CONFECTIONARY PROCESSING- Level II

Based on May 2019, Version 2 Occupational standards (OS)

Module: Conducting Routine Maintenance

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Contents

LG #23	LO #1 Conduct routine inspection of plant and equipment

Instruction sheet
This learning guide is developed to provide you the necessary information regarding the following content coverage and topics: • Inspecting Equipment • Assessing Nature of maintenance requirement 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 to identify signs of wear. • Assesse Nature of maintenance requirement
• **Learning Instructions:**

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
4. Accomplish the Self-checks
5. Perform Operation Sheets

6 Do the “LAP”.TEST

Information sheet 1	Inspecting Equipment

1.1 Inspecting equipment

In general Maintenance is defined as working on something to keep it in a functioning and safe state and preserving it from failure or decline.

- **Objectives of Maintenance:**

The objective of plant maintenance is to achieve minimum breakdown and to keep the plant in good working condition at the lowest possible cost**.**

A goal of maintenance is to eliminate or to avoid unnecessary or unplanned downtime due to failure.

May include but not limited to:

- Hand sharpening,
- cleaning,
- lubricating/greasing
- dismantling
- Tightening
- Simple tool repairs and adjustments.

1.1.1 Machine maintenance involves regular servicing of equipment, routine checks, repair work, and replacement of worn or nonfunctional parts. ... Maintenance of machinery is frequently handled reactively (e.g. after a breakdown) though it may also be done proactively, as with preventive and predictive maintenance.

Basically there are two types of maintenance:-

- ***Preventive – or proactive*** – maintenance is carried out to keep something functional. This type of activity is usually planned and scheduled.
- ***Corrective – or reactive* – maintenance** is repairing something to get it working again. This is an unscheduled, unplanned task, usually associated with greater hazards and higher risk levels.

1.1.2 Inspections of equipment

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. The need for inspection and inspection frequencies should be determined through risk assessment.

Whether other components of your confectionary system need to be inspected, replaced, or serviced will really depend on your equipment usage. In the confectionary industry, tasks should be based on run-time or observation of problems. For example:

- regularly check,
- Clean and replace hoses as needed. If you remove and clean hoses when debris like straw or manure is observed.

One of the most important inspections is to check the liners on the pulsator to make sure they are operating properly. If the liners fail, you can end up with faulty processing which can quickly add up in a larger processing and cause health problems. Professionals who inspect confectionary equipment regularly find that malfunctions are present in more than half of all service calls, and many of these could have been detected with a quick finger test

1.1.3 Inspection schedules

Confectionary product processing or confectionary products manufacture requires machines and installations by the use of which the raw material is transformed into a

product. Each and every piece of equipment of which the plant is assembled must perform its duty. Achieving the exact performance objectives of the plant as a whole requires maximizing the efficiency of all equipment. The term “efficiency” is used in this context as a comparison between the designed and the actual performance. Should, for instance, the set holding temperature in a pasteurization plant be 72°C (±1°C), the efficiency of the process is determined by checking whether, in the course of pasteurization of the product, any deviation from the wanted temperature levels occurs. In other words determining the efficiency requires collecting data concerning the actual performances and comparing them with those expected.

Any equipment is subjected to wear and tear and its efficiency and performance decrease with time. Keeping the plant performance at the required level is the responsibility of the food engineer and his staff. To fulfill this responsibility he needs to know what the actual performance is. By detecting a drop in performance he can take corrective action. But his first duty is to prevent any drop in efficiency by taking care of the equipment in a rational way or in other words by servicing the machine. This servicing procedure will be structured according to the needs of the plant but it will always be based on

- inspection of performance based on log book entries
- scheduled inspection combined with scheduled servicing at selected points considered crucial for plant efficiency
- Scheduled inspection of all other sections of the plant aiming at detection of faults not detectable by other routine procedures.

The practice of plant performance inspection and servicing of machines should be carried out with sufficient simplicity and thoroughness to yield the best results. The creation of a routine system in this respect is the first step in establishing good habits of proper care of all items of equipment.

It is essential to determine what should be inspected, how often and how to leave out of the procedure any collection of information which does not serve the main purpose. On

the other hand the system must be beared toward prompt discovery of each and every deviation from normal in the plant or in the machine operation and also toward immediate action aiming at corrections at the detected sources of the deviation.

