



## **Bee product processing Level-II**

Based on October 2020, Version 2 Occupational standards

### **Module Title: - Conducting Routine Maintenance of processing machineries**

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**Instruction sheet**

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

- Inspecting machinery and equipment
- Assessing nature of maintenance requirement
- Considering cleaning ,calibration and Maintenance schedule

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Inspect machinery and equipment
- Assess nature of maintenance requirement
- Consider cleaning ,calibration and Maintenance schedule

**Learning Instructions:**

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
4. Accomplish the “Self-checks” which are placed following all information sheets.
5. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).
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### 1.1. Important terminologies and definitions.

**A machine** is a device with a specific mechanism in it to perform a specific task or tasks with certain mechanical advantage. Or simply it is a device that gives mechanical advantage, which facilitates the doing of work

#### **Equipment is:**

Defined as any utensil or machine used or capable of being used in the cleaning of any equipment or facilities or

The whole or any part of any utensil, machine, fitting, device, instrument, stamp, apparatus, table, or article, that is used or available for use in or for the preparing, marketing, processing, packing, storing, carrying, or handling of any material, animal product, ingredient, additive, or processing aid; and others

**Essential services includes** the provision of process gases, lighting, ventilation, and water and waste management extraction is the removal of honey from the comb by centrifugal force, gravity, straining or other means facilities includes amenities, storage areas, and processing areas

**Good operating practice (GOP)** means documented procedures relating to practices that:

- are required to ensure products are fit for their intended purpose; and
- are appropriate to the operating circumstances

**HACCP** is a system which identifies, evaluates, and controls hazards which are significant for food safety

#### **Internal audit (or internal verification audit) means**

a systematic examination of RMP processes/procedures to ensure compliance to requirements:

- by obtaining factual evidence (e.g. records, visual inspection reality check, etc.); and
- carried out by an independent/ impartial suitably skilled auditor

**Label** includes any wording, tag, brand, symbol, picture, or other descriptive matter written, printed, stenciled, marked, embossed, impressed on, appearing on, attached to, or enclosed within any animal material or animal product

**Maintenance compound means any substance:**

- used for maintaining, repairing, servicing, cleaning, or sanitising equipment or surfaces that may be the source of, or result in, contamination of bee product or associated things;
- used for treating water; or
- used for pest control

**Monitoring (monitor)** means checking:

- Process parameters (eg. Moisture ) are within the limits (both operator and regulatory);
- documented procedures are being followed (e.g. hand washing procedures, load in checks et.);and
- records are correctly completed

**Monitoring records may include:**

- visual and other sensory assessment of equipment and the environment,
- documented checks of the supporting systems and GOP in action

**Non-complying (non- compliance)** means any material or product or input that fails to comply with regulatory requirements

**Non-conforming (non-conformance)** means any material or product or input that is suspected or known not to meet operator defined limits/criteria

**Operator** means an operator of a premises or place who operates an animal product business that is subject to an RMP

**Operator defined limit or food safety objective** means a measurable limit established by an RMP operator to manage the fitness for purpose of bee products

**Operator verification** means the application of methods, procedures, tests and other checks by the RMP operator to confirm the ongoing:

- compliance of the RMP to the legislative requirements; and
- compliance of the operation to the RMP as written; and
- applicability of the RMP to the operation; and forms part of confirmation

## **Packaging**

- means any material that is intended to protect and that comes into immediate contact with the bee product; and
- includes rigid materials such as cartons and containers where bee product is filled directly into the carton or container; and
- includes any other material contained with, in, or attached to, the bee product (such as labels)

**Potable water** means water that:

- in relation to water supplied by an independent supplier (including a public or private supplier), is of a standard administered by the independent supplier under the Health Act 1956 and any regulations made under that Act; or
- in relation to water supplied by the operator solely for the use of the operator (such as bore water, rainwater, surface water, or ground water):

### **1.2. Inspecting machinery and equipment**

An inspection is, most generally, an organized examination or formal evaluation exercise. It means careful examination or scrutiny. Examine, check, and or check up etc Inspection Machines include manual, mechanical and computerized systems which inspect products, packages or packaging components to ensure they conform to specification

The purpose of an inspection is to identify whether work equipment can be operated, adjusted and maintained safely – with any deterioration detected and remedied before it results in a health and safety risk. Not all work equipment needs formal inspection to ensure safety and, in many cases, a quick visual check before use will be sufficient. However, inspection is necessary for any equipment where significant risks to health and safety may arise from incorrect installation, reinstallation, deterioration or any other circumstances. The need for inspection and inspection frequencies should be determined through risk assessment

As a key component of a maintenance program, inspections include tasks that check the condition of equipment and determine what tools, materials, and labor are required to service them. Many inspections must be conducted while a production line is running or equipment is operating. Inspections cannot interrupt manufacturing or production

processes, and many pieces of machinery cannot be checked adequately without seeing them in action.

### **Damaged, decommissioned or idle equipment**

- Store damaged decommissioned or idle equipment in an appropriate way to ensure it does not become a source of contaminants or harbour pests.
- Ensure equipment that could be a source of contamination is:
  - ✓ physically isolated from processing lines and product; or
  - ✓ Removed from processing areas.
- Clearly identify damaged or decommissioned equipment that remains in processing areas.

### **Guidance**

- Where possible, remove damaged or decommissioned equipment from processing areas. Decommissioned equipment may be stored outdoors, but should be placed on a hard standing (e.g. concrete, sealed or paved area) and covered.
- It is recommended to operators that they document why equipment is decommissioned or damaged as these details can be helpful when determining the equipment's suitability for repair or re-commissioning.

Self-Check -1	Written Test
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Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Define inspection (2pts)
2. Why inspecting machine and equipment? (2pts)
3. What do we mean non-complying (non- compliance) (2pts)

**Note: Satisfactory rating – 6 points**

**Unsatisfactory - below 6 points**

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

### Answer Sheet

Score = \_\_\_\_\_

Rating: \_\_\_\_\_

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### **The importance of maintenance of plant and equipment**

An effective maintenance program will make plant and equipment more reliable. Fewer breakdowns will mean less dangerous contact with machinery is required, as well as having the cost benefits of better productivity and efficiency. Additional hazards can occur when machinery becomes unreliable and develops faults. Maintenance allows these faults to be diagnosed early to manage any risks. However, maintenance needs to be correctly planned and carried out. Unsafe maintenance has caused many fatalities and serious injuries, either during the maintenance or to those using the badly maintained or wrongly maintained/repared equipment.

### **Returning equipment to use (including re-commissioning equipment)**

- Document a procedure to ensure that equipment returned to use (i.e. after repairs and maintenance, re-commissioning or having previously been idle) is not a source of contamination to the product.
- Ensure the procedure includes steps to:
  - ✓ thoroughly clean and sanitise equipment before being returned into a processing or support area;
  - ✓ revalidate previously validated equipment if the repairs and maintenance activity may affect its validation status; and
  - ✓ perform a pre-operational check before processing re-commences.

Self-Check -2	Written Test
<b>Information Sheet 3: Considering cleaning, calibration and Maintenance schedule</b>	

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

1. Mention what type of equipment are returning to use (4pts)
2. What is the difference between damaged, decommissioned or idle equipment  
And returning equipment to use (6pts)

**Note: Satisfactory rating – 10 points      Unsatisfactory - below 10 points**

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

### Answer Sheet

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### **3.1. Cleaning and sanitation**

#### **3.1.1. Purpose and scope**

- To ensure the effective cleaning and sanitation of the premises, facilities and equipment to prevent or minimise the contamination of consumable bee products.

#### **3.1.2 General requirements and procedures**

- Operators must ensure that all areas of their site including the facilities, support areas and equipment, are maintained in a clean and sanitary condition
- Operators must use only approved maintenance compounds during processing operations or in the maintenance of processing areas, facilities and equipment.
- Any maintenance compounds used during processing operations must be approved for that purpose before use.
- Operators must develop and implement a written cleaning programme for all of the following:
  - ✓ processing areas;
  - ✓ storage areas;
  - ✓ freezers, chillers or cool rooms (if relevant), hot rooms;
  - ✓ equipment;
  - ✓ amenities; and
  - ✓ external areas of the premises.
- Ensure the cleaning programme includes the following information:
  - ✓ areas and equipment to be cleaned;
  - ✓ procedures for all cleaning and sanitising operations, including the cleaning method, frequency of cleaning and sequence of cleaning;
  - ✓ detergents/sanitisers to be used, their concentration, application method and contact time required;
  - ✓ the identity or position of person(s) responsible for the cleaning activity;
  - ✓ methods and frequencies of monitoring and verification of the effectiveness of the cleaning and sanitation procedures; and
  - ✓ cleaning records forms or check sheets.

## Guidance

Clean food processing areas, facilities and equipment in accordance to the cleaning programme. Frequency should be often enough to minimize or prevent cross contamination of product.

Regularly clean and sanitise other items that may contaminate products indirectly (e.g. handles of doors and refrigerators, taps, hand wash basins etc.).

The effectiveness of cleaning and sanitation can be verified by direct or indirect microbiological testing (e.g. using swabs) of the relevant environment and contact surfaces.

