occur when hazardous or pathogenic organisms are introduced to food and thus pose a food safety concern to consumers. For example, when microorganisms infect the food, it results in biological or microbiological risks. Microorganisms are tiny living organisms that can only be seen under a microscope. These microscopic organisms can be found in the air, soil, water, animals, and humans.

As a result, they have an effortless time infiltrating and contaminating the food along the entire supply chain. In addition, pests, such as rodents, flies, and other insects, can transport hazardous bacteria, making them biological hazards.

Chemical Hazards

A chemical hazard in food is when food gets contaminated with pathogens or toxic chemicals found in nature or created by humans. Chemical hazards can be introduced from various sources at different food production and preparation stages. For example, fruits, vegetables, root crops, and grains are usually treated with pesticides and fertilizers. Although these foods are washed during the harvesting process, some contaminants may remain.

Here are some examples of hazardous chemicals that can contaminate food:

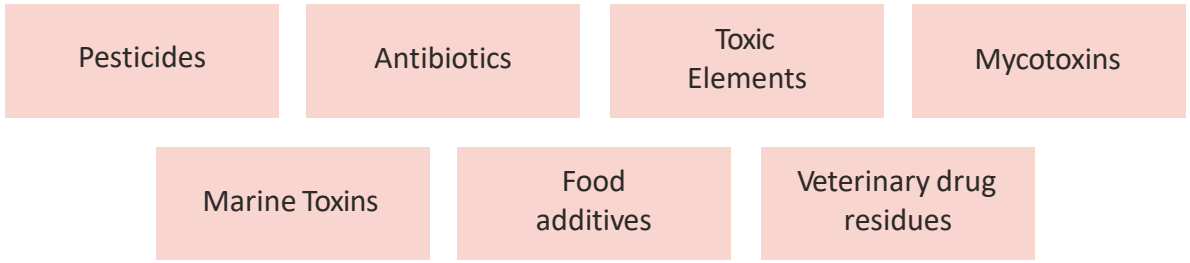


Fig 6.2 Examples of hazardous chemicals

Physical Hazards

Physical hazards are foreign materials unintentionally introduced to food products, such as metal fragments in ground meat or naturally occurring objects like bones in fish, hazardous to the consumer. A physical hazard may contaminate a food product at any stage of production. The extraneous substance is another term for this. Physical risks, such as rodent droppings and plastic, can also be biological and chemical pollutants. At any level of the manufacturing process, unnatural physical dangers might arise from various causes—for example – Plastic, stones and pebbles, glass, wood, metal, etc.

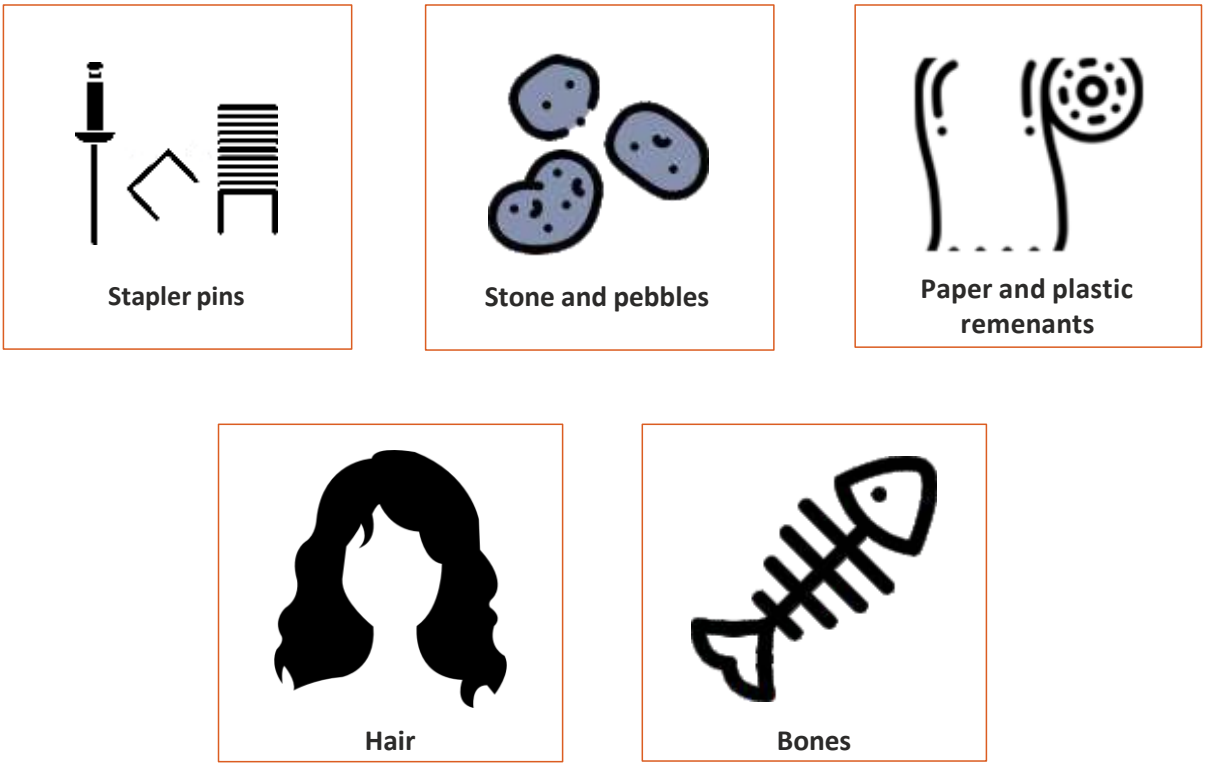


Fig 6.3 Sources of Physical Hazards

4.1.2 Food Contamination

Food contamination is generally defined as spoiled foods because they either contain microorganisms, such as bacteria or parasites, or toxic substances. The parasites that cause sickness create poisons that can cause food poisoning. Additionally, herbicides and specific cleaning agents can also contaminate the food. Therefore, it is crucial to know how food can become infected so that food product developers can take necessary safety measures.

The following are some of the most common causes of food contamination:

1. Improper food storage, handling, and preparation
2. Utensils that are not adequately cleaned or sanitized
3. Flies, cockroaches, insects, and pests contaminate the environment

4.1.3 Types of Food Contaminations

Food contamination can have severe consequences for both consumers and food producers. A variety of factors can cause food contamination.

There are four main types of contamination:

Chemical Contamination	Biological Contamination	Physical Contamination	Cross Contamination

Fig 6.4 Types of Food Contamination

Chemical Contamination

Chemical contamination happens when a chemical substance pollutes food. Chemicals are often used in the workplace for cleaning and disinfection, so, understandably, they could contaminate food. Contamination can occur when food is prepared on a surface that still has chemical residue on it, or when cleaning chemicals are sprayed near unprotected food. Furthermore, pesticides can affect food even before it reaches the kitchen. Fertilizers and pesticides, for example, may have been sprayed near food when it was growing.

Notes

Anyone who prepares or handles food must ensure that the food is not contaminated with chemicals. They should do the following to ensure this:

- Always store chemicals in the designated area
- Follow the manufacturers' instructions when using chemicals
- Procure raw material from approved who can guarantee the safety of the food they provide
- Adhere to SOP while cleaning and sanitation of workplace and equipment

Fig 6.5 Prevention from Chemical Contamination

Biological Contamination

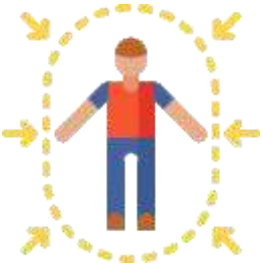
One of the most common causes of food-borne illness is biological contamination. Biological food contamination refers to the contamination of food by other living creatures. The hazardous germs spread on the foods during biological contamination. Even a single bacterium can multiply quickly when proper growth circumstances are found. Biological contamination may happen from different sources. Some of them are:

Dust

Raw Meat

Air

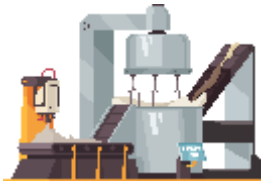
Continued...



Human body

Pets and pests

PPE



Equipment

Fig 6.6 Sources of Biological Contamination

It is essential to follow strict, high-standard food hygiene measures to avoid this form of contamination. Some of them are as follows:

- Separating raw material and ready-to-eat food at all stages of the food handling process, from delivery to transport
- Always washing raw fruit and vegetables
- Controlling pests and ensuring they are not on the premises

Fig 6.7 Prevention from Biological Contamination

Physical Contamination

When a foreign object contaminates food, it is called physical contamination. It can happen at any point during the delivery and preparation of food. Physical contamination can result in catastrophic consequences for consumers, such as fractured teeth or choking. Jewelry, hair, plastic, bones, stones, insect corpses, and cloth are examples of physical contaminants detected in food. Furthermore, if there are issues with the food premises or equipment, such as flaking paint or loose screws in a piece of equipment, these can go into the food. Physical impurities may transmit hazardous microorganisms, putting you at even more risk.

Physical contamination can be prevented through the following practices:

- Replacing any damaged equipment immediately
- Reporting any faults with equipment and premises without delay
- Having a thorough pest control system in place
- Following dress code principles, such as removing jewellery when handling food and wearing a hairnet

Fig 6.8 Prevention from Physical Contamination

Cross-Contamination

Cross-contamination refers to the contamination of a food product from some other sources. There are three main ways cross-contamination can occur:

Food-to-food

- Food can become contaminated by bacteria from other foods. This type of cross-contamination is especially dangerous if raw foods come into contact with cooked foods. Here are some examples of food-to-food cross-contamination:
  - In a refrigerator, meat drippings from raw meat stored on a top shelf might drip onto cooked vegetables placed on lower shelf.

Continued...

People-to-food

- People can also be a source of cross-contamination to foods. Some examples are:
  - Handling foods after using the toilet without first properly washing hands.
  - Touching raw meats and then preparing vegetables without washing hands between tasks.
  - Using an apron to wipe hands between handling different foods, or wiping a counter with a towel and then using it to dry hands.

Equipment-to-food

- Contamination can also be passed from processing equipment and utensils to food. This type of contamination occurs because the equipment or utensils were not properly cleaned and sanitized between each use. Some examples are:
  - Using unclean equipment, such as slicers, can openers, and utensils, to prepare food.
  - The food processing equipment handling a batch of raw meat was not thoroughly cleaned before the processing of the next batch leading to the growth of microorganisms.
  - Storing a cooked product, such as a sauce, in an unsanitized container that previously stored raw meat.

Fig 6.9 Cross-Contamination

Notes

The safety measures that can be implemented to prevent cross-contamination are as follows:

- Use separate utensils to prepare different types of foods.
- Avoid using the same processing equipment for ready to eat foods.
- Make sure raw foods don't come in contact with ready to eat foods.
- Cover and store raw foods below cooked foods to prevent cross-contamination.
- Store and seal garbage correctly to prevent cross-contamination.
- Clean and sanitize the waste bins to prevent infestation risk.

Fig 6.10 Prevention from Cross-Contamination

4.1.4 Importance of Isolating Materials to Prevent Contamination

Food product developers usually segregate factories to protect the product from the environment. For example, raw material is segregated from the finished product, and wet and dry materials are segregated. Ready-to-eat (RTE) food product developers further segregate or zone production areas for food safety or hygiene reasons.

Furthermore, a series of higher hygiene zones are created to protect the product from microbiological cross-contamination events after it has been heat-treated or decontaminated.

4.1.5 Allergen Management

Allergens are still the primary reason for product recalls in the food industry across the globe. Hence it is crucial to give proper attention to all the aspects involved in the management and prevention of allergens during the food production process.

Like many other concepts, allergen prevention and management will only work properly if each and every aspect of food production is properly controlled at all times.

A food allergy is an immune system reaction to a food that the body perceives as unfamiliar and harmful to it. For example, people might be allergic to an item as a whole or ingredients, for the most part, proteins, contained in an item. Depending on the individual, responses can go from high fevers, rashes, and influenza-like side effects to more extreme conditions like anaphylactic shock leading to death.

Some of the common symptoms of food allergy are as follows:

Fig 6.11 Symptoms of Allergen

Allergen management practices are crucial for good hygiene practices (GHPs), and, HACCP systems, in manufacturing, retail, and food administration. Therefore, allergens should be overseen through the supply chain and production process.