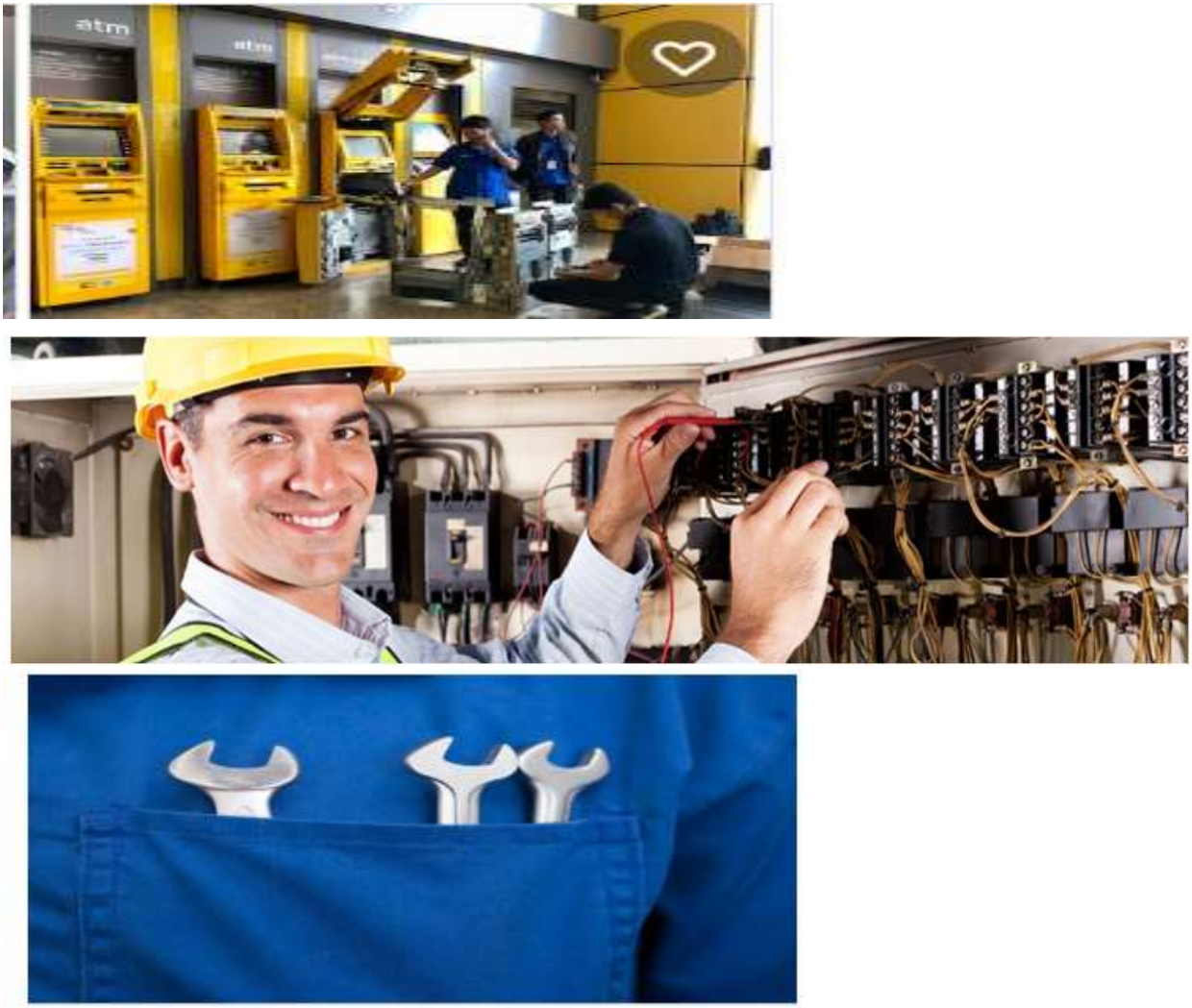

Figure 1.1 routine maintenance tasks for confectionary processing plant.

Keeping the processing area and equipment clean will help extend the life of your assets and reduce costs of corrective chemical usage or emergency repairs.

Be sure your rubber components are smooth and do not ink off and that no holes exist in air tubes and liners as this can signal a potential leak or quality issue.

During daily routine washing, you can easily observe your equipment to look for leaks and ensure that the water flows well through the entire system. At this point, you may be able to see that gaskets need to be replaced or leaks need to be repaired before these issues affect your product quality.

Self-check 1	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Choose the best answer (3 point)

1. Machine maintenance involves

A. regular servicing of equipment B. routine checks C, repair work d) all of the above

Test II: Short Answer Questions

1. What is Maintenance_____ (4 point)
2. Write down objectives of Maintenance?_____(4 point)
3. Write down types and its function of maintenance? _____(4 points)
4. Define Inspections of equipment _____ (5point)

Satisfactory rating ≥10 unsatisfactory rating≤10

Information Sheet 2	Assessing nature of maintenance requirement

2.1 Assessing nature of maintenance requirement

All maintenance operations included in the plant should fulfill the following three requirements: applicability, efficiency and profitability.
An operation is applicable if it can be implemented; it is efficient if it significantly reduces failure rate and it is profitable if it improves production.

- **Maintenance features**

Maintenance requirements fall into the following categories.

1. Operational checks to simulate automatic start-up, shut-down and emergency shutdown.

2. Inspection and maintenance.

- Drive train.
- Rotor, including tip flaps.
- Hardware control systems.
- Hydraulics.
- Electrical control signals and power system.
- Braking system.
- Tower.

2.1.1 Maintenance requirement determination

The development of maintenance policy for technical equipment involves the systematic application of a set of defined processes. These processes are collectively referred to as maintenance requirement determination.

The MRD (maintenance requirements determination) process involves:

- **Functional analysis**. This form of analysis is based on the definition of system operational requirements and the system or equipment maintenance concept and is used as the basis of detailed design. MRD requires the results of functional analysis in order to identify failure modes, causes and effects, and associated criticality using failure modes, effect and criticality analysis .

- **Maintenance determination**. Once the failure modes and the effect of failure have been determined, they are used as inputs for determining the corrective and preventative maintenance requirements.

    - The corrective maintenance determination is focused on identifying the necessary repair actions required to return an item to serviceability.
    - The preventative maintenance outcome is identified by the application of reliability centered maintenance (RCM)-based methodologies.

- **Maintenance task analysis (MTA)**. After identifying the corrective and preventative maintenance requirements, the logistics resources necessary to support these requirements must be identified through the process of MTA. MTA will identify resources; for example:

    - Repairable and breakdown spares.