Operators may choose to incorporate existing documented information into their cleaning and sanitation programme by reference

### 3.1.3 Cleaning methods

- Operators must carry out cleaning activities in a way that will minimise contamination of:
  - ✓ bee products;
  - ✓ ingredients;
  - ✓ product contact materials (e.g. packaging); and
  - ✓ previously cleaned areas, structures facilities or equipment.
- Train workers adequately on the handling of cleaning chemicals and the implementation of the cleaning programme.
- Use cleaning compounds in accordance with procedures. control of aintenance Compounds.
- Ensure the cleaning method is appropriate to:
  - ✓ the product and the operation;
  - ✓ the type of surface to be cleaned; and
  - ✓ the type and characteristics of the residual material or dirt to be cleaned off the surface.

## Guidance

Care is required to avoid re-contamination. Cleaning from clean areas towards dirty areas can help minimise the spread of contamination e.g. example, walls should be

washed before floors. However when hosing floors, high-pressure hoses can re-contaminate previously cleaned surfaces with waste water.

### **Most processing areas will require a wet cleaning routine**

Cleaning using a mixture of wet and dry methods may be suitable in some circumstances (e.g. support areas, packing areas that require occasional wet cleaning).

#### **3.1.3 Wet cleaning**

- Wet cleaning (e.g. water and steam) should be contained within the immediate area that is being wet cleaned to prevent wetting dry ingredients, packaging, products and dry product areas.
- If product is not removed from the wet cleaning area, the amount of water used should be limited to that necessary to complete the cleaning procedure.
- All equipment and food surfaces that are wet cleaned should be free from residues and moisture before processing restarts.

#### **3.1.5 Dry cleaning**

- Dry cleaning is recommended for areas where dry materials are handled and stored
- Dry cleaning methods include brushing, scraping and vacuuming.
- Dry cleaning in areas with exposed ingredients or product is only appropriate where moisture levels in products are below levels sufficient to support microbial growth.

#### **3.1.6 Cleaning inspection**

- Cleaning checks or inspections should be undertaken on a regular basis, as indicated in the cleaning and sanitation programme to ensure compliance with the cleaning schedule and to check the effectiveness of cleaning by assigned personnel.
- Pre-operational checks of facilities and equipment should be conducted by a suitably skilled person to ensure that operations begin only after sanitation requirements have been met.
- If a pre-operational hygiene check shows a problem:
  - ✓ the source of the contamination should be fixed (immediately if there is a food safety risk); or

- ✓ the frequency of cleaning should be increased sufficiently to manage the problem.
- Pre-operative hygiene checks of the area and equipment to be used should be completed before the product requiring the higher hygienic status is processed.

### **3.2. Calibration of measuring equipment**

Some equipment like digital thermometer, refractometer and other equipments used in bee product processing should be calibrated before any activity.

#### **Purpose and scope**

- To ensure that measuring equipment that is used to carry out critical measurements function as intended.
- Measuring equipment includes the following:
  - ✓ temperature measuring/recording devices;
  - ✓ timing devices;
  - ✓ scales;
  - ✓ metal detectors;
  - ✓ water activity meters;
  - ✓ pH meters;
  - ✓ flow meters; and others.
- It is recommended that calibration is also applied to equipment used in monitoring parameters (e.g. refrigeration temperatures) and product parameters (e.g. product weight).

### **3.3. Maintenance of cleaning equipment**

Cleaning implements and equipment should be maintained in a hygienic condition and should not introduce any hazard or foreign object to any edible bee product, packaging or product contact surface.

Self-Check -3	Written Test
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**Directions:** Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. During Calibration of measuring equipment mention some of the equipments included. (5pts)
2. Mention why the operators carry out cleaning activities (4pts)

**Note:** Satisfactory rating – 14 points      Unsatisfactory - below 14 points

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

### Answer Sheet

Score = \_\_\_\_\_

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**Instruction sheet**

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

- Assess maintenance task.
- Prepare machinery and equipment
- Select hand tools
- Check tools before use

Plan and schedule Maintenance This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- assess maintenance task.
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- select hand tools
- check tools before use

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## 1.1. Introduction

Regular maintenance of equipment is an important and necessary activity. The term 'maintenance' covers many activities, including inspection, testing, measurement, replacement and adjustment, and is carried out in all sectors and workplaces. It has a vital role to play in reducing the risk associated with some workplace hazards and providing safer and healthier working conditions. Insufficient/inadequate maintenance can cause serious (and potentially deadly) accidents or health problems.

The Maintenance Assessment Process (MAP) is an evaluation of the current state of the maintenance function of a corporation, company, or facility. The purpose of the assessment is to gauge how capable the maintenance function is in supporting the goal of operational excellence.

Equipment maintenance is any process used to keep a business's equipment in **reliable working order**. It may include routine upkeep as well as corrective repair work. Equipment may include mechanical assets, tools, heavy off-road vehicles, and computer systems.

Maintenance tasks indicate which action—or set of actions—a maintenance technician is supposed to perform to complete a work order. Different maintenance tasks are assigned based on the type of equipment that needs maintained.

## Objectives of Maintenance

The more specific objectives of maintenance management are as follows:

- To optimize the reliability of equipment and infrastructure
- To ensure that equipment and infrastructure are always in good condition
- To carry out prompt emergency repair of equipment and infrastructure so as to secure the best possible availability for production
- To enhance, through modifications, extensions, or new low-cost items, the productivity of existing equipment or production capacity
- To ensure the operation of equipment for production and for the distribution of energy and fluids

- To improve operational safety
- To train personnel in specific maintenance skills
- To advise on the acquisition, installation and operation of machinery
- To contribute to finished product quality
- To ensure environmental protection.

**General types of maintenance philosophies can be identified, namely:**

### **Corrective**

When we are conducting corrective maintenance the failure has now occurred and we are basically reinstating equipment functionality. To be clear, corrective maintenance can be the result of a deliberate run-to-failure strategy.

### **Preventive**

Most failure modes are not age related. However, most failure modes do give some sort of warning that they are in the process of occurring or are about to occur. The right task at the right time: how to evaluate maintenance tasks and select the right one for your strategy For any given asset there are typically dozens of different predictive or preventive maintenance tasks that *could* be performed, however selecting the right maintenance tasks that contribute effectively to your overall strategy can be tricky, the benefit is the difference between meeting production targets and the alternative of lost revenue, late night callouts, and added stress from unplanned downtime events.

**Step 1: Build out your FMEA (Failure Mode Effects Analysis) for the asset under consideration.**

Make sure you get down to appropriate failure modes in enough detail so that the causes are understood and you can identify the proper maintenance to address each specific failure mode.

Once you've made a list of failure modes, then it's detailed analysis time. If you want to be truly rigorous, perform the following analysis for every potential failure mode. Depending on the criticality of the asset you can simplify by paring down your list to include only the failure modes that are most frequent or result in significant downtime.

**Step 2: Identify the consequences of each failure mode on your list.**

Failure modes can result in multiple types of negative impact. Typically, these failure effects include production costs, safety risks, and environmental impacts.

### **Step 3: Understand the failure rate for each particular mode.**

Gather information on the failure rates from any available industry data and personnel with experience on the asset or a similar asset and installation, as well as any records of past failure events at your facility.

### **Step 4: Make a list of possible reactive, planned or inspection tasks to address each failure mode.**

Usually, you start by listing the actions you take when that failure mode occurs (reactive maintenance). Then broaden your list to any potential preventive maintenance and/or inspection tasks that could help prevent the failure mode from happening, or reduce the frequency at which it occurs.

- Reactive tasks
  - ✓ Replacement
  - ✓ Repair
- Preventive tasks
  - ✓ Daily routines (clean, adjust, lubricate)
  - ✓ Periodic overhauls, refurbishments, etc.
  - ✓ Planned replacement
- Inspection tasks
  - ✓ Manual (sight, sound, touch)
  - ✓ Condition monitoring (vibration, thermograph, ultrasonic's, x-ray and gamma ray)

### **Breakdown Maintenance and Process**

The breakdown maintenance is a type of maintenance that involves using a machine until it completely breaks down and then repairing it to working order. Breakdown Maintenance is referred to repair and maintenance work performed on a machine, production workshop or component, be it mechanical or electrical after it has failed or broken-down unexpectedly. It is also referred to as maintenance or engineering work related to unexpected plant breakdowns. It is not a planned event and other expenses such as out of budget maintenance costs including overtime, technician call outs and urgent delivery fees for spare parts or support.