The steps of Allergen management are as follows:

1. **Cross Contact Prevention during processing:**

   In this step,

   a. Allergenic and non-allergenic production areas to be segregated

   b. The traffic of raw material supplies, employees, and packaging materials to be limited during the manufacturing of allergenic products

   c. Dedicated equipment and tools to be used for allergenic products

   d. Reuse of products like oil, and water to be avoided

   e. Allergenic products should be easily identifiable using tags or colour codes, etc. while on the processing line

2. **Validated and verified allergen cleaning**

   In this step,

   a. Appropriate cleaning and sanitizing of equipment

   b. Written protocols to be maintained

   c. No dead spots should be present in the production

   d. Cleaning validation and verification procedures should be present with their records

   e. Identification of the effectiveness of the allergen control plan to be done through internal and external audits

3. **Review of product label /packaging usage and control**

   In this step,

   a. The product should be labeled appropriately as per standards and adhere to the Food Allergen Labeling and Consumer Protection Act of 2004

   b. Labels should be reviewed prior to their receipt for their accuracy

4. **Personnel training**

   In this step,

   a. Training to be provided to personnel at all levels for allergen awareness and control

   b. Specific documented training for jobs of greater responsibilities

   c. Consequences to be highlighted if the plan is not followed during training and the reasons for the protocols followed

Notes

Unit 4.2 Food Safety – Standard Operating Procedures

Unit Objectives

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

1. Outline the standard regulations to be followed for ensuring food safety as listed in 'The Food Safety and Standards Act, 2006 that need to be followed during production.
2. Discuss the importance of following the standard procedures for ensuring food safety.
3. Discuss the role of HACCP, VACCP and TACCP as well as procedures to implement these in the food industry
4. State the significance of training the team members regarding various food safety procedures such as GMP, HACCP, etc.

4.2.1 The Food Safety and Standards Act-2006

The Act covers all kinds of food that is consumed by human beings including unprocessed/semi-processed/processed foods, genetically engineered foods, all kinds of substances, and water used in the preparation of food.

Packaged juices, drinking water, infant food, alcohol-based drinks, chewing gums, and all other primary foods are also covered by the FSSAI Act.

Furthermore, the Act considers live animals or products of agriculture, horticulture, or animal husbandry as food items when it has already been passed on from the hands of a farmer.

This Act is applicable to all persons who are manufacturing, producing, selling or handling food meant for human consumption. The Act does not discriminate between a small hawker or a huge Food Business Operator and makes it mandatory for everyone handling food to keep it safe and fit for human consumption. Be it an Individual seller or a small business, everyone is considered a Food Business Operator under this Act. Therefore, this Act applies to every person in the food business.

The basic safety standards are as follows:

1. Regulation on Food Additive

Food shall not contain any food additive or processing aid unless it is in accordance with the provisions of this Act and regulations.

2. Regulation on Contaminants or Toxic Substances

Food shall not contain any contaminant, naturally occurring toxic substances or toxins, or hormones in excess of such quantities as may be specified by regulations.

3. Regulation on Pesticides, Veterinary Drugs, Antibiotic Residue, Microbiological Counts

Food shall not contain insecticides or pesticide residues, veterinary drug residues, antibiotic residues, solvent residues, pharmacologically active substances, and microbiological counts above such tolerance limit as may be specified by regulations.

4. Regulation on Genetically Modified Foods, Organic Foods, and Functional Foods

No person shall manufacture, distribute, sell or import any genetically modified articles of food, irradiated food, organic foods, foods for particular dietary uses, functional foods, health supplements, proprietary foods, and such other articles of food that the Central Government may notify in this behalf.

5. Packaging and Labelling of Foods

The labelling and presentation of food, including their shape, appearance, or packaging, the packaging materials used, the manner in which they are arranged and the information which is made available about them through whatever medium, should not mislead consumers.

The labelling and presentation of food should not mislead consumers, including:

- shape
- appearance or packaging
- packaging materials used
- manner in which they are arranged
- information which is made available about them through whatever medium

No person shall manufacture, distribute, sell or deliver to any agent or broker any packaged food products that are not marked and labelled in the manner as specified by regulations.

6. Regulation on Advertisement and Prohibition as to unfair trade practices

- No advertisement shall be made which is misleading or deceiving or in contradiction to the provisions of this Act, the rules and regulations made thereunder.
- No person shall engage in any unfair trade practice for the purpose of promoting the sale, supply, use, and consumption of articles of food
- No unfair practice should be adopted that falsely represents that the foods are of a particular standard, quality, quantity, or grade composition.

Furthermore, there are 10 golden rules on hygiene laid down by FSSAI to ensure food safety

Notes

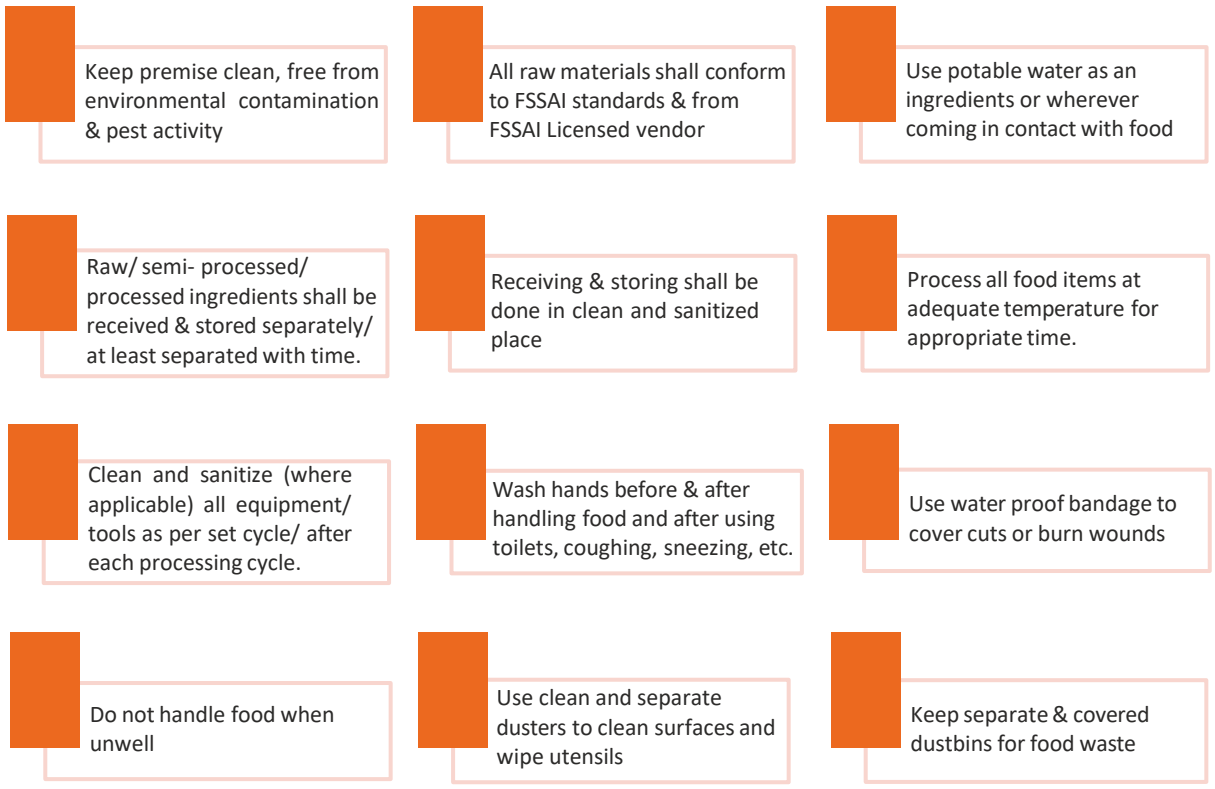


Fig 6.12 Golden Rules on Hygiene by FSSSAI

4.2.2 Importance of Food Safety- Standard Operating Procedure

Food safety refers to the handling, preparation, and storage of food in such a way that prevents the consumers from foodborne illness. It includes several standards to be followed to avoid any hazards affecting food. Food safety procedures are crucial to protect consumers from health risks related to common allergens and food-borne illnesses. Safe food products prevent companies and stakeholders from costly penalties and legal action. Fines and legal consequences could result in the closing down of a facility or may lead to bankruptcy.

So, we can say that following food safety procedures is highly critical both financially and ethically. The outcomes of failing to comply with food safety standards are multifarious. In addition to being extremely costly for organizations that must recall their products, revamp their processes, and manage the public relations crisis, inadequate food safety in manufacturing involves a significant human cost.

The cost of food recalls for companies

The failure in implementing an effective food safety protocol may lead to contaminated products entering the food chain. Once a defective product is noticed, food businesses are subject to dramatic disruptions in their operations as they manage and assume the cost of product recalls.

Food recalls can cost huge amounts to the companies, immediately measurable costs. In addition, the long-term effect that a product recall can have on consumer trust is conceivably even more damaging.

The human cost of unsafe food

The significance of food safety to human life is difficult to understate. Food safety problems are a prominent cause of several preventable diseases across the world. Each year, one in ten people will suffer from foodborne illness or injury. An estimated 420,000 people die every year because of eating contaminated food.

In addition to the human cost, unsatisfactory food safety comes with a greater ripple effect that obstructs socio-economic growth, especially in the developing world. The World Health Organisation states that food safety, nutrition, and food security are inextricably linked. A lack of safe food generates a "vicious cycle of disease and malnutrition" which overburdens public health services, disrupts social and economic progress, and detracts from the quality of life.

Food Product Developers can attain sufficient food safety measures by training and educating everyone who handles ingredients in a food business.

4.2.3 HACCP (Hazard Analysis and Critical Control Points)

Hazard Analysis and Critical Control Point (HACCP) is primarily an international food safety regulation followed to reduce the risk of hazards in a food-processing unit. It is a systemic and risk-based approach that aims to prevent the biological, chemical, and physical contamination of food in production, packaging, and distribution environments. The HACCP concept is designed to deal with health hazards by identifying potential food safety problems before they happen, rather than inspecting food products for hazards after the fact. The HACCP implies controlling for contaminants at several key stages in the food production process and strict adherence to hygiene practices throughout.

HACCP principles form the basis of Food Safety Plans across the globe. HACCP is applied to every stage of the food supply chain, such as production, preparation, packaging, and distribution, and is used to manage food safety across many types of food businesses. HACCP follows seven basic principles, which are as follows:

Notes

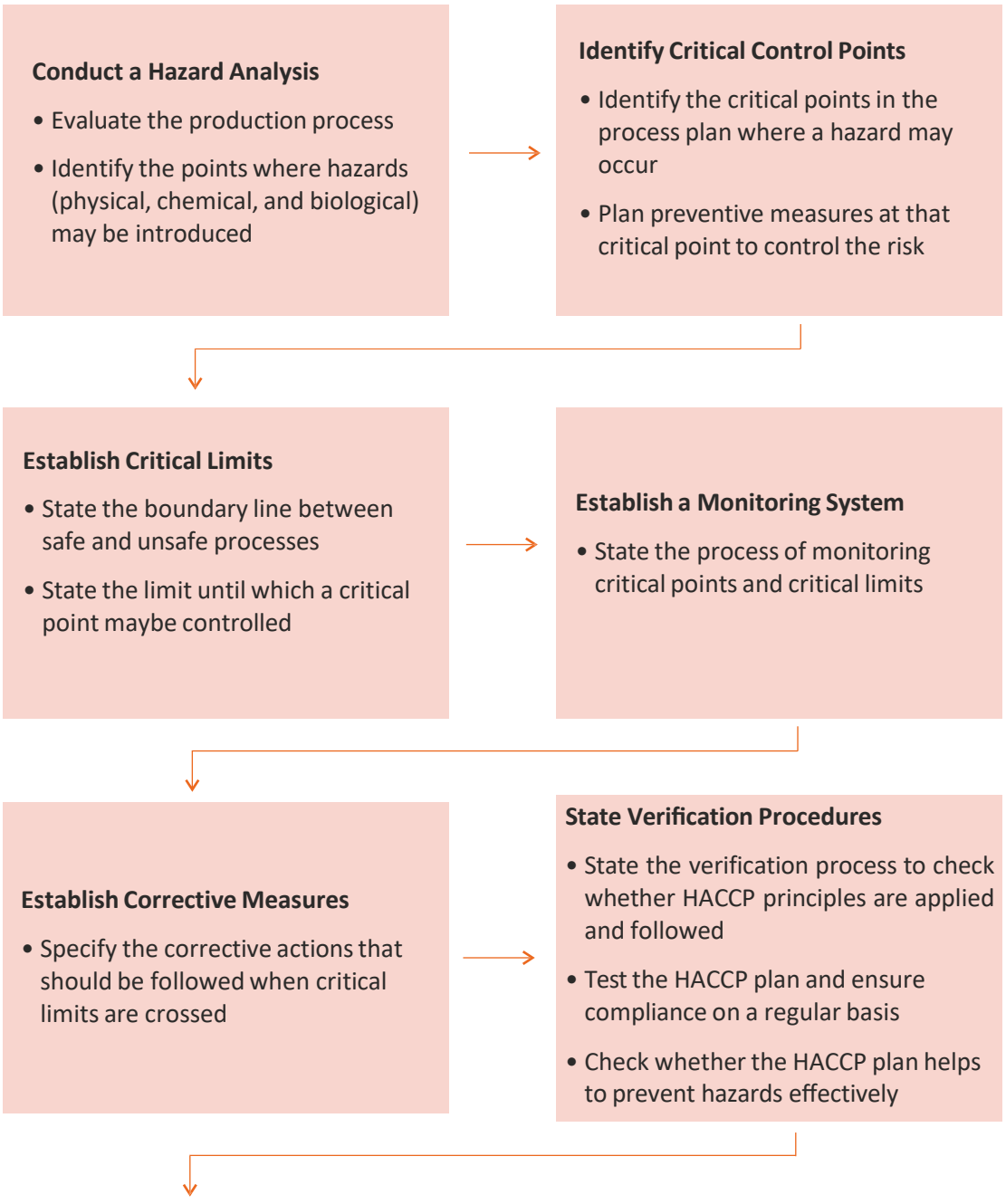


Fig 6.13 HACCP Principles

4.2.4 VACCP (Vulnerability Assessment Critical Control Points)

VACCP stands for 'Vulnerability Assessment Critical Control Points.' The VACCP examination is a tool to assess vulnerability in a critical control point. It is used to identify any potential weaknesses in the system and develop a plan to address them. The examination is based on a risk assessment. It considers the likelihood of an incident and the impact of that incident.