- Trade skills and training.
- Packaging handling and transport.
- Procedures required performing the task.
- Facilities.
- Support and test equipment.

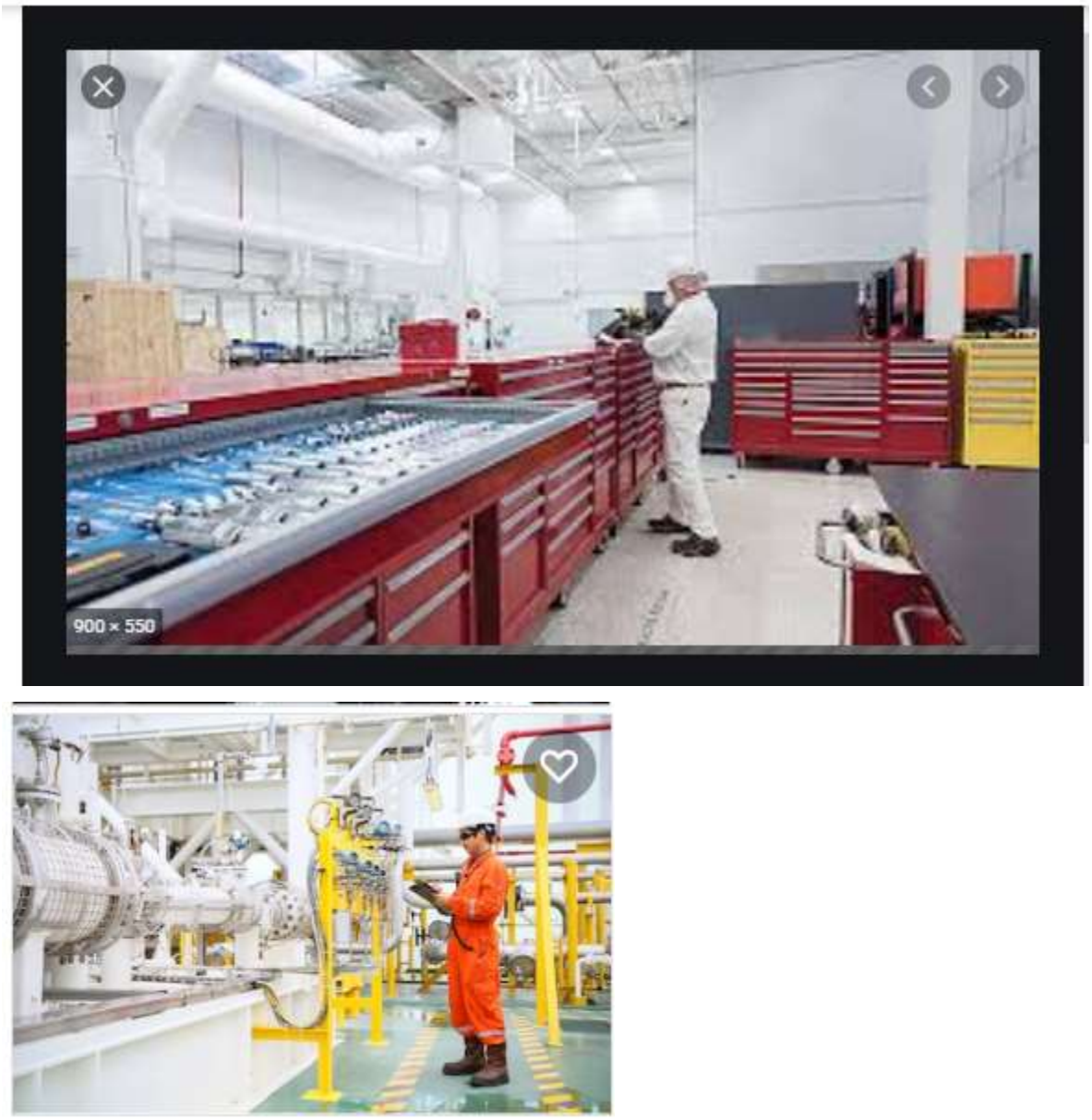

Figure 1.2 routine maintenance tasks on confectionary industry

Figure 1.3 routine maintenance tasks on confectionary equipment

Self-check 2	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

I Say true or false the following question: (1point)

1 Maintenance is needed annually for machinery equipment's

Test I: Short Answer Questions

1) Write two category of Maintenance requirements_____ (4 point)
2) The development of maintenance policy for technical equipment involves the systematic application of a set of defined processes is called?_____(5 point)
3) What does mean Functional analysis? _____(5 points)
4) What does mean Maintenance task analysis _____ (5point)
5) What are three requirements in maintenance operation _____ (5 point)

Note: Satisfactory rating ≥12.5points unsatisfactory ≤12.5 points

LG #24	LO #2 Prepare to conduct routine maintenance

Instruction sheet

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

- Assessing Maintenance task.
- Preparing Equipment for maintenance.
- Selecting Hand tools.
- Checking Tools before use and reporting unsafe and/or faulty items
- Planning and scheduling 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.
- Prepare Equipment for maintenance.
- Select Hand tools.
- Check Tools before use and report unsafe and/or faulty items
- Plan and schedule Maintenance.
- **Learning instruction**

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
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6. Do the “LAP”.TEST

Information Sheet 1	Assessing Maintenance task.

1.1 Assessing Maintenance task.

Maintenance tasks indicate which action or set of actions ,a maintenance technician is supposed to perform a work order.