Self-Check -1	Written Test
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**Directions:** Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Mention general types of maintenance philosophies identified (3pts)
2. What are the inspection tasks conducted (2pts)
3. Mention the difference between reactive and preventive tasks (5 pts)

**Note:** Satisfactory rating – 10 points      Unsatisfactory - below 10 points

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

### Answer Sheet

Score = \_\_\_\_\_

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## Information Sheet 2: Prepare machinery and equipment

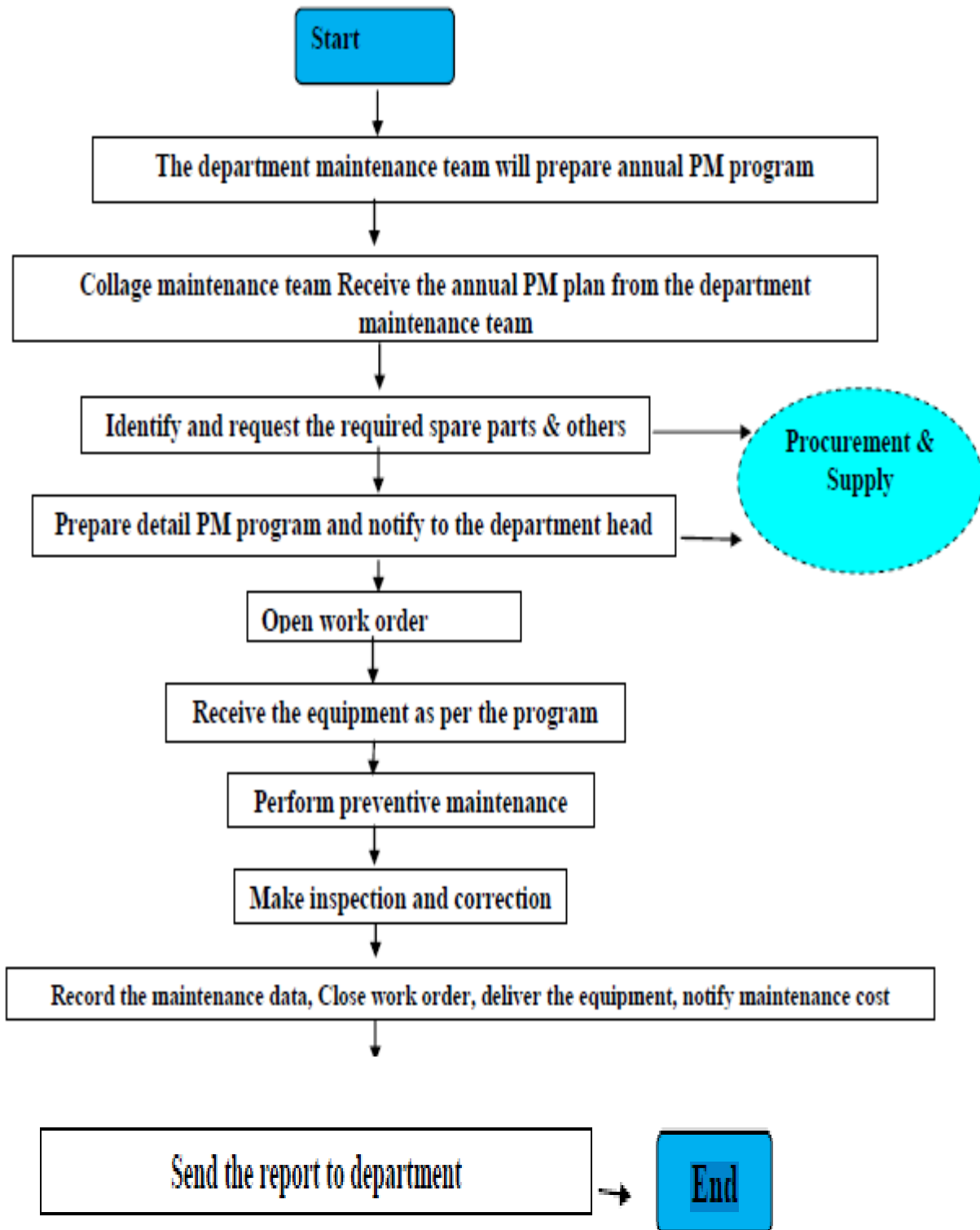
To prepare machinery and equipment for maintenance, Employers should control any risk by providing the worker/operator with the necessary information, instruction, training, supervision and appropriate safety equipment. While preparing machines and equipments for maintenance, the following problems are some of the point that one has to take in to consideration. These are:

- Broken or missing guards and devices. Loose parts, unusual noise, leaks, or vibration.
- Damaged
- may come back from the user with a notification that there is a problem
- may not be aligning correctly
- may be stiff or bent or in the case of scissors and knives the item may be blunt.
- Strange odours, heat, smoke, dust, fumes..
- Damaged or dirty PPE or PPE that fits badly.
- Unhealthy reactions, skin rashes, dizziness, hearing problems

### 4. Preventive maintenance Process & its Flow Chart

The team Receive, review & forward annual maintenance program

- 1.The department maintenance team will prepare annual PM program
- 2.Collage maintenance team Receive the annual PM plan from the department maintenance team before the coming budget year
- 3.Collage maintenance team Comment & Reviews the plan and prepares annual maintenance program and forward copy to department maintenance team.
4. The preparation of the PM program by the department maintenance team would be supported by Equipment Maintenance team as required.



**Diagram 3. Flowchart preventive maintenance and process**

## 2. Corrective maintenance

There are two types of corrective maintenance. These are :

- Planned Maintenance
- Unplanned Maintenance

## 3. Breakdown Maintenance and Process

Maintenance breakdowns can have many causes, some being the result of improper preventive and long term maintenance planning, lack of maintenance inspections, lack or incorrect evaluation of stresses and load cycles on machinery, faulty design and materials and in some cases neglect.

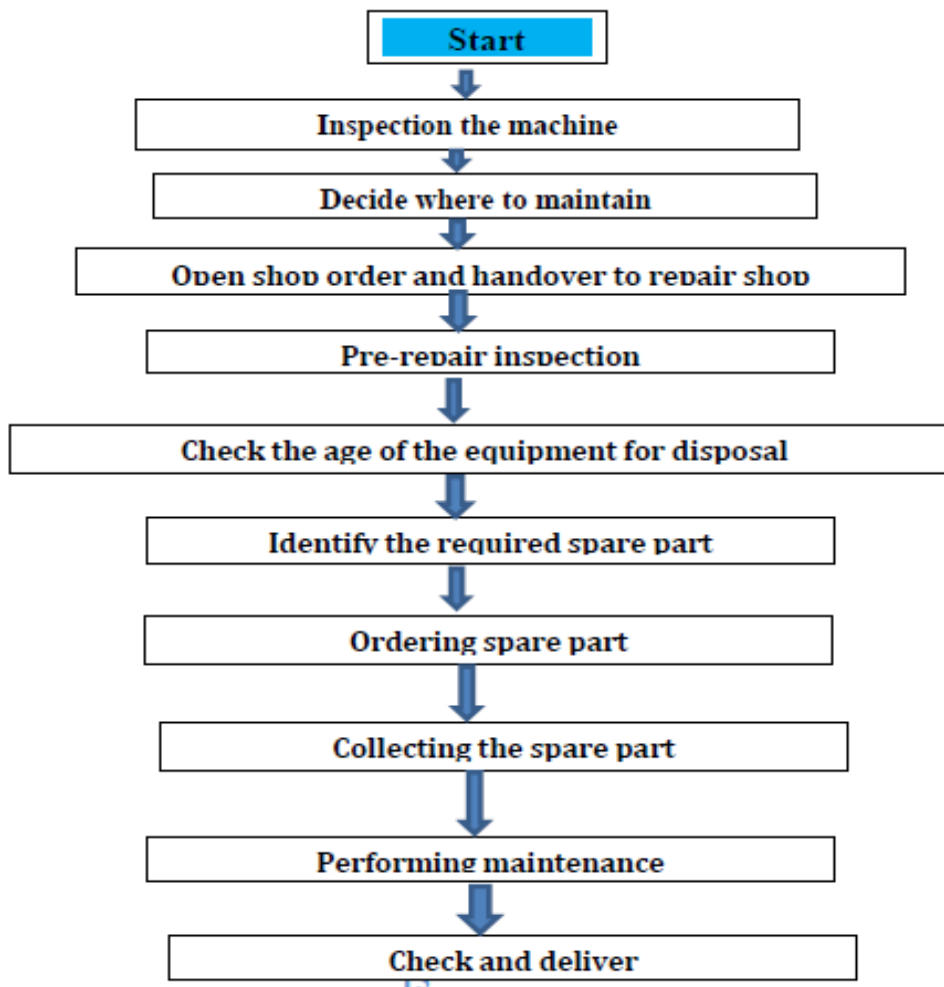


Diagram 3. Flowchart of breakdown maintenance and process

Self-Check -2	Written Test
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**Directions:** Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Mention at the two types of Corrective maintenance (2pts)
2. Which department of maintenance team will prepare annual PM program (2pts)

**Note: Satisfactory rating – 4 points**

**Unsatisfactory - below 4 points**

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

### Answer Sheet

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### Information Sheet 3: Select hand tools

We all know how wonderful it is to have the right tool for the job in bee product processing and storing. You'll find what you need for all aspects of beekeeping and bee product processing and storing here, whether it be tools to help you work extract and process your honey and /or wax efficiently and easily. So it is important to select the appropriate hand tools in any processing, labeling storing and dispatching of the product



Fig 1. Hand tools in beekeeping activity

#### **A Variety of Hammers, Screwdrivers, Wrenches, and Drills**

Some great tools to have in your toolbox for each job site is your basic toolset: hammer, screwdrivers (at least one Phillips head and one flathead), wrenches, and your power tools: drills, nail gun, and impact driver. We have a wide selection of toolsets so that you're ready for every situation.

#### **Tape Measure, Measuring Wheel, Spirit Level, and Laser Level**

These four measuring and leveling tools are super to have in your toolbox. Obviously used for clamps and electrical taking the right measurements, and ensuring that there is nothing crooked on the job site, they're great for every job site! Making sure that you have a measuring tape, levels, and measuring wheel are great ways to make sure your job is done right!

#### **Cutting Tools**

Every job site needs some cutting tools, the best ones to have by default in your toolbox are a utility knife, and a hand saw.



**Fig 2 measuring, cutting, Screwdrivers and Wrenches.**



**Thermometer** -Used to measure body temperature

### 1.1. A screwdriver

Is a tool, manual or powered, for screwing (installing) and unscrewing (removing) screws. A typical simple screwdriver has a handle and a shaft, ending in a tip the user puts into the screw head before turning the handle. The shaft is usually made of tough steel to resist bending or twisting.