The assessment includes a review of the process, its controls, and the resources needed to implement those controls. It also includes a review of the management structure and how it supports the control process. Generally, a thorough VACCP analysis includes:

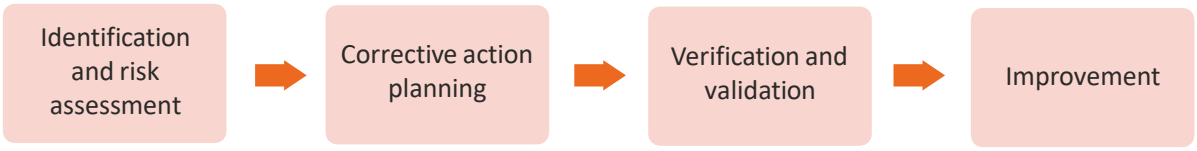


Fig 6.14 Steps of VACCP Analysis

The structure of VACCP is similar to the classic HACCP analysis as it also focuses on the safety of the facility. However, this approach enables the control of fake food by ensuring the quality of products and the safety of the production process.

Though, it is not a comprehensive food fraud control strategy but can be an effective tool to identify the risks in food product 'developers' supply chain.

This is not the only aspect to ensure product integrity. The implementation of several control measures along with VACCP can increase the effectiveness of preventing food fraud and other forms of food crime.

4.2.5 TACCP (Threat Assessment Critical Control Point)

With regards to food safety across the entire food manufacturing industry, food defense has been the most important element that comprises protecting businesses and consumers from internal and external threats. It encompasses a range of potential threats, like intentional contamination of food products, disruption of the supply chain, and using food or drink items for terrorism or criminal purposes

TACCP is a management process and a systematic strategy for protecting a food supply chain from deliberate contamination. Contamination is motivated by behavioral or ideological motives with the desire to damage individuals.

The key steps for an organization to follow while developing TACCP include:

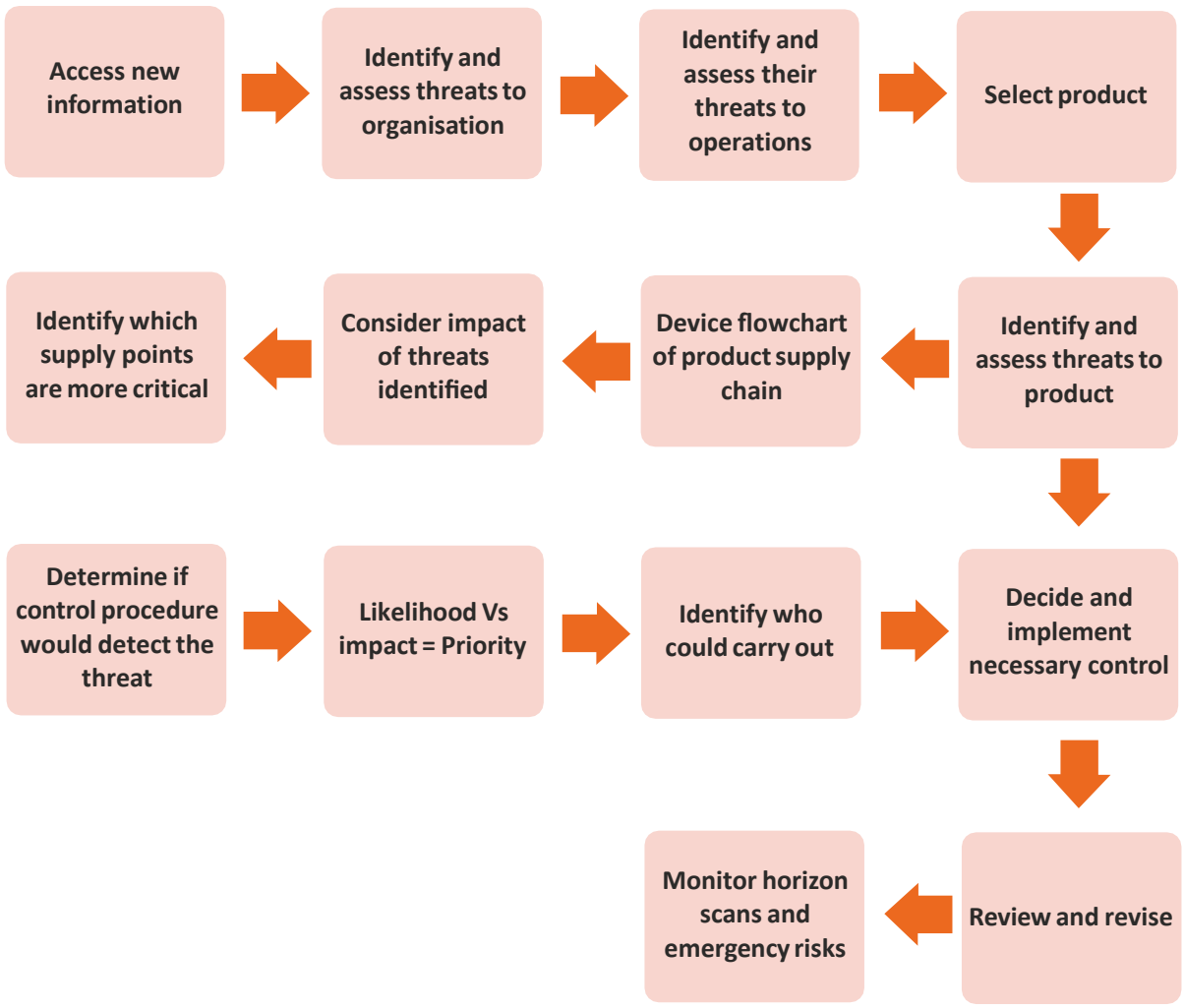


Fig 6.15 Steps of Developing TACCP

Notes

6. Significance of Training the Team on Food Safety Procedures

Training staff on methods to ensure food safety will help reduce the risk of contamination. Regulations require that food handlers are supervised and well-trained in food hygiene practices suitable for their work activity.

Certain areas which staff should be trained about are:

- Safe food storage practices
- Safe food handling practices
- Good hygiene practices
- Cleaning for food safety
- Pest control
- Good manufacturing practices

Food Safety measures are crucial because foodborne illnesses and allergic reactions may cause severe health issues.

Where bacteria in contaminated food are allowed to multiply and ultimately enter a ' 'person's body, it can cause problems ranging from causing mild discomfort to a life-threatening illness. The best possible way to prevent this is by ensuring that bacteria is killed and not able to reproduce in large enough numbers and that it cannot easily be transferred between foodstuffs. Similarly, allergic reactions are life-threatening and can only be prevented if people know exactly what ' 'they're eating. And this can only be known if food producers and preparers ensure that foodstuffs 'don't come into contact or mix when they shouldn't.

This is one of the core functions and most important elements of food safety procedures and can only be learned through proper training.

Notes

Unit 4.3 Food Safety Audits– Measures & Management

Unit Objectives

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

1. Explain the procedure to conduct workplace food safety audits
2. List various issues that can arise during food production and other processes
3. Discuss the procedure of performing root cause analysis and taking corrective and preventive actions against workplace problems
4. Discuss the corrective measures to be applied to ensure food safety

4.3.1 Food Safety Audits

There are several stages during the food production process when the food product may get contaminated. A food safety audit gives food product developers confidence that safety and hygienic practices in food processing have been followed throughout the supply chain.

A food safety audit process performs a detailed inspection of the food processing facility to evaluate its compliance with established food hygiene and safety standards. Food safety audit provides food product developers with multiple benefits. Some of them are as follows:

Mitigate Risk	Save Time and Money	Inspire Confidence	Enhanced quality and productivity

Fig 6.16 Benefits of Food Safety Audit

Notes

Based on the type of food safety audit being performed, it includes a comprehensive assessment of:

Building structure	Documentation, records and monitoring	Cleaning and hygiene schedule	Facilities and equipment
Personnel hygiene	Emergency procedures	Storage areas	Product handling and food display
Temperature control	Supply chain	Pest control	Training, supervision and instruction
Product and process audits	Audit of equipment maintenance and hygiene	Supplier or contractor audit	

Fig 6.17 Aspects of Food Safety Audit

4.3.2 Steps to Conduct Food Safety and Hygiene Audit

Discussed here are the key steps to performing comprehensive food safety and hygiene audit:

i. **Planning:** This is the initial stage of the food safety audit which consists of setting a clear objective and determining the audit scope, i.e., which areas need to be targeted. This stage also includes cost and resource considerations while planning for a food safety audit.

ii. **Execution:** Audit assesses the status of the quality management system and operations in real-time. It helps identify the problems that may arise now and encourages to take a proactive approach rather than a reactive one. Identifying areas where preventive strategies can be implemented based on audit findings can help improve operational efficiency and prevent problems in the future.

iii. **Preventive and Corrective Actions:** The gathered audit information along with problem descriptions and proper documentation can provide valuable data with actionable insights.

iv. **Verification:** In this phase, it is crucial to evaluate how efficient are the preventive and corrective actions and whether they follow regulatory standards.

v. **Audit Evaluation:** It is one of the most crucial steps of a food safety and hygiene audit – evaluating and validating the success of the audit process. Even the audit process should comply with the food developer's business objectives and statutory audit schedule.

Types of audits in food processing units:

The two types of audits carried out in food processing units are internal and external audits.

Internal audits are carried out by employees or staff from within the organisation. The employees can be from a different department or another unit of the same organisation. These audits are carried out to identify problem areas and rectify them. They can also be carried out as a pre-audit prior to the audit by external agencies to ensure that all the standard operating procedures and guidelines as per governing bodies are followed and compliant with the industry standards. Along with helping to improve processes, they also help to find deficiencies before the external audit and take corrective actions. All the findings and actions taken to resolve them are documented.

External or third-party audits are carried out by auditors from outside the organisation. They are often used to get a certification. The regulatory bodies carry out these audits to ensure compliance with the regulatory requirements. If the organisation is found to be non-compliant, then the external auditor may issue a warning letter, cancel the registration of the company, or stop the production of products/services.

4.3.3 Root Cause Analysis

Root cause analysis often referred to as RCA, is a method to analyse serious problems before trying to solve them. The main root cause of a problem is isolated and identified. It is considered one of the core building blocks in an ' 'organization's continuous improvement efforts. However, it is important to note that root cause analysis will not produce any results; it must be made part of a larger problem-solving effort for quality improvement.

Root cause analysis could be done using multiple tools and methods, including the following:

- Events and causal factor analysis
- Change analysis
- Barrier analysis
- Management oversight and risk tree analysis
- Kepner- Tregoe Problem Solving and Decision Making

Fig 6.18 Tools of RCA

When carrying out root cause analysis methods and processes, it's crucial to note:

- Though root cause analysis tools can be used by a single person, the output is better when a group of people works together to find the causes of the problem.
- Prominent members of the analysis team should be responsible for removing the identified root cause(s).