1.1.1 Types of Maintenance Tasks

Different maintenance tasks are assigned based on the type of equipment that needs maintenance. For instance, an asset that’s not critical to operations might be assigned a discard task while an asset that’s critical to operations might be assigned a restoration task.

However, not every task type is as cut and dry. For instance, an inspection or failure finding task may be assigned in an environment that embraces a proactive maintenance approach. For these tasks, technicians run through a maintenance checklist and need to look for subtleties in the equipment’s operational state. After this, they determine if a follow-up task (i.e. work order) is needed.

These are just a handful of different maintenance tasks that have been formalized across several industries, but other tasks types can be created based on an organization's unique needs.

- **Failure finding task**

Failure finding tasks, used in reliability-centered maintenance, reveal hidden failures or potential failures. A failure finding task is part of a comprehensive routine maintenance program. It affects the components of a system that are not readily seen during a routine inspection or addressed during preventive maintenance work. They usually have a protective function in the overall system and can make up 40 percent of failure modes.

- **Inspection task**

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.

- **Scheduled discard task**

A scheduled discard task involves replacing a specific part or component of a piece of equipment at regular time intervals, regardless of its performance quality. Manufacturing companies or other businesses that run production lines will schedule discard tasks on key pieces of equipment and machines.

- **Scheduled restoration task**

A scheduled restoration task is a complete overhaul of machinery or equipment that is performed on a predetermined schedule regardless of the condition of the equipment. They are designed to bring piece of equipment or machinery back to its original

operating condition. Unlike routine maintenance tasks, they are not focused on repair, inspection, or cleaning to simply keep things running and in good working order.

- **1.1.2 Maintenance assessment process**

The Maintenance Assessment Process 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.

Prior to the maintenance assessment process a list of documents is sent to your management team to prepare for the assessment. This allows both sides to prepare for the most effective site visit. A schedule will be established for interviews and observations.

The on-site maintenance assessment process consists of a review of maintenance programs and maintenance record-keeping by a team of two assessors using a three-pronged approach:

1. Interviews are held with facility managers, maintenance managers, planners and schedulers, technicians, and other appropriate personnel. The interviews are structured and linked to the assessment scoring criteria. During the interviews, the interviewer may request to see additional documents, examples of programs or processes, etc.
2. Performance of maintenance will be observed from planning, staging, shift meetings, and actual performance of preventive/predictive maintenance tasks.
3. Observations of equipment condition will be noted as well as the condition of shops and storerooms.
4. Data and technical information collected during the visit will be evaluated for process adherence and completeness

Fig 1.4 Electric motor pump

1.1.3 Common maintenance procedures

- **Lubrication**

Lack of lubrication is one of the principal causes of 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.

- **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 confectionary equipment.

- **Motors**. How to lubricate motors will depend on what type of bearings is used. Sleeve type bearing are usually lubricated with oil fed by a ring oiler, or if a it is small motors by felt wick. The type of oil used for these barings are oil with viscosity of 300-500 seconds at 100° F. For anti-friction bearings a multipurpose grease of medium consistency is recommendable

- **Speed Reducers.** Reducing gears and their bearings are almost invariably enclosed in oil tight housing, which has filling level testing and drain plugs. Well-refined oils containing an oxidation inhibitor provide the best results. Depending upon gear types and other design and operating factors, the oil used can have a viscosity of 300-2000 seconds at 100°F; it should as well be rust-inhibited and foam inhibited.
- **Conveyors**. All bearings should, if the design permits, be lubricated with a water repellent grease, as forcing grease into bearings forces dirt out and provides a seal against the entrance of all kind of foreign materials. If the bearings have to be lubricated by oil, oil of a rust-inhibiting type with a viscosity of 300 seconds at 100°F should be used. The chains are often lubricated by soap-water solution.
- **Air compressors and vacuum pumps**. The viscosity of the oil used for both vacuum pumps and air compressors affect the operating efficiency very much. If oil with too low viscosity is used it will pass the rings, and the result will be increased oil consumption and inefficient pump operation. It should be kept in mind that compressor oils should march the pressure and temperature conditions. The type of oil used should be rust and oxidation inhibited, non-foaming and have a viscosity of 300 seconds at 100° F.

Self-check 1	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

I say true or false the following question:

1. The viscosity of the oil used for both vacuum pumps and air compressors affect the operating efficiency very much. (1point)

Test II: Short Answer Questions.

1) What is Maintenance tasks_____ (3 point)
2) Write down types Maintenance tasks?_____(4 point)
3) Tasks used in reliability-centered maintenance, reveal hidden failures or potential failures is called_____ tasks (4 points)
4) _____is an evaluation of the current state of the maintenance function of a corporation, company, or facility (5point)
5) _____Are designed to bring piece of equipment or machinery back to its original operating condition. (3 point)

Note: Satisfactory rating ≥10 points unsatisfactory ≤ 10 points

Information Sheet 2	Preparing Equipment for maintenance.

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2.1 Preparing Equipment for maintenance

Proper maintenance is critical to personnel safety, smooth equipment operation and lasting performance. A production system or individual piece of equipment requires regular maintenance to help promote equipment safety, provide an optimum end product and to prevent costly down time. Failure to practice proper maintenance procedures as noted in the equipment manual can lead to unsafe conditions and shorten the life of the equipment operation tools, parts, materials and procedures.

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❖ **Maintenance Recommendations**

General maintenance recommendations are given below.