**Fig.8. screwdriver**

## 1.2. Pliers

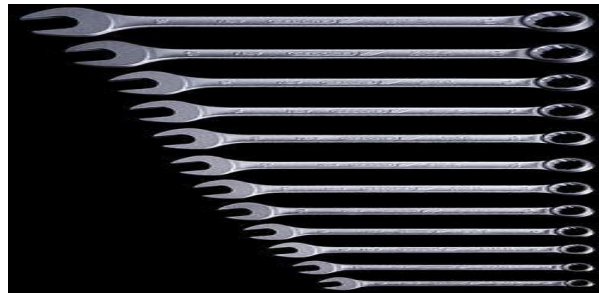
Pliers Is a hand tool used hold objects firmly. They are also useful for bedding and compressing a wide range of materials. Generally, pliers consist of a pair of metal first-class levers joined at a fulcrum positioned closer to one end of the levers, creating short jaws on one side of the fulcrum, and longer handles on the other side. This arrangement creates a mechanical advantage, allowing the force of the hand's grip to be amplified and focused on an object with precision. The jaws can also be used to manipulate objects too small or unwieldy to be manipulated with the fingers.



**Fig.9. Pliers**

## 1.3. wrenches

A wrench or spanner is a tool used to provide grip and mechanical advantage in applying torque to turn objects—usually rotary fasteners, such as nuts and bolts—or keep them from turning.



**Fig. 10. Wrenches**

Self-Check -3	Written Test
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**Directions:** Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Mention at least five different types of tools used in bee product processing (5pts)
2. Which tool is useful for bending and compressing a wide range of materials? (2pts)

**Note: Satisfactory rating – 7 points**

**Unsatisfactory - below 7 points**

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

### Answer Sheet

Score = \_\_\_\_\_

Rating: \_\_\_\_\_

Name: \_\_\_\_\_ Date \_\_\_\_\_

1

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## Information Sheet 4: Check tools before use and report faulty items

### Proper Hand Tool Maintenance

A common process of neglect when it comes to tools is the failure to maintain them. You should clean, inspect, care for, and store your tools properly to ensure that they are able to have a long, useful life. You should have a maintenance routine to ensure that you're giving your tools the love they need. Proper tool care also allows you to save money by preventing you having to replace them frequently.

While checking tools before use it is important to observe their defect. These defective lists are as follows:

- Deformations (for steel-based tools)
- Visual Damage
- Loose components
- Pre-production anomalies

Unsafe or faulty tools and equipment means those that are already breakdown or have defect and requires repair or replacement in order to make safe and risk free working environment for operators. Maintenance management involves 4 simple steps to help you carry out seamless maintenance routines

- Generating a request
- Carrying out maintenance sessions
- Recording information
- Reporting the results

All tools and equipment must be properly maintained so that workers are not endangered.

Keeping records up to date might include modifying particular records by changing information or adding information to them. For example, updating: damaged tools (stock

records) to make sure they match the actual number of tools stock items, technical information to ensure it is current ( daily, weekly or monthly targets, to reflect current)

Documenting your assets is necessary. You need to have an accurate asset count in order to know how many require maintenance. Add asset information like make/model, manufacturer ID, asset specification, and location. It is easy to update prerecorded data, and it also allows you to prioritize maintenance activities.

Self-Check -4	Written Test
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**Directions:** Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What does faulty items means? How can we check tools function? (5pts)

**Note: Satisfactory rating – 7 points**

**Unsatisfactory - below 7 points**

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

### Answer Sheet

Score = _____
Rating: _____

Name: \_\_\_\_\_  
\_\_\_\_\_

Date

**1**

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## Information Sheet 5: Plan and schedule Maintenance

Planned and scheduled or programmed maintenance is conducted to ensure that premises, facilities and equipment are maintained in good working order.

### 5.1. Planned and scheduled /programmed maintenance

Ensure maintenance occurs at the end of the processing period. If this is not practicable, it should take place at a time that reduces the opportunity of contaminating exposed ingredients, packaging and product. This could be at a normal work break during processing.

A delay in completing programmed maintenance is acceptable in some situations (e.g. when parts are not available due to factors outside the operator's control) provided it does not affect product safety and suitability.

### 5.2. General requirements for tools and equipment maintenance

General requirements for equipment maintenance includes:-

- Obtaining a copy of the maintenance schedule recommended by the manufacturer.
- Ensuring that maintenance is performed as required.
- Ensuring that the person(s) performing the maintenance are competent (e.g. licensed mechanic).
- Retaining records of maintenance/service conducted.
- Specifying who is responsible for overseeing equipment maintenance and where the records are kept.
- Set up a system for removal and tagging of damaged or defective tools and equipment.



**On top of programmed maintenance of tools these are some tips and tricks to take better care of your tools.**

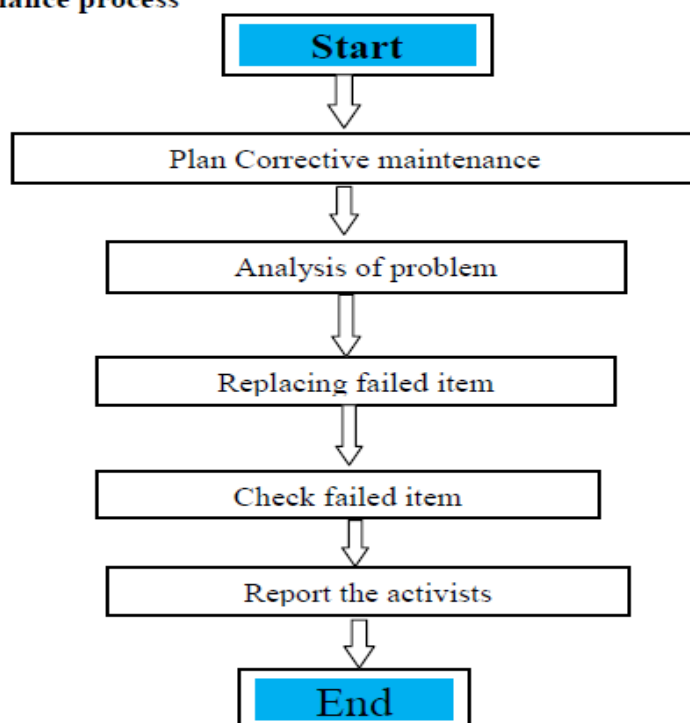
- Store your tools properly
- Only use tools in working order
- Avoid rust tools number one enemy!
- If they need it, repair your tools
- Quality not quantity
- Clean your tools after every use
- Keep some tools handy

### **Corrective maintenance**

The two types of Corrective maintenance are the following:

- **Planned Maintenance** is a scheduled service visit carried out by a competent and suitable agent, to ensure that an item of equipment is operating correctly and avoid any unscheduled breakdown and downtime. It is preplanned, and can be date-based on equipment running hours, or on distance travelled.
- **Unplanned Maintenance** the action which is carried out without any scheduled for thoughts or prior planning called unplanned

### Corrective maintenance process



*Diagram Diagram: Corrective maintenance*

Self-Check -5	Written Test
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**Directions:** Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What are the general requirements for tools and equipment maintenance (5pts)
2. To take better care of your tools mention at least 4 important points.(4pts)

**Note: Satisfactory rating – 9 points**

**Unsatisfactory - below 9 points**

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

### Answer Sheet

Score = \_\_\_\_\_

Rating: \_\_\_\_\_

Name: \_\_\_\_\_ Date \_\_\_\_\_

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## Operation sheet 1 Plan and schedule Maintenance

### Operation title: Corrective maintenance process of equipment/machine

Purpose	To acquire the trainees with Corrective maintenance process of equipment
Equipment ,tools and materials	<ul style="list-style-type: none"> <li>• Pliers, wrenches, screw drives, tester, magnifying material, forceps, winding equipment, lid, log sheet, and all necessary equipments and tools needed for the specified work accordingly</li> </ul>
Conditions or situations for the operations	<ul style="list-style-type: none"> <li>• All tools, equipment's and materials used in bee product processing should be available on time when required.</li> <li>• Store for storage of product, workshop to prepare/ process bee products damaged or maintained equipment and machines.</li> </ul>
Procedures/ steps	<ol style="list-style-type: none"> <li>1. prepare the necessary PPE</li> <li>2. prepare materials and equipments</li> <li>3. observe the equipment/cost of maintenance against the importance and duration of stay</li> <li>4. Plan Corrective maintenance</li> <li>5. Analysis of problem/risks</li> <li>6. Check failed item</li> <li>7. Replacing failed item</li> <li>8. Conduct maintenance</li> <li>9. Report the activists</li> </ol>
Precautions	<ul style="list-style-type: none"> <li>• Do not wear rings, a wristwatch, or a tie when operating electrical power equipment.</li> <li>• Care should be taken while the bee product processing equipment is not clean, free of bee venom</li> <li>• Care for inflammable materials (if wax is heated over required temp., honey is denatured)</li> <li>• Preparing damaged materials, tools and equipment used for bee product processing for corrective maintenance</li> </ul>
Quality criteria	<ul style="list-style-type: none"> <li>• Did personal protective equipment worn while fitting and adjusting bee product processing , packaging labeling and storing</li> <li>• While setting for use re check or inspect the maintained material/ equipment function properly., have no more defect</li> <li>• Quality report</li> </ul>

Operation title	Breakdown maintenance and process of equipment/machin
-----------------	---