A typical design of a root cause analysis in an organization might follow these steps:

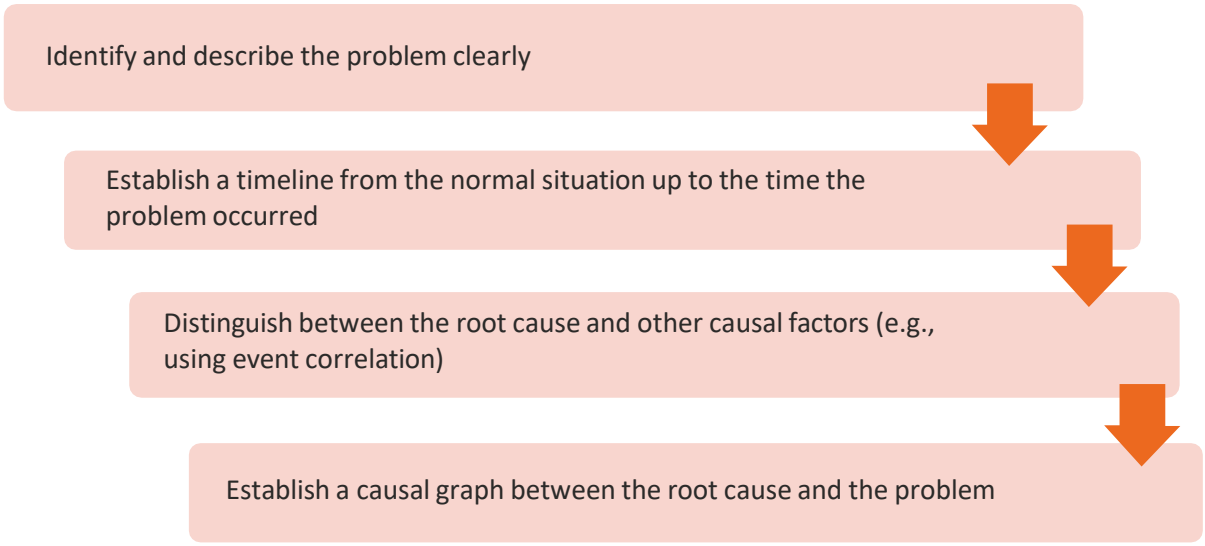


Fig 6.19 Design of RCA

1. A small team is formed to conduct the root cause analysis.
2. Team members are selected from the business process/area of the organization that experiences the problem.
3. During the analysis, equal emphasis is placed on defining and describing the problem, brainstorming its possible causes, analyzing causes and effects, and formulating a solution to the problem.
4. Weekly team meetings are conducted during the analysis period, sometimes two or three times a week. The meetings are always kept for a maximum of two hours, and since they are meant to be creative in nature, the agenda is quite loose.
5. One team member is assigned the role of making sure the analysis progresses, or tasks are assigned to various team members.
6. Once the solution has been designed, and the decision to implement it has been taken, it can take anywhere from a day to several months before the change is complete.

4.3.4 Corrective and Preventive Action (CAPA)

Corrective Action and Preventive Actions are derived from the 5 Whys consist of tools that can be used to address a systemic issue, and control processes to help prevent a costly food safety or quality incident.

CAPA procedure can be based on PDCA(Planned Do Check Act) philosophy as determined by Deming-Shewhart Cycle.

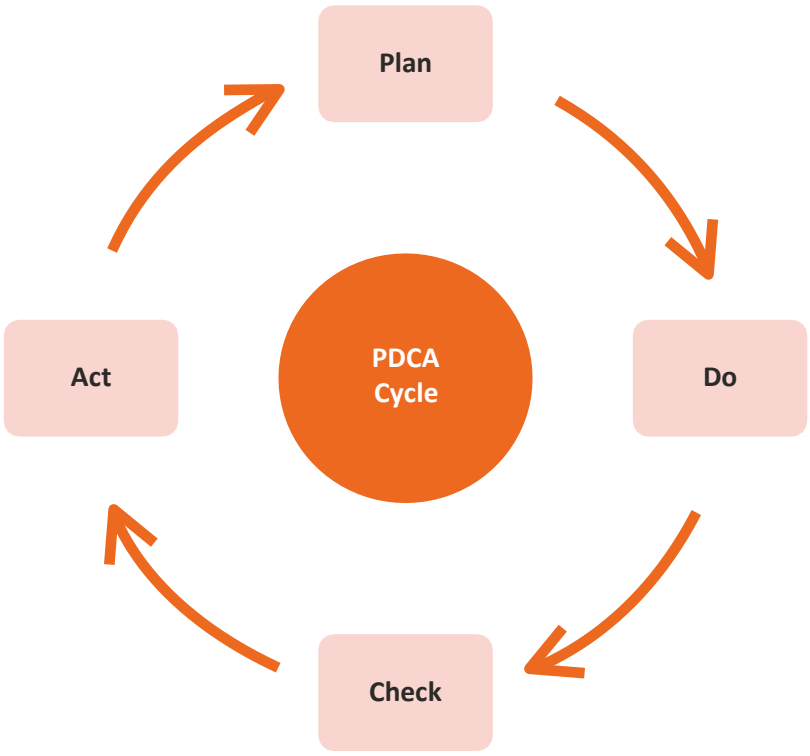


Fig 6.20 PDCA

The steps involved in CAPA are as follows:

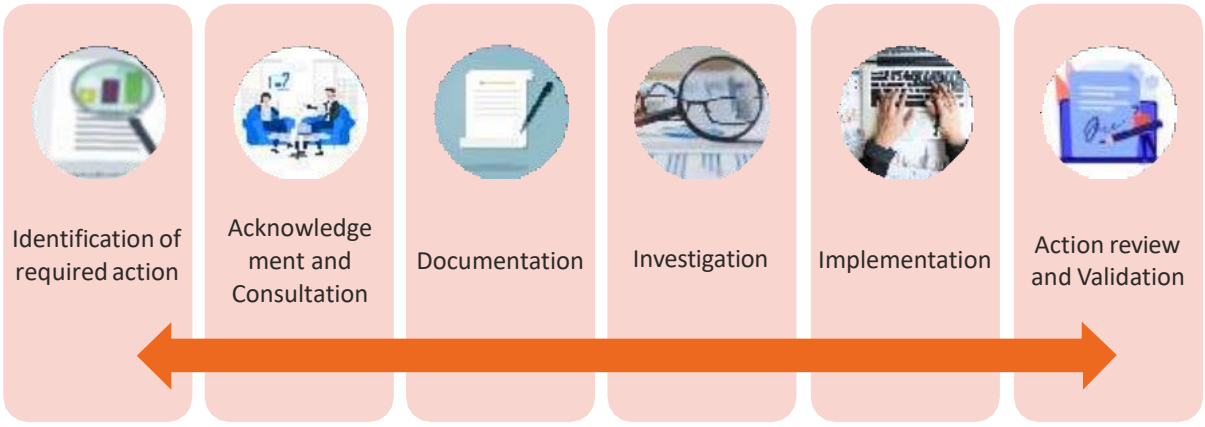


Fig 6.21 Steps of CAPA

A thorough and effective CAPA provides a lot of benefits. A few of them are as follows:

1. It eliminates detected conformities
2. It provides a framework for eliminating the cause of a detected non-conformance or other undesirable situation
3. It provides ways to recognize exact steps to be taken when a defect or process issue arises
4. It also helps in determining:
    - Documents or forms need to be completed
    - Who needs to be contacted?
    - Exact procedure to be followed

4.3.5 Common Issues during Food Production

Sometimes the foods that are counted on for good health are contaminated with germs that cause sickness and can even be deadly. More progress is needed to protect people and reduce food borne illnesses. New challenges to food safety will continue to emerge, largely because of:

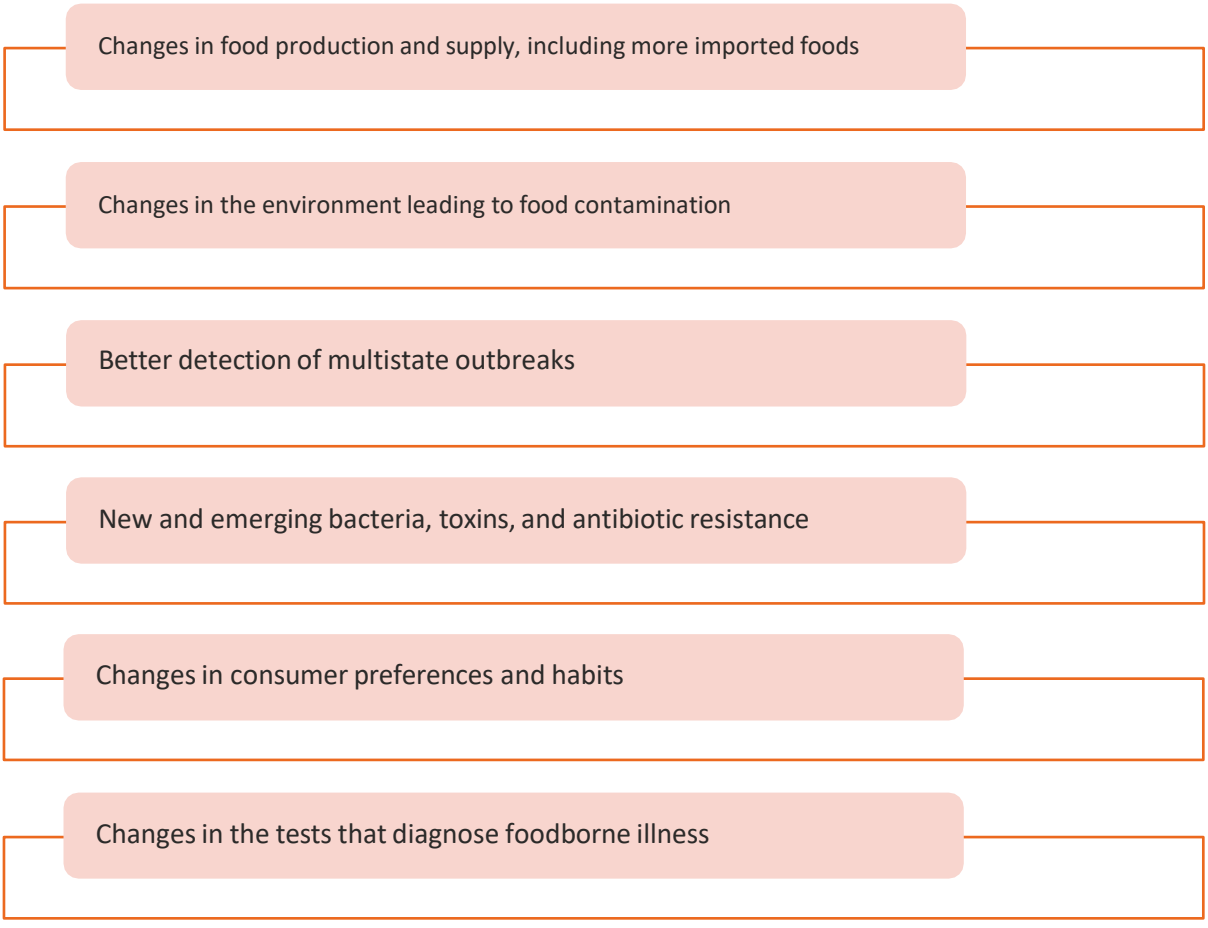


Fig 6.22 Reasons for Common Issues during Food Production

Some of the common issues during the food production processes are listed below:

Condensation on Pipes and other Equipment	Occurs when humid air contacts cold pipes in a food processing plant and resulting condensation can then drip from the pipes into the food product, causing contamination.
Contamination by Reworked Product	Using product from one product line in another product line (reworking) can cause food contamination.
Contamination During Processing	Caused when food is contaminated during processing such as not having an adequate glass cleanup policy.
Raw Material Contamination	This includes the following: 1. cases in which the raw materials arrive at the facility already contaminated and 2. cases in which the contamination occurs at the food-processing plant.
Inadequate Training of Employees	Can led to a variety of food safety problems. Food processing plants must train new employees on the minimum training requirements.
Equipment that's Hard to Clean	Some equipment is difficult to clean, either because of its own intrinsic design or because of the way it was installed at the food-processing plant.
Insufficient Cooling	It's important to keep food ingredients and products at proper, cool temperatures during processing or storage or risk contaminationThis is especially true of foods that are refrigerated or frozen.
Food Products that are Labeled or Packaged Incorrectly	Products may in some cases (wrongly) be packaged in old packages or placed in the wrong packages. In other cases, a label may not identify the presence of an allergen when it should be labeled.
Failure to Develop a Crisis Management Protocol	The lack of written procedures for how to manage a crisis at the facility, or poor training on how to carry out those procedures, can lead to food safety problems.
Inadequate Equipment Knowledge by Employees	This could be considered part of the poor training category, and it includes employees who don't know how to keep equipment clean and employees who don't know how to prevent routine equipment maintenance tasks (such as lubrication of a machine) from causing food contamination.
Failure to Reconcile Equipment Parts after Repairs	After repair to equipment in a food processing plant, it's important to reconcile equipment parts to make sure they're all accounted for when the repair is complete.