- Prior to any maintenance procedure, turn the equipment OFF and disconnect all power sources. Follow the lockout/tag out procedure. Failure to follow this warning could result in death or severe personal injury.
- Production systems are dangerous during operation. Death or severe personal injury may result if warnings are disregarded. When working on or around all equipment, avoid the use of loose clothing, jewellery or any loose articles that may be caught in moving parts. Keep all extremities away from moving parts. Never operate any equipment while other persons are cleaning, servicing, or performing maintenance.
- Wear personal protective equipment (safety garments, safety glasses, gloves, etc.) appropriate for the maintenance process to be performed.
- If you suspect faulty or damaged equipment, remove it from service and have it repaired or replaced by authorized personnel. Never allow equipment that is faulty or damaged to be operated.

- Maintain all safety devices, including switches, sensors and guards, for personnel safety. Ensure that these items are in proper working order prior to operation.

2.1.1 Maintenance of basic equipment

The maintenance section must therefore include immediate repair facilities covering a wider range of skills and resources than otherwise would be necessary for routine preventive maintenance .Breakdowns inevitably mean loss of product and therefore income. Substantial wastage may result, and if the breakdown cannot be rectified within a few hours the following day's operations are jeopardized.

The type of equipment's preparing for maintenance may include but not limited to

- a limited range of hand tools,
- spanners
- screwdrivers
- grease guns,
- Allen keys
- measuring and alignment equipment
- lubricants and consumables for video inkjet printers

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Self-check 2	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Choose the best answer (3 point)

1. Proper maintenance is critical to

A) personnel safety B. smooth equipment operation C. lasting performance d) all of the above

Test II: Short Answer Questions

1) The primary objective of a planned maintenance system is to_____(4 point)
2) Write down at least three maintenance recommendations?_____(4 point)
3) Write down type of equipment's preparing for maintenance? _____(4 point)

Note: Satisfactory rating - ≥7.5 point's unsatisfactory ≤7.5 points

Information Sheet 3	Selecting Hand tools.

3.1 Selecting Hand tools

Technicians that will conduct a maintenance activity should analyze which tools and equipment requires for the right maintenance activity. Inappropriate selection of tools and equipment will be as a source of workplace hazards..

Use of equipment and tools such as:

- ❖ hand tools
- ❖ specialized tools
- ❖ Measuring and aligning equipment

The safe and correct use of specific hand tools and their function

Some examples of maintenance tools are listed below

- **Pipe wrench**

- **How is it used?**

Used to tighten and loosen pipe couplings. It is also used to grip round edges to enable other turning/loosening/tightening actions.

- **Spanners sizes 6-24**

- **How is it used?**

Various bolts can be fastened or loosened using the spanner of the correct size

- **Screw drivers**

- **How is it used?**

Tighten or loosen screws of different sizes. Flat ended screwdrivers are used to tighten or loosen flat head screws, whilst Philips screwdrivers (“star”) are used for star head screws. Some screwdrivers are magnetic and will hold the screw to the tip of the screwdriver.

- **Shifting spanner**

How is it used?

Has a similar function to regular spanners but provides option of using only on bolts of varying sizes. This means you do not have to transport a range of sizes.

- **Wire cutters**

- **How is it used?**

Cutting wire and stripping outer coatings off electrical cable.

- **Pliers**

How is it used?

Pliers are used for various purposes, including:

- Tightening wire.
- Fixing wire.
- Gripping bolts to tighten with a spanner.

Selected pliers are equipped with wire stripping edges and can strip the outer insulating layer off electrical cord.

All tools can be handled correctly which enhances the functionality and safety of tools. Incorrect use impairs functionality, is detrimental to the tool and may be dangerous to the user and or other people.

Self-check 3	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

I Say true or false the following question:

1 All tools can be handled correctly which enhances the functionality and safety of tools.(1point)

Test II: Short Answer Questions

1) Write down Use of equipment and tools for maintenance_____ (3 point)

2) Write down at least three examples of maintenance hand tools?_____(4 point)

3) _____Is used to grip round edges to enable other (4 point)

4) _____Turning/loosening/tightening actions. (4 point)

5) _____Cutting wire and stripping outer coatings off electrical cable. (4 point)

Note: Satisfactory rating ≥10 points unsatisfactory ≤ 10points

Information Sheet 4	Checking Tools before use and reporting unsafe and/or faulty items

4.1 Checking Tools before use and reporting unsafe and/or faulty items

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.

An inspection should concentrate on those safety-related parts which are necessary for the safe operation of work equipment and, in some cases; this may require testing or dismantling. However, not all safety-critical features on a particular item of work equipment may require inspection at the same intervals.

To ensure safe use of hand tools, remember:

- never use a defective tool
- double check all tools prior to use
- ensure defective tools are repaired

Defective tools can cause serious and painful injuries. If a tool is defective in some way, don't use it.

Be aware of problems like:

- chisels and wedges with mushroomed heads
- split or cracked handles
- chipped or broken drill bits
- wrenches with worn out jaws
- tools which are not complete, such as files without handles

An inspection can vary in its extent, as the following demonstrate:

- quick checks before use (eg electric cable condition on hand-held power tools, functional testing of brakes, lights on mobile machinery)
- weekly checks (eg presence of guarding, function of safety devices, tyre pressures, and the condition of windows, mirrors and CCTV on mobile plant)
- more extensive examinations, undertaken every few months or longer (eg general condition of a ladder, close examination of a safety harness, portable appliance testing)

What to check for to reduce the risk of these injuries:

4.1.1 Checking hand tools

- **Screwdrivers**

- Handles are tight in the shank, clean, not worn or cracked and do not show signs that the screwdrivers were used as a chisel or as a punch.
- If they are electrically insulated, insulation has not been compromised, exposing the underlying metal shank.
- The shanks are straight and do not show signs the screwdrivers were used as a pry bar or submitted to extra turning power.
- The tips of the blades in slotted screwdrivers show a straight edge.
- The tips of Phillips screwdrivers have the star configuration well defined.