<b>Opreation sheet 2 Plan and schedule Maintenance</b>	
Purpose	To acquire the trainees with Breakdown maintenance process of equipment with the team established.
Equipment ,tools and materials	<ul style="list-style-type: none"> <li>• Pliers, wrenches, screwdrives, Tester, magnifying material, forceps, winding equipment, lid, log sheet, and all necessary equipments and tools needed for the specified work accordingly</li> </ul>
Conditions or situations for the operations	<ul style="list-style-type: none"> <li>• All tools, equipment's and materials used in bee product processing should be available on time when required.</li> <li>• Store for storage of product, workshop to prepare/ process bee products damaged or maintained equipment and machines.</li> </ul>
Procedures/ steps	<ol style="list-style-type: none"> <li>1. prepare the necessary ppe</li> <li>2. consider the risks</li> <li>3. inspection the machine</li> <li>4. decide where to maintain</li> <li>5. open shop order and handover to repair shop</li> <li>6. pre-repair inspection</li> <li>7. check the age of the equipment for disposal</li> <li>8. identify the required spare part</li> <li>9. ordering spare part</li> <li>10. collecting the spare part</li> <li>11. performing maintenance</li> <li>12. check and deliver</li> <li>13. reporting and recording of the activity</li> </ol>
Precautions	<ul style="list-style-type: none"> <li>• Do not wear rings, a wristwatch, or a tie when operating electrical power equipment.</li> <li>• Care should be taken while the bee product processing equipment is not clean, free of bee venom</li> <li>• Care for inflammable materials (if wax is heated over required temp., honey is denatured)</li> <li>• Preparing damaged or broken materials, tools and equipment used for bee product processing for break down maintenance</li> </ul>
Quality criteria	<ul style="list-style-type: none"> <li>• Did personal protective equipment worn while fitting and adjusting bee product processing , packaging labeling and storing</li> <li>• While setting for use re check or inspect the maintained material/ equipment function properly., have no more defect</li> </ul>

LAP Test	Practical demonstration
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Name: \_\_\_\_\_ Date: \_\_\_\_\_

Time started: \_\_\_\_\_ Time finished: \_\_\_\_\_

**Instructions:** Given necessary templates, tools and materials you are required to perform the following tasks within 6 hours.

Task 1. Perform Corrective maintenance

Task 2. Perform break down maintenance

**Instruction sheet**

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

- Maintain work place safety procedures
- Carry out routine maintenance on machinery and equipment
- Report workplace information
- Record maintenance activities

This guide will also assist you to attain the learning outcomes stated in the cover page.

Specifically, **upon completion of this learning guide, you will be able to:**

- maintain work place safety procedures
- carry out routine maintenance on machinery and equipment
- report workplace information
- record maintenance activities

**Learning Instructions:**

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
4. Accomplish the “Self-checks” which are placed following all information sheets.
5. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).
6. If you earned a satisfactory evaluation proceed to “Operation sheets
7. Perform “the Learning activity performance test” which is placed following “Operation sheets” ,
8. If your performance is satisfactory proceed to the next learning guide,
9. If your performance is unsatisfactory, see your trainer for further instructions or go back to “Operation sheets” .

## Information Sheet 1- Maintain work place safety procedures

The most important concept to remember is that you are responsible for your own safety and the safety of others. Most safety practices are common sense. Unfortunately, they can be forgotten or overlooked unless you make safe practices a habit or an instinct.

### General Safety

By doing things right, you and your co-workers will commit yourselves to safety on the job and everyone will benefit. Accidents occur in many ways but most often can be traced back to one of two basic factors: ignorance or carelessness. You must always be concerned with your own safety and with the safety of others around you.

The following is a general list of safety precautions you must observe in any work area:

- Don't fool around. "Horseplay" is one of the biggest causes of injuries on the job and it may be grounds for dismissal.
- Never work while under the influence of drugs or alcohol, as you are a hazard to yourself and your co-workers.
- Pay particular attention to moving objects, such as equipment, dollies, mixers, and slicers.
- Walk, do not run, in the work areas.
- Stay completely alert on the job.
- Avoid back strain by lifting properly.

One of the best ways to maintain a safe facility and promote a safe culture is through visual communication. Having visual cues around the facility can be helpful reminders of the safe practices that must be followed. Some ways to do this is to post signs to let workers know when to don PPE, use labels to clearly communicate dangerous equipment, or hang posters reminding workers of safety procedures. Floor marking is another visual tool that can be used in a facility. You could use floor tape to mark off hazardous equipment or lay down industrial floor tape to create lanes for pedestrian and forklift traffic.



Training is also an excellent strategy for maintaining safety in the workplace. Periodic training sessions should be held annually or throughout the year to keep workers up-to-date and refreshed on safety practices and procedures.

### **Easy Workplace Safety Tips**

- Train employees well about safety and activities in maintenance of tools and equipments.
- Reward employees for safe behavior
- Partner with occupational clinicians
- Use labels and signs
- Keep things clean
- Make sure employees have the right tools and have regular equipment inspections.
- Encourage stretch breaks
- Implement safety protocols from the start.

Self-Check -1	Written Test
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**Directions:** Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Mention 5 easy workplace safety tips (5pts)
2. What are the general list of safety precautions you must observe in any work area? (6pts)

**Note: Satisfactory rating - 11 points**

**Unsatisfactory - below 11 points**

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

### Answer Sheet

Score = \_\_\_\_\_

Rating: \_\_\_\_\_

Name: \_\_\_\_\_

Date: \_\_\_\_\_

### Short Answer Questions

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2.

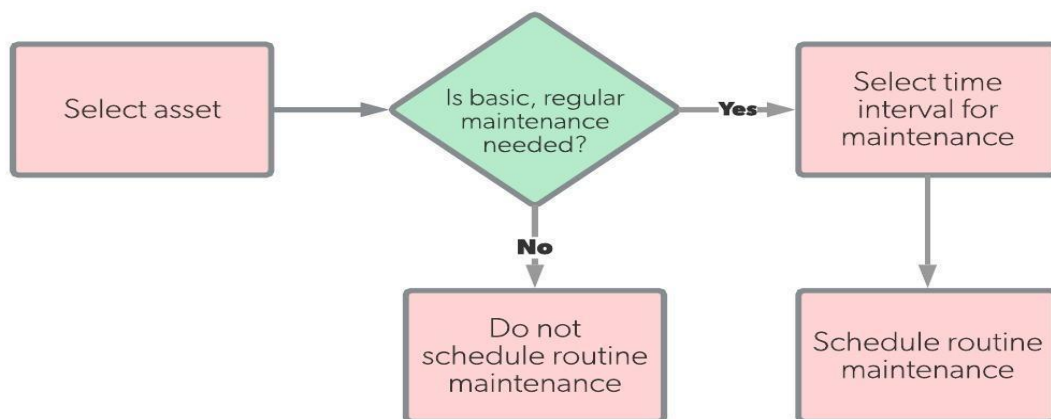
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## What is Routine Maintenance?

### Information Sheet 2 Carry out routine maintenance of machinery and equipment

Routine maintenance is maintenance activities such as regular inspections or machine servicing. Routine maintenance is done on a regular basis, whether that is daily, weekly, monthly, or yearly. Routine maintenance is an important part of keeping systems up to date and functional.

#### Routine maintenance work flow



Routine maintenance tasks are small and simple in nature and only require basic maintenance skills to perform well. They may be completed daily, weekly, monthly, quarterly, or annually. It is a type of preventive maintenance and also a key part of total productive maintenance in which machine operators perform small maintenance tasks to increase the reliability of the machines they use every day.

#### How routine maintenance decreases downtime?

Routine maintenance is designed to keep equipment, machines, and buildings operating optimally. If a particular piece of equipment needs lubrication, it may work at a slower rate and reduce the efficiency of an entire line. If dirt interferes with a certain component, an entire production line can be shut down until the problem is identified. Lubricating and cleaning equipment on a regular schedule prevents such problems.

In addition, routine maintenance can be scheduled on a daily basis, allowing a company to maximize the use of its maintenance resources. For example, if maintenance technicians move from one emergency work order to another, they may have to travel between locations, gather different tools and equipment, or simply switch mental gears from one problem to the next. A maintenance worker performing routine maintenance can clean, inspect, and adjust many items on a single piece of equipment much more quickly.

### **Examples of routine maintenance**

Workers who perform routine maintenance for an apartment complex or other residential building are responsible for cleaning shared areas, inspecting and cleaning units when residents move in or out, or changing filters or other components in the HVAC system.

Routine maintenance in a factory setting involves lubricating, cleaning, and adjusting machines, replacing equipment parts on a schedule, inspecting certain components, or performing conditioned monitoring exercises.

Maintenance technicians who work for a municipality perform routine maintenance throughout a city. This includes trash removal, landscaping, and building walkthroughs to check for busted ballasts and burnt bulbs.

### **Maintenance Procedure:**

In order to maintain any given equipment's one has to know the procedures to be performed during maintenance. The maintenance process involves:-

- Identifying the main parts of machines & equipment's
- Identifying machines & equipment's which need maintenance
- Prepare tools & equipment's needed for maintenance
- Identify OHS , hazards & risks involved during maintenance
- Prepare PPE to avoid or minimize those risks

In order to carry maintenance activities accurate, timely and relevant information about the equipment's & machineries are necessary

## **Benefits of routine maintenance**

Routine maintenance prevents larger problems from occurring. Taking good care of equipment, machines, and facilities extends their overall life as well as keep them performing at their best. Routine maintenance gives technicians an opportunity to regularly “lay their eyes on” important components of a production line or specific system as well as a chance to catch any other potential problems that are lurking.