Continued...

Absence of a Protocol for Product Recovery	Not having a product recovery protocol, including no coding, traceability, or recall systems, can lead to food safety problems.
Failure to Perform Preventive Maintenance	When a machine breaks down or performs improperly, that can be a cause of food safety problems. Therefore, it's better for a food processing plant to routinely perform preventive maintenance instead of simply reacting to maintenance problems.
Poor Employee Hygiene	If employees at a food processing facility have poor hygiene, that can cause contamination in the food products.
Inadequate Pest Control	It's essential for a food processing facility to have a comprehensive and detailed pest management policy & program and to ensure it's carried out properly (be sure to document this).
Inadequate Sanitation of Plant and/or Equipment	Poor sanitation may result from poor (or absent) sanitation policies, poor sanitation procedures, and/or poor monitoring and verification that those policies and procedures are being enacted.
Improper Plant Design and Construction	Plant design and construction can have a good or bad effect on food safety within a food processing facility, and some design and construction issues make food safety problems more likely. For example, floors with poor drainage and/or cross-over between the process flows of raw and finished products.
Post-Process Contamination at Manufacturing Plant	In some cases, a finished food product can be contaminated after it's been processed. This can occur between the lethality treatment and packaging or post-packaging.
Dead-Ends in Plumbing Leading to Accumulation of Stagnant Water	Plumbing connections that don't drain into other areas and therefore result in sitting water may harbor contaminants that ultimately create food safety problems.
Using Unpotable Water During Food Processing	It's always important to use fresh, clean, sanitary, potable water for food processing.

Fig 6.23 Common Issues during Food Production

4.3.6 Food Safety and Corrective Actions

There are many factors that food processing businesses need to consider when ensuring food safety for consumers. A few of them are listed below:

Fig 6.24 Factors for Ensuring Food Safety.

Food product developers often define critical limits to ensure food safety.

Critical limits represent the minimum or maximum acceptable level of a food safety hazard at each Critical Control Point (CCP). Corrective action is taken when the critical limit is exceeded at any step of food production (e.g., delivery, storage, preparation, etc.).

There are two types of corrective action:

- Immediate
- Preventative Immediate

corrective actions are reactive, but preventative actions are proactive. **Examples**

of immediate corrective actions

An immediate corrective action resolves an existing problem or any deviation from a critical limit. It prevents a food safety breach that is happening at present.

Some examples of immediate corrective actions are:

- A food delivery with bite marks on the packaging (or other signs of pest infestation) being rejected
- Unrefrigerated, perishable food items being transferred into cold storage (5° C or below)
- Food items in the temperature danger zone for more than four hours are being disposed of.
- Food items that show signs of spoilage (e.g., bad smell or slimy skin) are being thrown away.
- An employee being asked to go home if they are experiencing symptoms of illness (e.g., fever, nausea, or diarrhoea)

Examples of preventative actions

A preventative, action prevents a potential problem from happening. It stops a breach from occurring in the future.

Some examples of preventative actions are:

- Broken, cracked, or chipped equipment, dishware, or glassware being repaired.
- Food preparation surfaces (e.g., chopping boards or countertops) with cracks or deep scratches being replaced.
- Change work procedures to improve food safety.
- A food safety supervisor appointed to manage food safety risks in the business

Notes

Unit 4.4 Food Production Process– Record and Documentation

Unit Objectives

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

1. List the information to be recorded in the work process such as product traceability and recall
2. Discuss about product information and consumer awareness, product recall and withdrawal, and traceability

4.4.1 Product Specification

In Quality Management, several documents and certificates related to the purchased products and raw materials are required by the buyers. One of the most important product-related documents is the product specification. This document contains a detailed description of the product, all the requirements related to the production process as well as technical and functional aspects of the product. A product specification document can be released for any kind of product, from the raw materials (raw material specifications) to the machine parts or the packaging goods.

The specification documents are useful at all stages of the production process, on the suppliers and producer sides as well as on the buying company side which can use this document as a quality standard required at the delivery.

In some industries, such as the food industry, the number of protocols and documents required during the production process can quickly skyrocket to guarantee food safety and higher food quality. To meet this goal and standard, the food product and raw material specifications sheets primarily inform about the ingredients of each product and its condition of production.

4.4.2 Product Recall and Traceability

Traceability or product tracing is defined as the ability to follow the movement of a food through specified stage(s) of production, processing, and distribution. Traceability within food control systems is applied as a tool to control food hazards, provide reliable product information, and guarantee product authenticity. Traceability systems should be capable of documenting a product's history and/or locating it in the food chain. The traceability exercise is part of the recall procedure. Traceability has two components:

Tracing : Backward	Tracking : Forward
• Tracing is the ability to reconstruct the history of a product in the food chain and identify the origin, movement patterns, and relevant associated information of a specific unit and/or batch of product located within the supply chain by referencing records held upstream.	• Tracking is the ability to trace the final destination of a product in a food chain and to follow the path of a specified unit and/or batch of product through the supply as it moves from organizations to the final point of the process, point of sale, point of service, or point of consumption.

Fig 6.25 Backward and Forward Traceability

In a food traceability exercise, records and documents are prepared for the following areas.

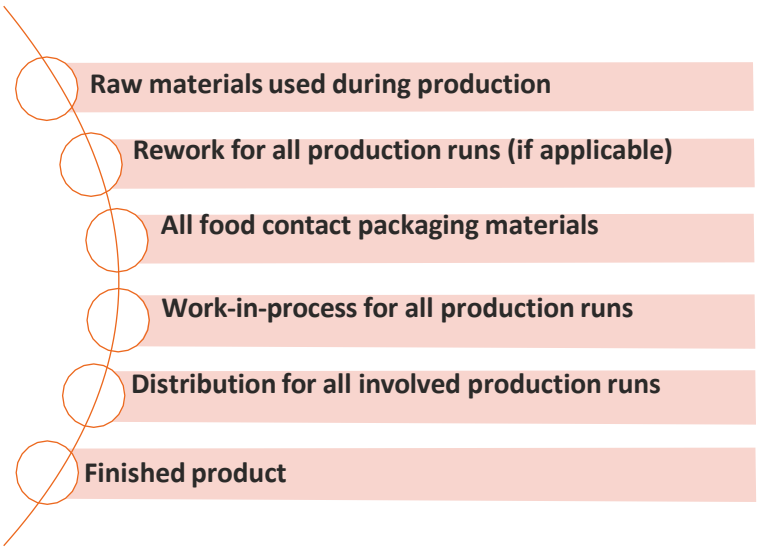


Fig 6.26 Document and Record Details for Traceability Exercise

The following figure below demonstrates the steps in the traceability exercise process.

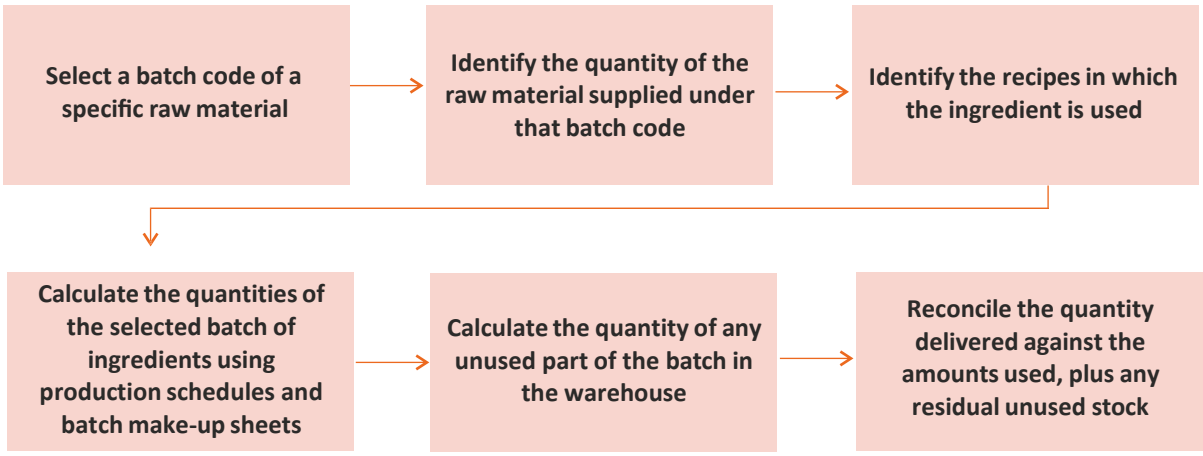


Fig 6.27 Traceability Process

Recall or **Product Recall** is defined as the action to remove food from the market at any stage of the food chain, including that possessed by consumers. A food recall is a fundamental tool in the management of risks in response to food safety events and emergencies. Traceability and recalls are essential components of a national food control system.

A mock product recall is an internal exercise designed to assess a company's ability to track down and remove unsafe products or ingredients from the market. The following are the goals of food recall:

1. To develop a written recall strategy
2. To conduct a food recall
3. To ensure the effectiveness of the action and to prevent a recurrence.

This is the procedure that an FBO (food business operator) must follow to remove unsafe or illegal products from the market. The goal of a food recall is to direct FBO:

1. Stop delivering and selling the product in question
2. Notify the appropriate regulatory bodies
3. Product removal from the market in a proper and timely manner

The following are the reasons for food recalls in the food industry:

Adulteration

Ambiguous allergy information

Misbranding

Missing Labels

Fig 6.28 Reasons for Food Recalls

The scope and benefits of food recall are as follows:

1. Trace a product's journey through the supply chain to evaluate the company's traceability system
2. Check the communication systems (contact information of recall personnel, suppliers, and consumers)
3. Determine and modify aspects of the recall plan that are problematic or difficult
4. Whose quality does not comply with the Act and the Rules and Regulations promulgated thereunder
5. All food businesses regulated by the Food Authority that engage in the wholesale supply, manufacture, or importation of food must have an up-to-date recall plan

The following are included in the Mock Recall Plan and Procedure:

1. Designated recall team
2. Random product for mock recall and traceability exercise
3. Tracking of the products using traceability procedures
4. Reconciling the affected product with current inventory
5. Rapid Recall Exchange to simulate the communication of the event

6.Assessment of mock recall results

The designated recall team includes:

Recall coordinator

- Oversees all activities relating to the recall and manage other team members

Quality assurance specialist

- Identifies the root causes and issues that led to the recall

Communications expert

- Handle public relations (press releases and media statements)

Sales/Customer representatives

- Communicates with consumers

Legal counsel

- Advise on the legal requirements for a recall

Fig 6.29 Recall Team

The following figure explains the standard procedure of food recall exercise in the food industry.