- **Hammers & mallets**

- No tape is wrapped around the handles.
- All handles do not show slivers or any cracks.
- The handles, if not integral, are firmly and correctly attached to the head of the hammers.
- The heads are not damaged and the faces are not mushroomed.

- **Wrenches**

- SAE and/or metric systems wrenches are available as necessary.
- Larger wrenches or commercial handle extenders in case that a superior amount of torque is necessary during the operations are available.
- If hand and power wrenches are used, check that the sockets of one are not used in the other.
- Adjustable wrenches are not being permanently used in place of fixed opening wrenches.
- The jaws of pipe wrenches are not worn to the point of not providing the necessary grip against a pipe.
- Wrenches do not present deformations caused by being abused.

- **Saws**

- The handles are firmly attached to the blades or to the frames.
- Blades are tightly attached and not dull or damaged.
- The orientation of the teeth – hacksaws usually have the teeth pointing forward, thus cutting during the “push stroke”.

- **Pliers**

- Pivot points and/or joints are firm.
- If a plier is electrically insulated, check that the insulation has not been compromised, exposing the underlying conductive material.

- Pliers are not being abused. e.g.: hammering the jaws to cut a wire or bolt.

▪ *Files & wood rasps*

- Teeth are of equal height and not dull.
- Handles, if non-integral, are firmly attached to the tang.
- Files do not present any abnormality in their shapes and surfaces which could indicate that they were used as a pry bar or hammer.
- Files are dry and there is no foreign material stuck in between the teeth.
- A file card / brush is available for cleaning the grooves.

▪ Clamps

- Only specialized lifting clamps are used to hoist objects.
- Clamps are not used to permanently hold objects in place.
- The frames and/or the spindles are not bent.
- Their moving parts are clean and oiled.
- If present, the swivel is turning free.

▪ Chisels

- Handles are firmly attached to the tang and not cracked if made of wood.
- No mushroomed heads.
- The cutting edges are sharp.

▪ Utility knives

- Utility knives not in use have their blade retracted.
- Handles are not damaged.
- The blades are not dull and their tips are not damaged.

▪ Checking power tools

- When not in use they should be disconnected from the energy source and properly stored.
- They do not show signs of being operated outside their designed specifications.
- The tools, besides being visually inspected, should also be briefly turned on in order to check for abnormal noises, mal function of switches, etc.
    - **If electric driven, check the following:**

- Electrical cords are in good condition and have a three-pronged plug or are double insulated.
- The cordless tools have compatible rechargeable batteries and chargers in good condition.

- **If pneumatic driven, check the following:**

- That the compressed air supply is adequate to the ratings of the various tools operated by the end users.
- Hoses do not present damage or splices; their pressure ratings and diameters are adequate.
- When using quick disconnect type fittings, the male end is installed on the tool.
- Radiator hose clamps are not used to secure air hoses to fittings.

- **If hydraulic driven, check the following:**

- Warning signs: maximum pressures, working loads, etc. are conspicuously displayed and easy to read.
- Hoses, couplings, fittings and valves follow manufacturer's specifications and do not present any sign of damage.
- Operators are aware of the possible existence of "residual energy" even after the equipment has been shut down.

- **Before you report a defective/faulty item:**

it will help in processing and investigating your concerns if you can also provide the following information:

- reasons you consider the faulty item to be defective
- details of any injuries or harm resulting from the defect
- a description of the defect with, where relevant, measurements (such as gaps in safeguards and the distance through such gaps to parts giving rise to danger)
- photographs of the faulty item and the defect, if available
- details of the other markings / information on the faulty item or accompanying documentation (eg type, serial number, date of manufacture)
- full contact details of the manufacturer, any supplier(s) and date of supply
- extracts from the user instructions which deal with health and safety
- details of any examinations or tests undertaken

The information on the unsafe/faulty items reports includes the following:

- faulty items Number
- Type of faulty items
- Date / Time / Location of items
- Date and Time Reported
- Name / Address / Phone Number of Person Reporting items
- Time Taken to Investigate
- Officer(s) Investigating faulty items
- Details of faulty on tools
- Follow-up Required
- Distribution of Report

Self-check 4	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Choose the best answer (3 point)

1. To ensure safe use of hand tools, point of consideration.

A) Never use a defective tool B) double check all tools prior to use C) ensure defective tools are repaired D) all of the above

Test II: Short Answer Questions

1) Write down the purpose of inspection_____ (4 point)
2) Write down inspectional variation in its extent?_____(4 point)
3) Write down at least four hand tools? _____(4 points)
4) Write down the information on the unsafe/faulty items reports _____(5point)

Note: Satisfactory rating - ≥10 points Unsatisfactory - ≤10points

Information Sheet 5	Planning and scheduling Maintenance.