In addition, most maintenance technicians assigned to perform routine inspections, cleaning, or adjustments are entry-level or relatively new to a particular maintenance department. Routine maintenance is typically simple and straightforward and is an excellent training ground for a new technician to learn about a particular facility, business, or complex.

### **2.1. How to maximize routine maintenance**

Routine maintenance provides an excellent return on investment considering the reduction of emergency work orders, increased efficiency of equipment, and fewer equipment replacement needs.

In order to maximize the benefits of routine maintenance, provide training and education to maintenance technicians about how to clean, inspect, lubricate, service, and adjust equipment, components or systems. Create a comprehensive maintenance checklist for each piece of equipment or machinery that requires routine maintenance, and research the industry standard for lubricating, replacing, or cleaning to ensure the routine maintenance is appropriate.

### **2.2. Types of equipment maintenance systems**

#### **I. Preventive maintenance**

This is the persistent and systematic procedure for the care of all production, control and auxiliary machinery in a livestock factory including regular servicing, upkeep and

overhaul, record keeping and stocking of essential spare parts for the purpose of preventing breakdowns and emergency shut downs for repair.

Preventive maintenance must begin with the purchase of the right type of equipment for any specific job. The machine must always do the job of its right capacity for high durability. If a machine that is of low capacity is consistently being called upon to do a job meant for a high capacity one, no amount of preventive maintenance will cure it!

Preventive maintenance is useful and necessary because it will prevent loss of money and profits due to:

- Unnecessary machinery shut downs
- Shortened machine life
- Machine inefficiency and
- Reduced productivity

The main objective of preventive maintenance is to:

- Increase the efficiency and improve the performance of machines and service equipment
- Increase the overall productivity of the entire plant by achieving coordinated and continuous operation of all plant equipment
- Increase the certainty of meeting daily production schedules
- Reduce unscheduled down time
- Extend the useful life of all plant equipment
- Minimize property and personnel hazards.

## **2.2. Elements of preventive maintenance program me**

A good preventive maintenance (PM) program me must include the following elements:

- Routine external inspection of all machines and equipment
- Periodic internal inspection
- Systematic lubrication
- Prompt adjustment, repair or replacement of defective part(s)

- Record keeping system
- Periodic analysis of system(s) operating parameters
- Spare parts inventory and inventory control
- Scheduled major overhaul of machinery
- Economic basis for scrapping off of equipment
- Maintenance cost analysis and reporting to management
- Capable maintenance supervision

All the above elements are essential for an effective PM programme. None should be overlooked or ignored. From the above, a more comprehensive definition of PM should be:

Preventive Maintenance is a procedure utilising programmed and coordinated lubrication, internal and external inspections, timely adjustments, repairs and replacements performed by skilled and trained personnel under qualified supervision., for the purpose of preventing unscheduled down time, preserving equipment, maximizing overall plant performance, minimizing maintenance costs, and thereby contributing to an improved profit position" (Newcomer, 1981).

### **2.3 . Routine maintenance**

Not dependent on any broken parts or downtime, it includes some necessary activities such as cleaning, lubricating and replacing batteries on small-scale assets or equipment. This is generally performed on a weekly basis.

### **2.4. Economical Maintenance**

The secret of economical upkeep is to train operators to handle the equipment as if it were their own, and to keep a continuous inspection for the small things that go wrong. This should be supplemented by a periodic general inspection. In small plants, it is advisable for each operator to take care of the equipment he/she runs, when minor repairs are needed since there is seldom an engineer around. In large plants, a trained engineer should usually be available for all required repairs.

## **2.5. Common maintenance procedures**

### **2.5.1. Lubrication**

Lack of lubrication is one of the principal causes of machine/equipment breakdown. The best solution is to have a regular lubrication schedule, and perhaps a lubrication chart for each machine, setting the frequency of lubrication, type of lubrication needed, and places to be lubricated. Modern equipment calls for certain types of lubricants for certain types of bearings e.g. light, high speed bearing will require a light oil, whereas a heavy duty, low speed bearing will require heavier oil.

Bearings that are operated at high temperatures must have a lubricant specially adapted for this use, just as those bearings that operate at extremely low temperatures will require zero oil.

Many machine in bee product processing have rather high humidity and for that reason the moisture problem should be considered. Certain lubricants are available that resist rusting and corrosion due to moisture. There are also oils that resist emulsification with water and are advantageous for flooded systems of lubrication where gears and chains run in oil.

The most tightly enclosed oiling system will with time allow moisture to accumulate. It is essential to occasionally check the oil in an enclosed drive to make certain it is not contaminated with water. Usually the water will collect at the bottom and may be drawn off easily.

### **2.5.2. Handling of Lubricants**

In many cases, bearing failures may be traced directly to improper lubrication responsibility and to the handling of lubricants. Some of the factors concerned are:

- Centralised Lubrication Responsibility. Lubrication responsibility should be given to a trained specialist who is fully familiar with the most exact lubricating requirements of the equipment.



- **Planned Lubrication Schedules.** Schedules outlining the type of lubricant to be used and lubrication frequency should be established and followed to the letter.
- **Lubricant identification.** Frequently the product loses its identity after being received by the user and becomes just another barrel of grease. Good housekeeping will assure clean and well marked containers.
- **Accessibility of Lubricating Devices.** Lubrication devices should be placed in accessible locations to ensure safety of the operators and to encourage attention to lubrication.

## **2.6. Indications of Faulty Operations of Anti-friction Bearings**

Faulty anti-friction bearing operation can sometimes be distinguished by abnormal noises. Accurate diagnosis, however, is possible only if the bearing is dismantled and inspected. Some of the defects that cause noisy bearing operations are:

- A scraping noise indicates the presence of foreign bodies e.g. metal chips, dirt or sand.
- A regular grinding noise indicates cracked belts or rollers; and irregular grinding noise may indicate that the bearing cage is rubbing against the inner or outer race.
- A clear, metallic ringing, almost a whistle, indicates lack of lubricant
- A jolting noisy indicates surface crumbling or races and rolling elements out of line. Another cause is hardened deposits on the rolling elements resulting from lubricants of poor quality or improper type.
- Alternatively strong and weak rattling indicates a loose ball or roller or too much play in the bearing cage.
- A regular humming sound indicates that the bearing is in normal operation.

### **2.6.1. Over or under-lubrication**

- Over lubrication causes overheating and waste of lubricant.
- Under lubrication results in excessive wear, overheating due to friction and as a result reduced bearing life.

- It is recommended that a bearing be padded or filled not more than 1/3 or 1/2 full. This will allow the grease, under operating conditions, to expand without building up excessive internal pressure.

### **2.6.2 . Contamination and Corrosion**

The presence of abrasive contaminants such as dirt, dust, metal particles, hardened grease deposits and other foreign materials is probably the principal source of antifriction bearing damage and failure. The other important cause for bearing trouble is corrosion resulting from moisture introduced by handling or by exposure to excessively wet conditions and inadequate sealing.

Grease containers should be kept covered, grease dispensing equipment should be cleaned, grease fittings should be wiped clean before refilling.

### **1.7. Lubrication of Equipment.**

The direction on how to lubricate equipment given by the manufactures should always be followed. Below is given some general facts of how to lubricate and what type of lubricants to use when lubricating the most common types of dairy equipment.

Self-Check -2	Written Test
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**Directions:** Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Indicate the **routine maintenance work flow** (5pts)
2. Write the objective of preventive maintenance. (5pts)

**Note:** Satisfactory rating – 10 points      Unsatisfactory - below 10 points

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

### Answer Sheet

Score = _____
Rating: _____

Name: \_\_\_\_\_ Date \_\_\_\_\_

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### Information Sheet 3: Report workplace information

Instructions and directions provided by supervisor must be followed and if we have any question we can ask when necessary. And also employee must observe and follow maintenance information and procedures in relation to workplace practices in the handling and disposal of materials in conducting routine maintenance of equipment and machineries.

May include but not limited to:

- Standard Operating Procedures (SOPs)
- Manufacturers' specifications
- production log books
- routine maintenance schedules
- manufacturers' advice
- condition monitoring information
- Specifications for tools and equipment
- record keeping

The MSDS is a detailed informational document prepared by the manufacturer or importer of a hazardous chemical. It describes the physical and chemical properties of the product. MSDS's contain useful information such as:

- Flash point
- Toxicity
- Procedures for spills and leaks
- Storage guidelines

SOP is a set of step-by-step instructions compiled by an organization to help workers carryout complex routine operations. SOPs aim to achieve efficiency, quality output and uniformity of performance, while reducing miscommunication and failure to comply with industry regulations

A Work Instruction is a detailed sequence of steps that an employee needs to follow each time she/he performs a task. The purpose of a Work instruction is to organize steps in a logical format so that an employee can easily follow it independently.

It is important for you to follow directions and work instructions provided by your supervisor when you are working. If you don't follow instructions and directions, you will not be successful at your job and you will result in loss of materials and product, customer complaints, or liability issues. You have to listen to your supervisor's verbal or written directions and follow them for your job to be complete.