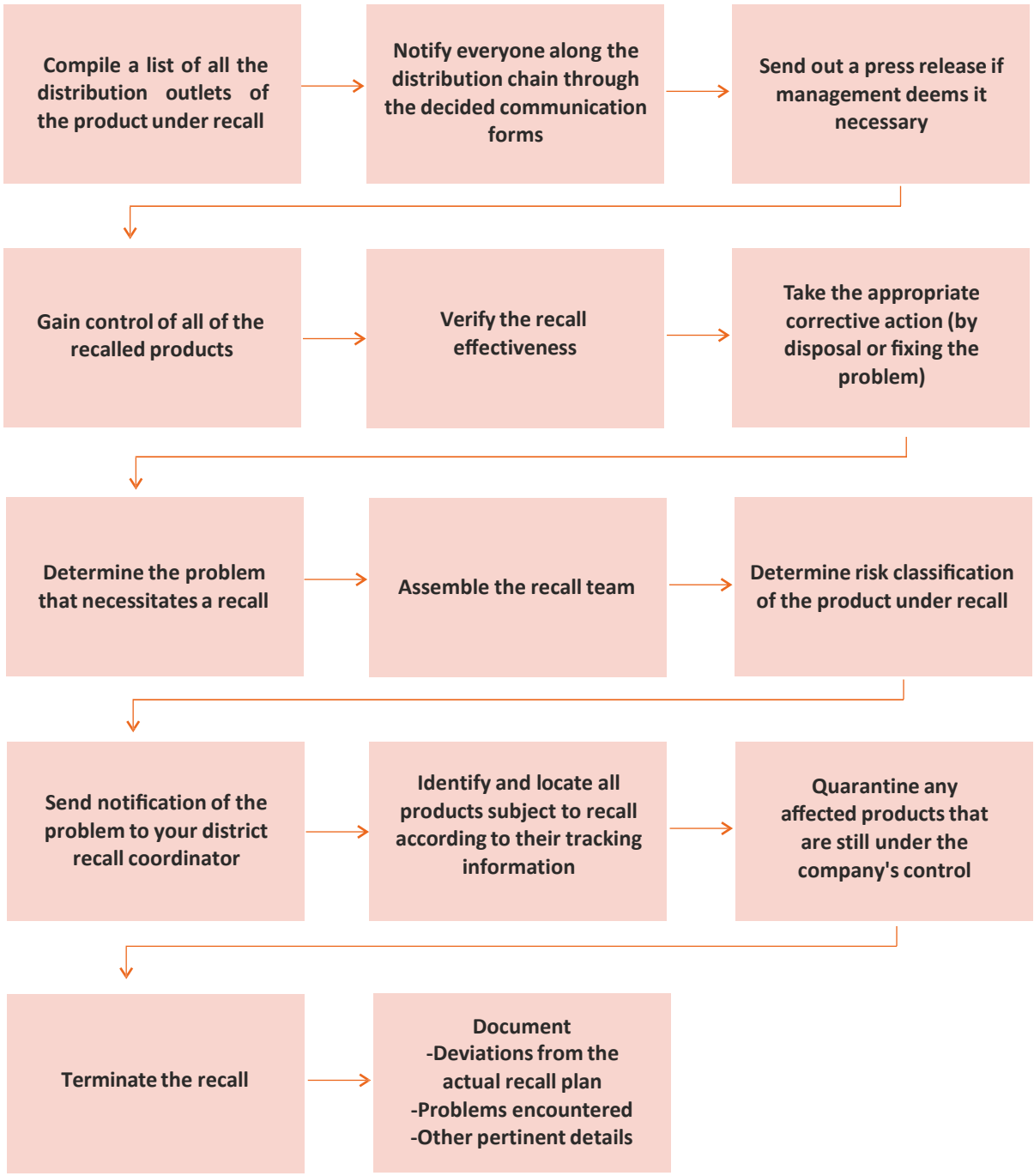


Fig 6.30 Standard Process for Food Recall

After the food recall process, it is essential to conduct a proper Key Assessment. The figure below explains the steps to be taken following the food recall exercise.

Key questions to ask after the recall:

- Was the recall team able to convene quickly and reach a decision regarding the recall?
- Was the contact information of all stakeholders (recall team members, suppliers, retailers, consumers) available and up-to-date?
- How difficult was it to:
  - Trace the recalled product?
  - Gather the information necessary to activate the recall?
  - Contact regulatory agencies?
  - Prepare documents for media correspondence (press releases and media statements)?
  - Maintain a log of activities?

Fig 6.31 Key Assessment for Recall Process

Notes

Summary

- Types of biological, chemical, and physical hazards present in the food processing industry
- Various types of food contaminations, their causes, and ways to prevent them
- Importance of ensuring that the materials (such as raw materials, processed materials, finished goods, etc.) are adequately isolated to prevent them from contamination
- Various types of allergens and their management at the workplace
- The standard regulations to ensure food safety are listed in 'The Food Safety and Standards Act, 2006' that need to be followed during production.
- The importance of following the standard procedures for ensuring food safety.
- The role of HACCP, VACCP, and TACCP, as well as procedures to implement these in the food industry
- The significance of training the team members regarding various food safety procedures such as GMP, HACCP, etc.
- The procedure to conduct workplace food safety audits
- The procedure of performing root cause analysis and taking corrective and preventive actions against workplace problems
- Corrective measures to be applied to ensure food safety
- Information to be recorded in the work process
- Product information and consumer awareness, product recall and withdrawal, and traceability

Exercise

I. Answer the following questions:

1. List the types of different hazards in the Food Processing Industry.

2. List down different types of Food Contamination.

3. What are the steps involved in CAPA?

4. What are the symptoms of Allergen?

5. Write down the key steps for an organization to follow while developing TACCP.

6. What is backward traceability?

7. Explain the food recall process.

8. List the steps for traceability exercise.

Notes

5. Ensuring Food Safety and Personal Hygiene

Unit 5.1 - Introduction to Food Safety

Unit 5.2 - Schedule IV requirements of FSSAI

Unit 5.3 - Personal Hygiene

Unit 5.4 - Health Safety

(FIC/N9901)

Key Learning Outcomes

At 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 5.1: 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

5.1.1 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.

5.1.2 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.

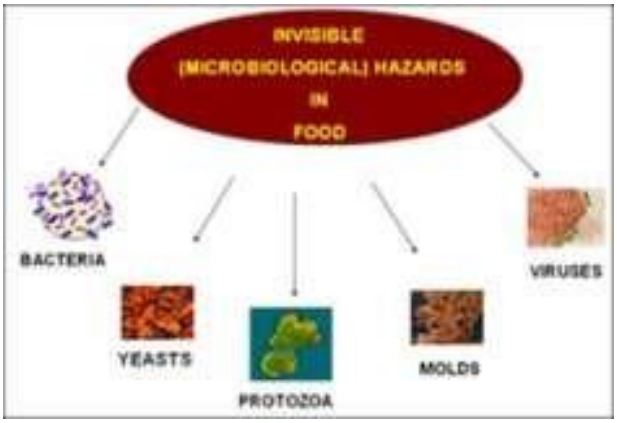


Fig. 5.1.1: Microbiological Hazards

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. 1.1.2: 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.

Fig. 1.1.3: 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. 5.1.4: 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. 5.1.5: 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 shelfish (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' diarrhe' 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' diarrhe' 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.

5.1.3 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

5.1.4 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.

5.1.5 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. 5.1.6: 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 and of temperature ranges.

5.1.6 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 5.2: Schedule IV requirements of FSSAI

Unit Objectives

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

1. Identify requirements in Schedule IV in FSSAI

5.2.1 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 5.2.1: 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

Fig. 5.2.1: Location and Surrounding factors

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

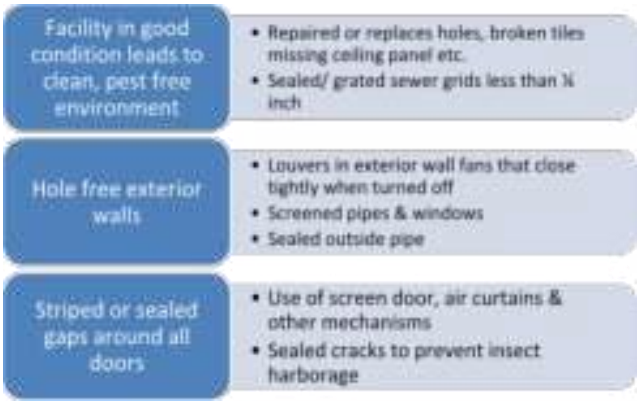


Fig. 5.2.2: Layout and Design factors

- **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. 5.2.3: 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

Fig. 5.2.4: 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

Fig. 5.2.5: Waste Disposal

Fig. 5.2.6: 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. 5.2.7: Personal facilities

Fig. 5.2.8: 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. 5.2.9: 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. 5.2.10: Storage of raw materials and food

Review Of Product Label /Packaging Usage And Control

Labels should be reviewed allergens are mentioned don 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. 5.2.11: 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. 5.2.12: Maintenance

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

Fig. 5.2.13: 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. 5.2.14: 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:

Fig. 5.2.15: 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

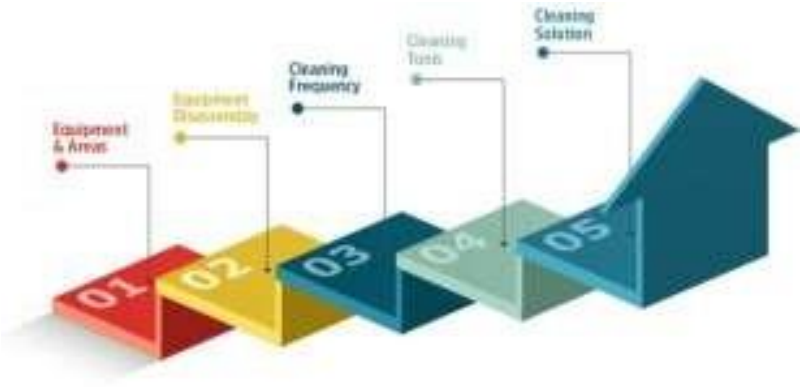


Fig. 5.2.16: Storage of sanitizing materials

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 (quarts), 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. 5.2.17: 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

  oFood shall be adequately covered during transportation to assure food safety. o

  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. 5.2.18: 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 5.3: Personal Hygiene

Unit Objectives

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

1. Identify types of health and safety policies and procedures

5.3.1 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.

5.3.2 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.

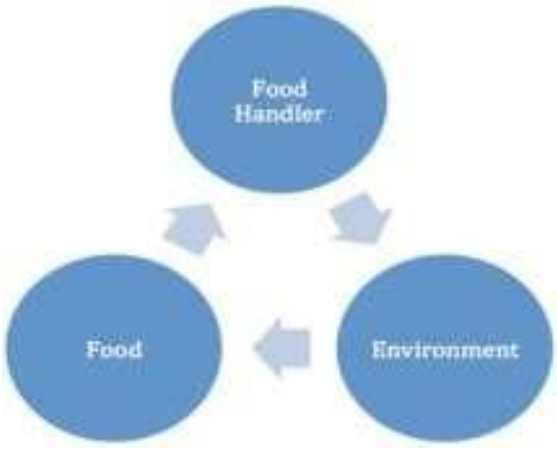


Fig. 5.3.1: Importance of Personal Hygiene

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

Fig. 5.3.2: Personal hygiene

5.3.3 Hand Washing

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

Fig. 5.3.3: Methods of washing hand

How to Use Sanitizer?

Fig. 5.3.4: Usage of Sanitizer

When to Wash and Sanitize Hand?

Fig. 5.3.5: 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.

5.3.4 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 5.4: Health Safety

Unit Objectives

At 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

5.4.1 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.

5.4.2 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.

  Fig. 5.4.1: Safety hazards

  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

- **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:

  oImproperly adjusted workstations and chairs o

  Frequent lifting

  o Poor posture

  o Awkward movements, especially if they are repetitive

  oHaving to use too much force, especially if you have to do it frequently o

  Excessive vibration

Fig. 5.4.2: 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.

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

5.4.3 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.

5.4.4 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.

5.4.5 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. 5.4.3: 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. 5.4.4: 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

Fig. 5.4.5: FSSAI dos and don'ts for food handlers

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.

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. 5.4.6: 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

1.Personal Hygiene-

https://www.youtube.com/watch?v=6WXc6cH_gII&t=1s

2. General Requirement on Hygiene and sanitation-

https://www.youtube.com/watch?v=d5kn5ns0zWM

6. Managing Accidents and Emergencies

FIC/N9901

Key Learning Outcomes

At 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 6.1: Hazard, Risk and Accidents

Unit Objectives

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

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

6.1.1 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.

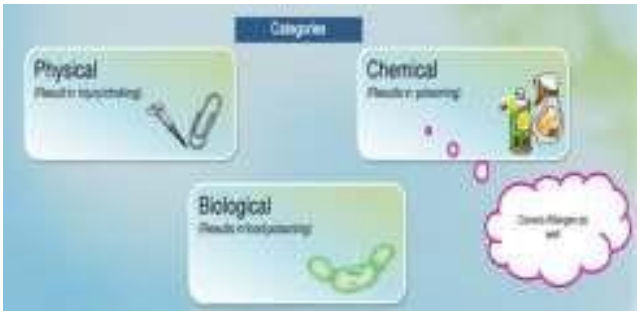


Fig. 6.1.1: Examples of physical, Chemical, Biological hazards

  - Harmful radiation like micro-waves, radio-waves, electro-magnetic waves, and so on.