6.1 Planning and scheduling Maintenance

- Maintenance workshops shall be separate and away from production areas. Whenever spares, changed parts and tools are stored in the production area, these shall be kept in dedicated rooms or lockers. Tools and spare parts, for the manufacture of products which are susceptible to microbial contamination, shall be disinfected before these are carried inside the production areas.

❖ **Maintenance planning**: - Can be defined as the process used to develop a course of action. Effective maintenance planning involves the development of a course of action that includes all maintenance, repair, and construction work.

During maintenance schedule consider the following points:

- Preventive maintenance of equipment and machinery shall be carried out regularly as per the instructions of the manufacturer.
- The preventive maintenance programme shall include all devices used to monitor and/or control food safety hazards and cover the maintenance procedure, frequency and identification of the person (and/ or external agency) responsible for maintenance activity.
- Internal & External calibration schedule for critical food safety equipment shall be maintained.
- Corrective maintenance shall be carried out in such a way that production on adjoining lines or equipment is not at risk of contamination and post maintenance verification shall be done.

- Temporary fixes that put product safety at risk shall be removed / permanently fixed in a timely manner.
- Lubricants, heat transfer fluids or any other similar material shall be food grade where there is no risk of direct or indirect contact with the product.
- Plant equipment's breakdown records shall be maintained.
- Loose items control policy (Nut & bolts, Nails broken pieces or smaller parts of machines) shall be followed to prevent any contamination with product or packaging material.

Corrective/ Break-down maintenance	Preventive maintenance	Predictive maintenance
Maintenance of equipment after equipment break down or malfunction is often most Expensive	Maintenance performed with the intent of avoiding failures, safety violations, unnecessary production losses, and to conserve original materials of fabrication	Advances in sensing and computing technology have given rise to 'predictive maintenance'
The worn out equipment part can damage other parts and lead to multiple damage and increase repair/replacement costs.	The effectiveness of a preventive maintenance schedule depends on the Root Cause Analysis	It uses sensors to monitor key parameters within a machine or system and uses this data in conjunction with analysed historical trends to continuously evaluate the system health and predict a breakdown before it happens e.g. on-line monitoring of bowl speed, motor current, flow-rate etc. during operation of Clarifier / Cream separator / Bacteria removing clarifier.
Higher Machine downtime and Production loss	The history sheet maintained also helps in early detection of problems and increased equipment life.	The continuous temperature monitoring of say bearings or internal motor / transformer windings would enable the operator to take appropriate action even before the equipment is due for preventive maintenance.

6.1.1 Schedule of Plant Maintenance:

Maintenance scheduling follows a similar procedure to that outlined for production. It is required to know that how long a job will take, when it should be done and if resources are available.

❖ ***Scheduling principles of maintenance***

- System should be clear, precise and easy to operate,
- Should be based upon accurately determined time standards,
- Should be finalized in consultation with production department so that the equipment for maintenance purposes can be spared,
- Should aim at creating a balanced work load on each trade section in the department, that is, each section should be evenly loaded.

❖ **Maintenance schedule time should:**

- Be such that, the maintenance work can be carried out during lunch hours, between shifts or at weekends etc.,
- Take advantage of planned machine stoppages such as tool changes, loading and unloading of job etc.,
- Plan major repairs and overhauls during holidays,
- Make use of reserve plant if the need arises

Scheduling means determining calendar inspection dates that will fulfill the frequency requirements in the most efficient way.

EQUIPMENT DETAILS.

Equipment: Fountain.

Capacity:

Location:

Make & Model:

Task Description	D	W	2W	M	3M	6M	A	Notes.	Annual Item
Check pump operation control and terminals		X							
Clean filter			X						
Check for any leak if necessary replace valves and fittings					X				
Check and grease pump bearing							X		
Clean inside pump casing							X		
Clean paint piping							X		

Notes :

(1) Use additional sheets if required.
(2) P.P.M. routines based on complete running hour where recommended by the Manufacturer

Self-check 5	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

I Say true or false the following question .(1point)

1 Maintenance scheduling follows a similar procedure to that outlined for production.

Test II: Short Answer Questions

1) What is maintenance planning _____ (3 point)
2) What is maintenance scheduling?_____(3 point)
3) Write down types of maintenance? _____(4 points)
4) write down benefits of preventive maintenance _____ (4point)

Note: Satisfactory rating – ≥7.5 points Unsatisfactory≤10 points

LG #25	LO #3 Carry out routine maintenance

Instruction sheet
This learning guide is developed to provide you the necessary information regarding the following content coverage and topics: • Carrying out Routine maintenance on equipment. • Reporting 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: • Carry out Routine maintenance on equipment. • Report 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 4. Accomplish the Self-checks 5. Perform Operation Sheets **6.** Do the “LAP”.TEST

Information Sheet 1	Carrying out Routine maintenance on equipment.

1.1 Carrying out Routine maintenance on equipment

Routine maintenance tasks for the confectionary industry include system awareness and adjusting equipment according to manufacturers' recommendations. It's important to ensure your core system works well, has regular inspections, and receives needed maintenance.

- **Routine maintenance: -** Routine maintenance tasks refer to on-going, scheduled tasks that are performed in order to keep hand tools and basic equipment functioning properly. It could include tasks such as unblocking pipes and nozzles, sharpening blunt tools, cleaning nozzles on sprayers, checking water and oil levels in machinery, cables and plugs.