Self-Check -3	Written Test
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**Directions:** Answer all the questions listed below. Use the Answer sheet provided in the next page:

- List down instructions and directions provided by supervisor to be followed by an expert in poultry raising (5pts)
- Write the useful information contained in material safety data sheet. (5pts)

**Note:** Satisfactory rating – 10 points

Unsatisfactory - below 10 points

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

### Answer Sheet

Score = \_\_\_\_\_

Rating: \_\_\_\_\_

Name: \_\_\_\_\_

Date \_\_\_\_\_

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Maintenance records are written notes that provide documentation about the upkeep of a certain piece of equipment. Many people keep detailed records of personal automobile maintenance, and may also record service performed on home appliances like air conditioning units and back-up generators

For any equipment hire company, your fleet is the lifeblood of your business. Keeping equipment at optimum working condition minimises the risk of having unscheduled downtime. If maintenance is needed, it's important to keep a comprehensive record - whether scheduled or unscheduled - to help you understand the importance of your equipment's upkeep works

**Here we list the benefits of keeping a maintenance record.**

**Prevent expensive repair works from happening**

With constant use, your equipment is prone to wear and tear. Performing routine inspections allow you to see and repair small damages before they become a big problem. Documenting these inspections and small repairs help you keep track of all the maintenance work that your equipment has undertaken, ensuring that each machine is in tip-top shape before putting them to work.

- **Helps you create specialised maintenance programs**

Each equipment go under different working conditions and they have different limitations as well. With the help of routine check-ups, you will be able to determine and record the differences of each individual equipment with regards to maintenance works. In turn, this information will help you in creating maintenance programs specifically catering to each individual equipment on your fleet.

- **Prevent problems regarding warranty claims**

Documenting every repair or maintenance work done on your equipment will help you process warranty claims much easier. Keep a record of the type of maintenance work

done to your equipment as well as the exact time and date repairs were done as this information will help determine your rights for the warranty claims.

- **It increases the safety of operators**

If a piece of plant or equipment is well maintained, the risk of accidents occurring due to malfunctioning machinery is reduced. When incidents involving faulty machinery occur, there's a big chance that the operator is the first one to be affected. Having an equipment's maintenance history documented will help you keep track of your machinery's health. This enables you to schedule an inspection when needed, at the same time it ensures that your equipment are safe to work with.

- **Helps you track who is accountable for a piece of equipment**

One machine might have multiple operators. Performing a routine inspection and documenting the findings after every project will help you track down who is accountable for any damage inflicted on your machinery. Keeping these types of records will also encourage operators to take better care of the equipment.

- **It increases the resale value of the equipment**

Keeping a detailed record of all the maintenance and repairs that a piece of equipment went through will help increase its resale value. Buyers thoroughly assess a piece of equipment before purchasing it, most especially if the machines have already been used. Presenting potential buyers a documentation of your equipment's maintenance history lets them know that the equipment they are planning to buy have been well taken care of.



Self-Check -4	Written Test
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**Directions:** Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What are the benefits of keeping a maintenance record (5pts)

**Note:** Satisfactory rating – 5 points

Unsatisfactory - below 5 points

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

### Answer Sheet

Score = \_\_\_\_\_

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Operation sheet Carry out routine maintenance of machinery and equipment	
Operation title:	Techniques or procedures of using equipment
Purpose	To acquire the trainees with <b>Techniques or procedures of using equipment</b>
Equipment ,tools and materials	<ul style="list-style-type: none"> <li>Honey extractor, honey presser, honey strainer, wax extractor, beekeepers tool, sieve, packaging and labeling materials, glass jars, refractometer, thermometer, and all necessary equipments and tools needed for the specified work</li> </ul>
Conditions or situations for the operations	<ul style="list-style-type: none"> <li>All tools, equipment's and materials used in bee product processing should be available on time when required.</li> <li>Store for storage of product, workshop to prepare/ process bee products.</li> </ul>
Procedures	<ol style="list-style-type: none"> <li>prepare yourself to use equipment</li> <li>Never use any equipment you have not been trained to use.</li> <li>Check all switches to see that they are off before plugging into the outlet.</li> <li>Do not touch the edge of the blade</li> <li>Clean any equipment blade from the center out.</li> <li>Never starts a machine until you are sure all parts are in their proper places</li> <li>When using electrical power equipment; always follow the manufacturer's instructions and recommendations</li> <li>Reporting and recording of using equipment</li> </ol>
Precautions	<ul style="list-style-type: none"> <li>Do not wear rings, a wristwatch, or a tie when operating electrical power equipment.</li> <li>Care should be taken while the bee product processing equipment is not clean, free of bee venom</li> <li>Care for inflammable materials (if wax is heated over required temp., honey is denatured)</li> <li>Preparing materials, tools and equipment used for bee product processing</li> </ul>
<b>Quality/safety criteria</b>	<ul style="list-style-type: none"> <li>Did personal protective equipment worn while fitting and adjusting bee product processing , packaging labeling and storing</li> <li>Did the product after processing is purified to the standard set.</li> <li>Did the honey product is not denatured, wax is purified, have good smell etc</li> </ul>

LAP Test	Practical demonstration
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Name: \_\_\_\_\_ Date: \_\_\_\_\_

Time started: \_\_\_\_\_ Time finished: \_\_\_\_\_

**Instructions:** Given necessary templates, tools and materials you are required to perform the following tasks within 1 hour.

Task : perform techniques/ procedures of using equipment

### Instruction sheet

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

- Inspecting equipment
- store Tools and materials
- Notify relevant personnel
- Maintain housekeeping standards
- Conducting work as workplace environmental guidelines

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, **upon completion of this learning guide, you will be able to:**

- inspect equipment
- store Tools and materials
- notify relevant personnel
- maintain housekeeping standards
- conduct work as workplace environmental guidelines

### Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
4. Accomplish the “Self-checks” which are placed following all information sheets.
5. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).
6. If you earned a satisfactory evaluation proceed to “Operation sheets
7. Perform “the Learning activity performance test” which is placed following “Operation sheets” ,
8. If your performance is satisfactory proceed to the next learning guide,
9. If your performance is unsatisfactory, see your trainer for further instructions or go back to “Operation sheets”.

## Information sheet 1Returning inspections equipment to the operating order

Every inspection must examine who, what, where, when and how. Pay particular attention to items that are or are most likely to develop into unsafe or unhealthy conditions after maintaining the materials because of stress, wear, impact, vibration, heat, corrosion, chemical reaction or misuse can be happened

### 1. Features / functions of system acceptance

Returning is by the screen display and voice confirmation, streamline business processes and acceptance sorting Returns!

Returning can be standardized by the screen display and voice response, a complex work of sorting the returned items. Confirmation by voice input numbers; we achieve accurate inspection results together.



With confirmation screen (see), and the voice confirmation (listen), the precision of the inspection and the assortment and working efficiency are raised. Select multiple items maintained in the same JAN code or part number from the list screen available.

In addition, the integration with inventory management system and the actual data returned goods acceptance, product category by product location management and disposal goods management inspection per month is possible (optional feature).

## 2. Steps in the challenges and solutions(Example)

<b>STEP 1: I want to accept quickly correctly</b>		
	Challenges	Solution
1	I want to assort goods in units (items) quickly and accurately reuse one target product	By checking the sorting acceptance inspection standard (reuse or abandonment subjects) or the quantity of input through “watch” and “listen,” we can do more accurate work
2	I want to complete acceptance of returned goods of the big lot in a short period of time to focus on two cutoff dates	Once the acceptance inspection management is done on Line 1, it is possible that returned products are divided into many acceptance inspection lines/ laboratories by storage number management and their acceptance inspection is done at the same time
<b>STEP 2: Merchandise control optimization of errors</b>		
1	Sometimes, many stock numbers / products are managed by the same JAN code, so we tend to use wrong products sorting methods. Therefore, we need something different way, such that anybody can do acceptance inspection sorting, and management easily.	Master in the registration and management system of accepting the item / product in multiple Part with the same JAN code, check the voice response at the time of acceptance, on the screen can be selected from a list of candidates.
<b>STEP 3: I want to take advantage of advanced</b>		
1	I want to manage the cash fare at the time of return.	We can record fares on delivery by inventory numbers and manage data along with return performances.
2	I want to manage the difference between the quantity of goods	By matching credit voucher input by receipt management unit and collection results, we

	<p>“return” and “loan products”, and the difference between the actual acceptance of the “returned goods” and the quantity of the “credit voucher”.</p>	<p>can detect differences</p>
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Self-Check -1	Written Test
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**Directions:** Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Mention the ways/ processes in which one can sort wrong products after maintenance activity (4pts)
2. How can one assort goods in units (items) quickly and accurately to reuse one target product. (3pts)

**Note: Satisfactory rating – 7 points**

**Unsatisfactory - below 7 points**

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

### Answer Sheet

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## Information Sheet 2 Store Tools and materials

Safe storage of materials and equipment is essential for many businesses, such as construction job sites, laboratories, and other locations that handle chemicals, flammable gases and other hazardous materials. Storage methods and procedures are regulated for many such items; when in doubt it is always best to be cautious to prevent accidents. Locking storage cabinets and restricting access to storage areas will prevent unauthorized handling of stored items and minimize the possibility of theft.

### General plan

Create a plan for storing all equipment and materials at your site. Assign a specific location to each item or type of item and label the space accordingly. Make certain that work areas and walkways are kept clear of all stored items. Use tape or paint to identify such areas on the floor of a large area, such as a manufacturing facility. In an office, laboratory or similar smaller setting, use cabinets with doors that close securely. Always leave at least 1.5 feet between the top of stored items and fire sprinklers, if present. Make sure that all stacks are solid and secure them whenever possible.

### Flammable Materials

Materials that are highly flammable require special handling. Gases such as propane and butane must be kept in pressure-safe containers with appropriate labels. Flammable gases are to be kept in a separate, well-ventilated area. According to the Occupational Safety and Health Association, flammable liquids such as gasoline and kerosene must be stored in approved containers located away from other flammable materials. These can be stored only in a specially constructed room that is able to contain a fire for one to two hours. Keep flammable materials 50 feet away from sources of heat or flame.