- **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. 6.1.2: Sources of different types of hazards

6.1.2 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 6.2: Standard Practices and Precautions

Unit Objectives

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

1. Categorize the standard precautions and practices

6.2.2 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 Etiquete:** One should follow the below guidelines to maintain respiratory hygiene.
  oCovering 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 6.3: Uses of Electrical Equipment

Unit Objectives

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

1. Examine the utilization of the electrical equipment

6.3.1 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. 6.3.1: 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. 6.3.2: Electrical hazard symbols

UNIT 6.4: Usage of Personal Protective Equipment

Unit Objectives

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

1. Explore the usage of personal protective equipment

6.4.1 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. 6.4.1: 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 6.5: Organisational Protocols

Unit Objectives

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

1. Recognizing the organizational protocols

6.5.1 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 6.6: Dealing with Toxics

Unit Objectives

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

1. Monitor the ways to handle the toxics

6.6.1 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. 6.6.1: Waste disposal process for a different type of waste

UNIT 6.7: 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

6.7.1 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.
- **Liquified 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. 6.7.1: 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. 6.7.2: 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 6.8: Artificial Respiration and CPR

Unit Objectives

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

1. Evaluate CPR as well as the artificial respiration

6.8.1 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:

		
Position your hand	Interlock fingers	Give chest compressions

		
Open the airway	Give rescue breaths	Watch chest fall
		
Repeat chest compressions and rescue breaths		

Table 6.8.1: 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.

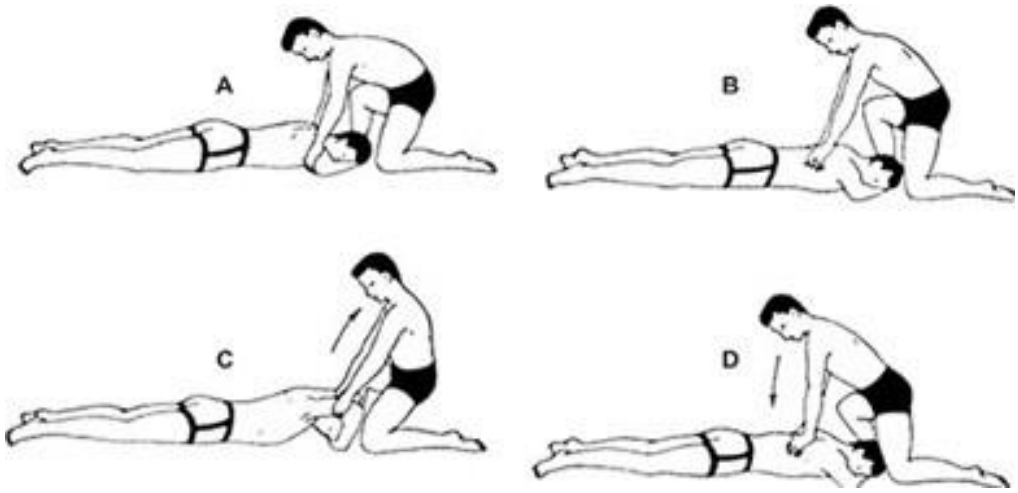


Fig. 6.8.1: Back Pressure Arm-Lift

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.

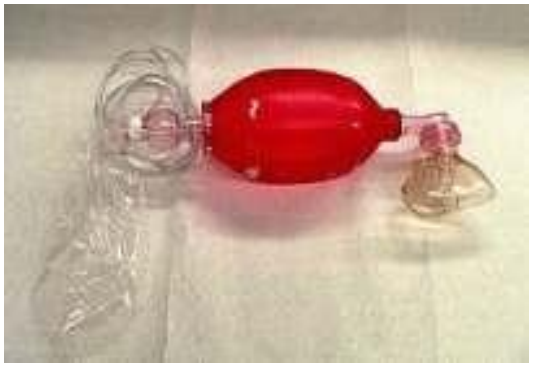


Fig. 6.8.2: Big Valve mask

Fig. 6.8.3: Ventilator

UNIT 6.9: Rescue and Evacuation In Case Of Fire

Unit Objectives

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

1. Discuss the evacuation and rescue during a fire incident

6.9.1 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 inidviduals requires to be nominated inidviduals in order to conducr 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. 6.9.1: 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 responsing 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 indivdiuals 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 fires 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. 6.9.2: Fire evacuation process

UNIT 6.10: First Aid

Unit Objectives

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

1. Cataloguing the first aids

6.10.1 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. 6.10.1: First Aid Kit

UNIT 6.11: Potential Injuries and Ill Health

Unit Objectives

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

1. Understanding the ill health as well as potential injuries

6.11.1 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 6.12: Precautions in Mobility

Unit Objectives

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

1. Demonstration of the precautions in mobility

6.12.1 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 6.13: Significance of various types of hazard and safety signs

Unit Objectives

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

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

6.13.1 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. 6.13.1: 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. 6.13.2: 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.

Fig. 6.13.3: Biological hazard safety signs

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.

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. 6.13.4: 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.

Exercise

A. Answer the following questions briefly.

1. Is Covid -19 a biological hazard?
   A True B False
2. Which of the following is included in Personal Protective equipment?
   A Spectacles or clear goggles B Earmuffs
   C Hard hat D All of them.
3. Can toxic substances spillage be wiped off with a normal cloth and with bare hands?
   A True B False
4. A simple technique for using fire extinguisher_____.
   A. PASS method B Installation on telephonic desk
5. Which is not a part of potential injury at the workplace?
   A Muscle strain B Cuts
   C Slip or fall D Drowning

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

1. Explain the golden rule of “First Aid”.
2. Why is Organisational Protocol necessary for an organisation?
3. Describe any two types of electrical equipment?
4. Explain why hand hygiene is necessary for oneself.
5. Describe the various types of hazards involved while handling or dealing with toxic?

Notes

7. Working Effectively in an Organization

FIC/N9902

Key Learning Outcomes

At 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 7.1: Organizational Policies

Unit Objectives

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

1. Categorize the organizational policies

7.1.1 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 7.2: Legislations, standard, policies, and procedures

Unit Objectives

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

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

7.2.1 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:

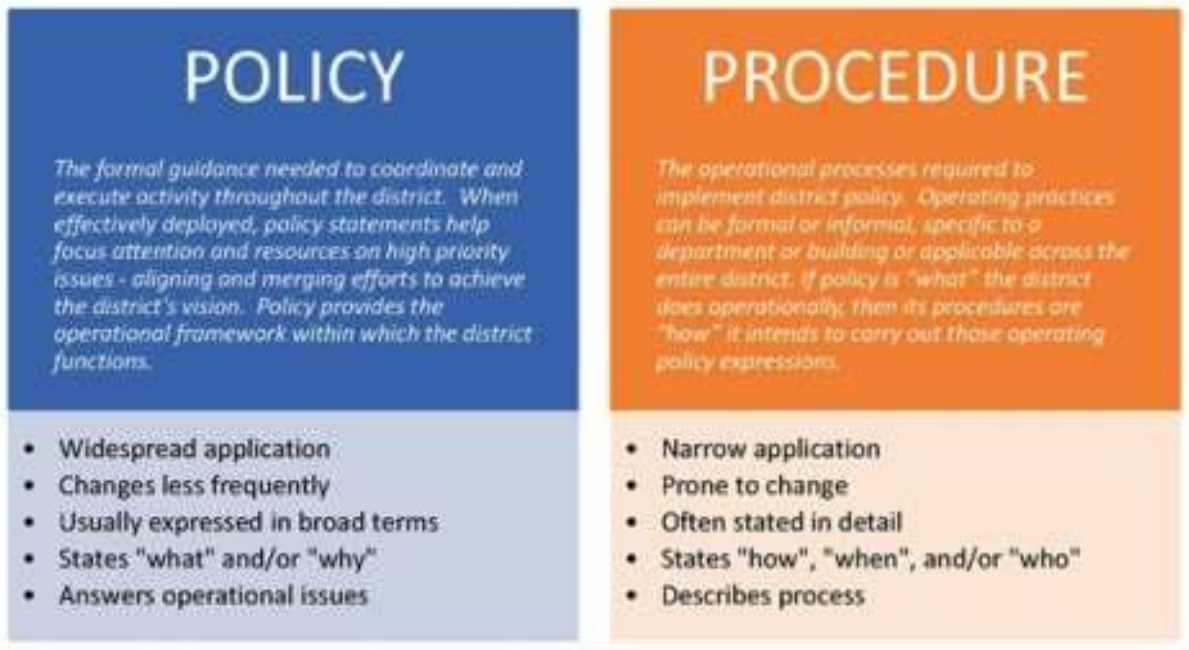


Fig. 7.2.1: Difference between Policy and Procedure

UNIT 7.3: Reporting Structure

Unit Objectives

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

1. Analyse the reporting structure

7.3.1 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. 7.3.1: Company's Reporting Structure

UNIT 7.4: Inter-Dependent Functions

Unit Objectives

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

1. List the inter-dependent functions

7.4.1 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. 7.4.1: Process of the concept of Inter-dependence

UNIT 7.5: Harassment and Discrimination

Unit Objectives

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

1. Discuss the impact of harassment and discrimination

7.5.1 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.

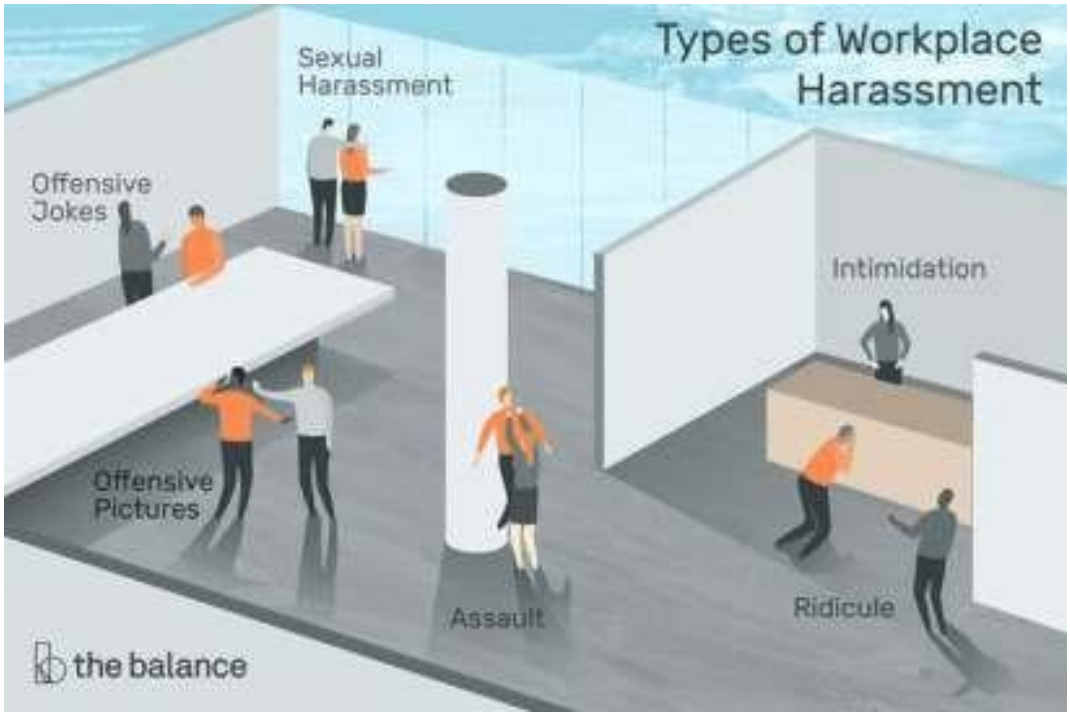


Fig. 7.5.1: Types of Workplace Harassment

UNIT 7.6: Prioritizing Tasks

Unit Objectives

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

1. Monitor the ways of prioritizing the task

7.6.1 The Ways of Prioritizing 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 7.7: Communication Skills

Unit Objectives

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

1. Record the types of communication skills

7.7.1 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.

Fig. 7.7.1: Essential Communication Skills

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.

- **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.

Fig. 7.7.2: 7 Key Active Listening Skills

- **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.
- **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 7.8: Teamwork

Unit Objectives

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

1. Evaluate the ways of carrying out a teamwork

7.8.1 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 7.9: Ethics and Discipline

Unit Objectives

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

1. Highlight the ethics and discipline

7.9.1 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 7.10: Grievances Solution

Unit Objectives

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

1. Illustration of the grievance's solution

7.10.1 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 tackledwith 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 7.11: Interpersonal Conflicts

Unit Objectives

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

1. Recognize the interpersonal conflicts

7.11.1 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 7.12: Disabilities and Challenges

Unit Objectives

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

1. Identify the disabilities and challenges

7.12.1 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 authorizethem 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 7.13: Gender Sensitivity and Discrimination

Unit Objectives

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

1. Identify the disabilities and challenges

7.13.1 The Disabilities and Challenges

Gender sensitivity has also been an ongoing dialogue inside the workplace. The workplace has frequantly 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 otherscould 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 7.14: Applicable Legislation, Grievance Redressal Mechanisms

Unit Objectives

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

1. Discuss the applicable legislations, grievance redressal mechanisms

7.14.1 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 Commitee:** 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 Commitee:** 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).
- **Commitee 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 7.15: Transacting With Others without Personal Bias

Unit Objectives

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

1. To administer with others without personal bias

7.15.1 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 givingas well asreceiving 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 inone'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.

Exercise

A. Answer the following questions briefly.

1. Which policy stands to be the workplace or organizational policy?
   A. Social Media Policy B. Environment Protection Policy
2. _____at workplace lays a strong foundation of trust between the employer and its employees.
   A. Communication B. Discipline
3. _____can prove to be quite harmful if not dealt in time.
   A. Actions B. Grievance
4. The employment barriers might include:
   A. Communication barriers B. Disciplinary barriers
5. _____requires employers to pay equal remuneration to the workers.
   A. Equal Remuneration Act, 1976 B. Republic Act No. 9710

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

1. List down the importance of having the company policies in force.
2. State the differences between policies and procedures.
3. What do you understand by communication skills?
4. What are policy barriers?
5. What are some of the central and state-specific labour laws in India for focusing on the grievance redressal mechanism?

Notes

8. Material Conservation

FICSI
Food Industry Capacity and Skill Initiative

SGJ/N1702

Key Learning Outcomes

At 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 8.1: Material Handling

Unit Objectives

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

1. Identify the ways to handle materials

8.1.1 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.

8.1.2 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 establish for 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 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).
- Pallet used to store materials can cause different hazards. For example- Damage pallets can result into product damage or fall down of the product; Protruded nails can 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 8.2: Workstation Layout, Electrical and Thermal Equipment

Unit Objectives

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

1. Categorize the workstation layouts, electrical and thermal equipment

8.2.1 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
- Too ls 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 8.3: Organisational Procedures for Minimising Waste

Unit Objectives

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

1. List the organizational procedures for minimising waste.

8.3.1 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. 8.3.1: 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 8.4: Practices of Efficient and Inefficient Management

Unit Objectives

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

1. Analyse the practices of efficient and inefficient management

8.4.1 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 8.5: 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.

8.5.1 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.

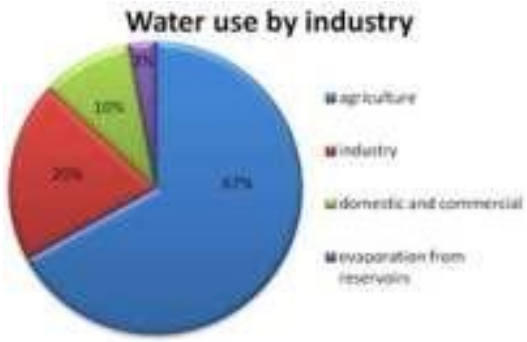


Fig. 8.5.1: Industry-wise water consumption

Industrial usage of water:

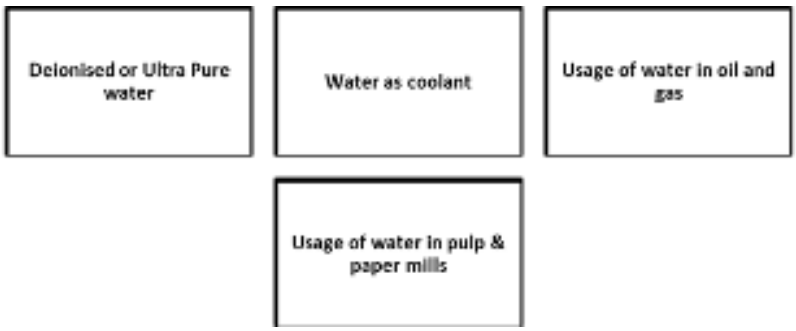


Fig. 8.5.2: Industrial wastage of water

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 mini- mal 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

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

1. What are the key indicators of inefficient management?
2. What are the four ways to control the defects types of waste?
3. What are the points required to consider while designing an electrical workstation?
4. What are the important aspects which need to be considered while designing the workplace?
5. What are the requirements for a storage space?

Notes

9. Energy and Electricity Conservation

Unit 9.1 - Define Electricity

Unit 9.2 - Basics of electricity

Unit 9.3 - Energy efficient devices

Unit 9.4 - Standard Practices for Conserving Electricity

SGJ/N1702

Key Learning Outcomes

At 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 9.1: Define Electricity

Unit Objectives

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

1. Define electricity

9.1.1 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:

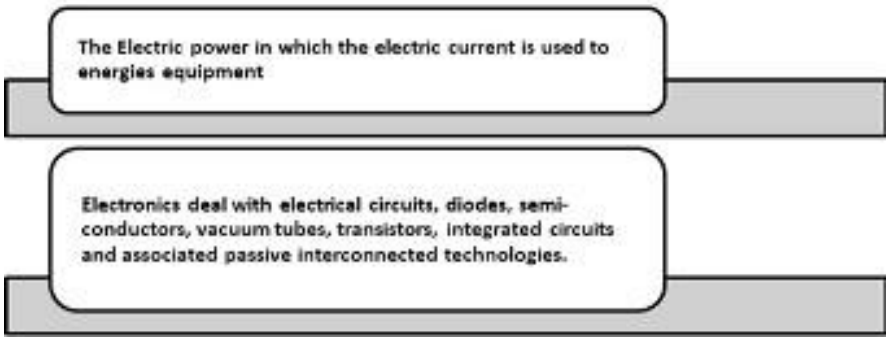


Fig. 9.1.1: Electricity utilization

UNIT 9.2: Basics of electricity

Unit Objectives

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

1. State the basics of electricity

9.2.1 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 104 to 107-ohm m. For example, Iron, Copper, etc.
- **Semi-conductors –** Materials whose conductivity lies between 10-6 to 104-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.

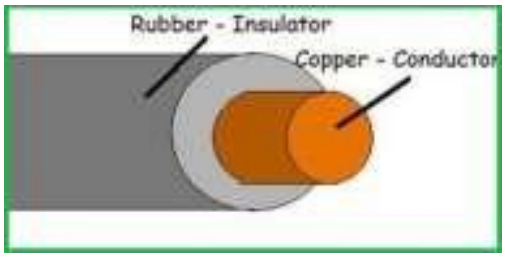


Fig. 9.2.1: Conductor of Electricity

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 9.3: Energy efficient devices

Unit Objectives

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

1. Identify the energy-efficient devices

9.3.1 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. 9.3.1: 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.

9.3.2 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 indivdiuals 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 9.4: Standard Practices for Conserving Electricity

Unit Objectives

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

1. Explain the standard practices for conserving electricity

9.4.1 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 de- crease 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 consid- eration before an investment decision.
- Electrical equipment involves any machine powered by electricity.

Exercise

A. Answer the following questions briefly.

1. On the basis of conductivity, conductors possess:

   A. Materials whose conductivity lies between 10-6 to 104-ohm m

   B. Materials whose conductivity lies between 104 to 107-ohm m

   C. Materials whose conductivity lies between 10-20-to-10-10-ohm m

   D. None of the above

2. What is the full form of EMF?

   A. Electromotive Force

   B. Electromagnetic Force

   C. Electro mobile Force

   D. Electro massive Force

3. _____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

4. Energy_____is broader in comparison to energy efficiency in including active efforts to decrease energy consumption.

   A. Release

   B. Emission

   C. Conservation

   D. Deletion

5. Modern energy efficiency refrigerators use_____less energy than their conventional models did in 2001.

   a. 50%

   b. 40%

   c. 60%

   d. 90%

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

1. What are the classifications for the materials of electricity?
2. What are the three primary electrical parameters?
3. What are the components of electrical equipment?
4. What are the categories of appliances?

Notes

10.Waste Management and Recycling

Unit 10.1 - Types of waste

Unit 10.2 - Waste Management and Disposal Solutions

Unit 10.3 - Pollution and Remedies

SGJ/N1702

Key Learning Outcomes

At 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 10.1: Types of waste

Unit Objectives

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

1. List the different types of waste

10.1.1 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 2. Steel 3. Aluminium 4. Plastic (PET) 5. Newspapers 6. Corrugated Cardboard 7. Plastics (HDPE) 8. Glass 9. Mixed Papers 10. Used Motor Oil 11. Used oil from food industry	1. Garbage. Mixture of different of garbage makes it hard to recycle. 2. Food-tainted items (such as: used paper plates or boxes, paper towels, or paper napkins) 3. Ceramics and kitchenware. 4. Windows and mirrors. 5. Plastic wrap. 6. Packing peanuts and bubble wrap. 7. Wax boxes. 8. Photographs 9. Medical waste 10. Polystyrene or Styrofoam 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 10.1.1: 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. 10.1.1: 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. 10.1.2: 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, TSIIC 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 Huladek 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. 10.1.3 : Examples of waste collecting vendors

UNIT 10.2: Waste Management and Disposal Solutions

Unit Objectives

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

1. Describe waste management and disposal solutions

10.2.1 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. 10.2.1: 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. 10.2.2: 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 10.3: Pollution and Remedies

Unit Objectives

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

1. Explain pollution and its remedies

10.3.1 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 in-ception to its end disposal.
- Proper management of waste is significant for building sustainable and liveable cities, yet it re- mains 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 re- leased 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

4. The Latin term for pollution is _____

   A. pollueme

   B. polluese

   C. polluere

   D. polluete

5 . _____waste comes from medical facilities.

   A. Municipal

   B. Biomedical

   C. Industrial

   D. Commercial

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

1. What are the differences between recyclable waste and non- recyclable waste?
2. What are two general types of wastes?
3. What stand to be the significance of the different colored dustbins?
4. Outline the responsible waste management hierarchy.
5. What are the methods for controlling pollution?

Notes

Scan the QR Codes to Watch the related Videos

1.Waste Management -

https://www.youtube.com/watch?v=Qyu-fZ8BOnI

2. Conservation - Reduce, Reuse & Recycle-

https://www.youtube.com/watch?v=abuousxwRe4

11. Employability Skills

DGT/VSQ/N0102

Employability Skills is available at the following location :

https://www.skillindiadigital.gov.in/content/list

Scan the QR code below to access the e-book

12. Annexure

Module No.	Unit No.	Topic Name	Link for QR Code (s)	QR code (s)
1.Introduction to the program and Overview of the Food Processing Industry	UNIT 1.1 Size and scope of the food retail industry	Scope of food processing in India with National and International perspective-	https://www.youtube.com/watch?v=5VlYw38hCxU	Scope of food processing in India
		Overview of Food Processing Industry	https://www.youtube.com/watch?v=J-2EiMVNtpM	Overview of Food processing industry
2. Prepare for cleaning and sanitation of food processing facility	Unit 2.1 Introduction to Food Sales and Marketing	Sanitation Training and Education-	https://www.youtube.com/watch?v=BFABjcFD8IM	Sanitation Training and Education-
3. Supervise Hygiene Practices	Unit 3.1 Monitor and Supervise the Cleaning and Sanitation Tasks	Cleaning Procedures of Equipment	https://www.youtube.com/watch?v=Bzfv32XUDns	Cleaning Procedures of Equipment
		Cleaning and Disinfection	https://www.youtube.com/watch?v=vBMuX8XzRY0	Cleaning and Disinfection
		Cleaning and Sanitation	https://www.youtube.com/watch?v=QWpU7DAfNcs	Cleaning and Sanitation

Module No.	Unit No.	Topic Name	Link for QR Code (s)	QR code (s)
5. Ensuring Food Safety and Personal Hygiene	Unit 5.3 - Personal Hygiene	Personal Hygiene	https://www.youtube.com/watch?v=6WXc6cH_gil&t=1s	Personal Hygiene
		General Requirement on Hygiene and sanitation	https://www.youtube.com/watch?v=d5kn5ns0zWM	General Requirement on Hygiene and sanitation
10.Waste Management and Recycling	UNIT 10.2: Waste Management and Disposal Solutions	Waste Management	https://www.youtube.com/watch?v=Qyu-fZ8BOnI	Waste Management
		Conservation - Reduce, Reuse & Recycle	https://www.youtube.com/watch?v=abuousxwRe4	Conservation - Reduce, Reuse & Recycle
11. Employability Skills	Employability Skills is available at the following location		https://www.skillindiadigital.gov.in/content/list	Employability Skills

Skill India
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सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

NCVET

N·S·D·C

FICSI
Food Industry Capacity and Skill Initiative

Address: Food Industry Capacity and Skill Initiative (FICSI)
Shriram Bharatiya Kala Kendra (3rd Floor)
1, Copernicus Marg, New Delhi 110001
Email: helpdesk@ficsi.in
Web: https://www.ficsi.in/
Phone: +91-9711260230,+91-9711260240
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