### Chemicals and Equipment

All chemicals, including cleaning materials, should be kept in their original containers or in properly labeled containers of an appropriate type. Every workplace that uses chemicals of any type should have a book containing all material data safety sheets,

and the book must be kept where it is easily accessible. Chemicals must be stored where there is no public access and where tipping or breaking can't happen, such as secure shelves inside a locked cupboard. The cupboard must be labeled with the type of materials it contains

## **Machinery and Equipment**

Machinery such as forklifts such must be kept in a safe location where it is protected from unauthorized access, weather and accidental damage. It must be kept away from driveways, walkways and other areas where access is required. All equipment should be turned off when not in use. If there is a chance of oil, hydraulic fluid or other liquids leaking from the vehicle while it is stored, use a drip pan underneath it to catch any spills. Check the area frequently for such leaks and clean them up immediately if any are found, as these represent significant fall hazards for employees.

Self-Check -2	Written Test
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**Directions:** Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Mention where and how tools and equipments can be stored (5pts)

**Note: Satisfactory rating – 5 points**

**Unsatisfactory - below 5 points**

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

### Answer Sheet

Score = \_\_\_\_\_

Rating: \_\_\_\_\_

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## **Maintenance personnel and contractors**

Ensure that maintenance workers, including contractors are:

- Competent to perform the required tasks without disruption by email or on notice board.
- trained to do their job without contaminating product (or if contamination occurs, able to follow appropriate product disposition procedures);
- where possible, to minimise contamination of the surrounding environment; and trained in, and adhere to hygienic requirements.

## **Maintenance Notifications**

Maintenance Notifications (comes under Plant Maintenance) are used in maintenance processing in the event of a malfunction or exceptional situation to:

- Describe the exceptional technical condition at an object
- Request the maintenance department to perform a necessary task
- Document work that has been performed

Maintenance notifications document maintenance tasks completely, and make them available for analysis in the long term. As soon as maintenance work is completed, under the agreement will function as designed and will not fail in any manner whatsoever so as to cause a risk to public safety or private lands, building or structures within the Development Plan or immediately adjacent boundary lands.

## **Maintenance Review – Operations, Regulations & Standards**

This includes topics:

- Components of the maintenance control system, including defect reporting, technical dispatch instructions, service information review processes, service difficulty reporting procedures, maintenance schedules, and evaluation or quality assurance programs

- approved maintenance organizations (AMOs), commercial operator, and private operator variations
- Maintenance regulations and standards

Notify this all to the satisfaction of the Director or to relevant personnel by the Developer at its cost.

Self-Check -3	Written Test
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**Directions:** Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Mention the important topics outlined in maintenance reviews (3pts)
2. Describe the important points that maintenance workers, including contractors ensure during maintenance task (3pts)

**Note: Satisfactory rating – 6 points**

**Unsatisfactory - below 6 points**

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

### Answer Sheet

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## Housekeeping at work

Why should we pay attention to housekeeping at work?

Effective housekeeping can help control or eliminate workplace hazards. Poor housekeeping practices frequently contribute to incidents. If the sight of paper, debris, clutters and spills are accepted as normal, then other more serious hazards may be taken for granted.

Housekeeping is not just cleanliness. It includes keeping work areas neat and orderly, maintaining halls and floors free of slip and trip hazards, and removing of waste materials (e.g., paper, cardboard) and other fire hazards from work areas. It also requires paying attention to important details such as the layout of the whole workplace, aisle marking, the adequacy of storage facilities, and maintenance. Good housekeeping is also a basic part of incident and fire prevention.

Effective housekeeping is an ongoing operation: it is not a one-time or hit-and-miss cleanup done occasionally. Periodic "panic" cleanups are costly and ineffective in reducing incidents.

Effective housekeeping results in:

- reduced handling to ease the flow of materials
- fewer tripping and slipping incidents in clutter-free and spill-free work areas
- decreased fire hazards
- lower worker exposures to hazardous products (e.g. dusts, vapours, )
- better control of tools and materials, including inventory and supplies
- more efficient equipment cleanup and maintenance
- better hygienic conditions leading to improved health
- more effective use of space
- reduced property damage by improving preventive maintenance
- less janitorial work
- improved morale
- improved productivity (tools and materials will be easy to find)
- Regularly inspect, clean and repair all tools. Do not use damaged tools.

OHS said inspections are a vital factor in a successful housekeeping program because they are the only way deficiencies can be discovered and changed.



Self-Check -4	Written Test
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**Directions:** Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What are the effective housekeeping results in (8pts)
2. Why should we pay attention to housekeeping at work? (2pts)

**Note: Satisfactory rating – 10 points      Unsatisfactory - below 10 points**

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

### Answer Sheet

Score = \_\_\_\_\_

Rating: \_\_\_\_\_

Name: \_\_\_\_\_  
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## Information Sheet 5 Conduct work

While conducting work the most important environmental issues in bee product processing activity, follow procedures below to operate safely.

- Procedures for equipment operation
- Procedures for sharp utensils
- Avoid burns
- Keep floors safe
- Handle glassware and china safely
- Store supplies safely
  - ✓ When opening boxes, crates, etc. remove the nails. Do not bend them down.
  - ✓ Always store heavy materials on bottom shelves, medium-weight materials next, and light-weight items on top shelves.
  - ✓ Get rid of all dirt, grease, and trash promptly to reduce fire hazards
  - ✓ Be sure light bulbs are guarded. As a precaution against fire, do not store any materials within 45 cm (18 in.) of any bulb.
- Dispose of refuse properly
  - ✓ Do not allow containers to overflow. Empty them before they are completely full.
  - ✓ Do not stack full refuse containers.
  - ✓ Report broken or defective containers.
- Lifting practices
- Good Housekeeping is important part of safety
- Personal protective equipment(PPE)  
(Clothing, footwear, Hand protection, eye protection, hearing protection, respirators etc)
- Equipment safety
- Ventilation
- **Ventilation systems**

The environment in which you work is very important. The air around you may be filled with smoke and steam. Maintenance area has some type of ventilation equipment

usually areas in the same units as the fire suppression systems. Many other types of ventilation equipment may be found in workplaces. It is important, regardless of where you are working, to become familiar with the ventilation equipment or systems and use them.

- **Emergency shutdown systems**

Many working areas have emergency shutdown systems or “panic buttons.” These are installed so that only one switch has to be thrown to kill the power to a large amount of equipment. These systems are to be used when a person is being electrocuted or is caught in a piece of machinery. Under these circumstances, you do not have time to hunt for and throw the correct switch. Fast action is necessary. Hit the panic button. When you enter the working area for the first time, locate and learn how to use the emergency shutdown.

- **Guards and barriers**

Guards and barriers are used as safety devices on many pieces of equipment used in a working area. Always use them to ensure you are operating the machinery in the safest way possible. Never operate a piece of equipment unless all guards and barriers are in position.

- **Utilities**

Each time you have a new work location, check the location of the shutoffs for all of the utilities. That way you will be prepared for an emergency.

- **Electrical**

You should make yourself aware of the location of the main panel or sub-panels being used, and you should learn how to shut them off in case of an emergency. If you must shut the power off, notify your supervisor right away. Obtain permission from the electrician before using a new service.

Electrical extension cords, if they need to be used, should be orderly and not allowed to become tangled. Such cords should be taped to the floor whenever possible as this will reduce the chance of someone tripping over them

- **Electrical safety**

Even though you may normally deal with low voltages and current, the values are never far away from lethal levels. You can receive a shock or burn from any common electrical circuit.

- **Water supply**

The water may damage material, tools, and equipment or work already done. In addition, water may create an electrical hazard if it comes in contact with electrical panels or outlets. If you must shut the water off, notify your supervisor at once.

- **Gas supply**

Locate the gas shutoff in the working area Escaping gas can cause an explosion that could injure someone or do great damage. When the valve handle is running parallel with the gas line, the supply of gas is flowing and on. By turning the valve handle 90 degrees (that is, perpendicular to the gas line), you can shut off the gas supply. If you must shut off the gas, notify your supervisor immediately. Remember, you must have the gas flowing in order to light the pilot lights on equipment.

- **And other services**

Their services, such as telephone, cable, and Internet, do not usually present any danger to people, and there is no way you can shut them off. If the lines for these services are broken or cut and if they must be located and repaired or moved, get in touch with the company that supplies the service.

Self-Check -5	Written Test
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**Directions:** Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Mention at least 10 environmental procedures followed in bee product processing activity, for safe operation of the activity.(10pts)

**Note: Satisfactory rating – 10 points      Unsatisfactory - below 10 points**

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

### Answer Sheet

Score = \_\_\_\_\_

Rating: \_\_\_\_\_

Name: \_\_\_\_\_ Date \_\_\_\_\_

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Health, Safety and Environment: A Series of Trade Union Education Manuals for Agricultural Workers, Peter Hurst • Peter Kirby

UNL Environmental Health and Safety • (402) 472-4925 • <http://ehs.unl.edu>

## Web sites

<file:///C:/Users/USER/Downloads/workplace%20environmental%20guidelines.html>

<https://bizfluent.com/how-7576502-store-equipment-materials-safely.html>

<https://sielearning.tafensw.edu.au/MCS/9362>

[https://www.ccohs.ca/oshanswers/hsprograms/hazard\\_identification.html](https://www.ccohs.ca/oshanswers/hsprograms/hazard_identification.html)

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