1.1.1 Some tips on routine maintenance, we have to follows

- Use the correct tool for the job
- Keep tools in good condition
- Handles should be tight and free from defect
- Cutting tools should be kept sharp
- Wedges and punches should be free from "mushroom heads"
- Use and maintain power tools according to their operator instructions
- Make sure power tools are properly grounded or are double insulated
- Switch off and unplug power tools before changing blades or servicing and repairing
- Wear clothing that is free of strings or loose ends that could catch.
- Wear appropriate personal protective equipment (PPE), such as glasses, goggles, dust masks, face shields, hearing protection, etc.

- Keep by standers at a safe distance
- Keep all guards and shields in place
- Unplug and store tools after use
- Consider keeping power tools locked up to prevent unauthorized use

1.1.2 Typical examples of routine maintenance include:

- Lubricating, cleaning, or adjusting machinery.
- Inspecting equipment to ensure proper operation and safety.
- Replacing parts that show deterioration.
- Checking, testing, and maintaining safety equipment, such as safety barriers, fire extinguishers, or alarm systems.

❖ **Preventive maintenance**

1. Principles

The determination of plant efficiency at all essential points of the process is the first step in creating a preventive maintenance system which is fundamental to achieving optimal performance in any milk plant.

The precise meaning of the term “preventive maintenance” depends on the concept of the organization of the plant, of its capacity and processing and manufacturing programme as well as on the availability of, and accessibility to specialized services of machinery manufacturers.

The obvious benefits of preventive maintenance include:

1. Less production interruptions
2. Fewer large-scale repairs
3. Less raw material and product spoilage
4. Increased life expectancy of equipment

5. Less standby equipment needed
6. Identification of items with high maintenance costs leading to investigation and correction of causes, such as misapplications, operator abuse or obsolescence
7. Better spare parts control, greater work safety and lower manufacturing costs.

❖Routine maintenance tasks

A check list we should have to follow for routine maintenance

- Complete a visual inspection:

Tool:	YES	NO
1. Are tools in safe condition?		
2. Are instruction manuals available?		
3. Are power tools properly grounded?		
4. Are guards and shields in place?		
5. Is Personal Protective Equipment available?		
6. Are tools properly stored?		

Fig 1.5 conducting scheduled routine maintenance in chocolate processing plant.

These benefits are the objectives of preventive maintenance. Although the objectives and principles of preventive maintenance programmes (PMP) are the same for any processing industry and for any plant within an industry, the actual programme of preventive maintenance procedures is an adaption of general rules to the needs of a given plant.

Since there are no identical plants, there cannot be identical preventive maintenance programmes.

Fig 1.6 conducting routine maintenance on confectionary processing equipment

Self-check 1	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

I Say true or false the following question

1. Routine maintenance tasks for the confectionary industry include system awareness and adjusting equipment according to manufacturers' recommendations (1point)

Test II: Short Answer Questions

1) What is Routine maintenance_____ (5 point)
2) Write down tips on routine maintenance that we follow?_____(5 point)
3) Write down typical examples of routine maintenance? _____(5 points)
4) What is preventive maintenance? _____(4point)

Note: Satisfactory rating ≥10 points Unsatisfactory - ≤10 points

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Information Sheet 2	Reporting Maintenance activities

2.1 Reporting maintenance activity

Finally any reporting activity should be reported and recorded in a compiled form. This includes reporting operations, approving operations and closing work order operations and work orders.

❖**Five Steps to Create a Maintenance Report**

Step 1: **Create** the Cover Page. Open a new document in MS Word and **write** the title.

Step 2: Cover Letter. On the next page include the cover letter. ...

Step 3: Device Information

Step 4: New Parts Cost Details

Step 5: Suggestions and Signature.

The report shows maintenance details of each event in the time range, including the Setup/Takedown Time, Instructions, Event Time, Facility, Event, ID (Rental, Contract or Event), Service, and Customer

2.1.1 Activity Description

- **Reporting Operation**

Report when the actual work or inspection has been performed. When you report, you enter information about the operation. This information includes details about the time spent on the operation, materials used and inspection results.

The details about the programs used for these activities are described in the process document below this level.

- **Approving Work Order Operation**

Approve work order operations when the operations have been reported. Operations may be automatically approved, as is the case for inspection operations. When an

operation requires manual approval, the approval is likely to be done by a supervisor who makes sure that the work has been performed according to the original requirements.

Work order operations are approved in 'Work Schedule. Open Toolbox' (MOS195).

- **Closing Work Order Operation**

Close the operations when they are reported and approved. It is possible to close an entire work order when all operations are closed. When you close an operation, you also make sure that there are no outstanding materials or purchases connected to the operation.

- **Closing Work Order**

Close the work order header when all operations contained within the work order are completed and closed. This step can be automated, allowing the work order header to be automatically closed when the last operation is closed.

Example of simple "Repair Report"

GEAR DRIVE REPAIR REPORT					
Location: Building 511, 1st floor			**Machine separator 1**		
Gear drive type: Reducer 1:20			**Serial no.: 10245156**		
Date of putting in operation: 5/20/1997			**Manufacturer: Flender Germany**		
Date of Repair: 5/26/2000 **Special maintenance requirements:** **Oil Grade 05**			**Auxiliary drives:** □ Belts _____ □ Chain _____ □ Coupling **Flexible Coupling** □ Others _____		
Part	**Failure**	**Mark**	**Part**	**Failure**	**Mark**

Auxiliary Drive	Chain or belt broken		**Gears**	Seat worn out	
	Sprocket/Pulley worn out			Broken teeth	
	Keyway problem			Worn out teeth	**X**
	Drive shaft bent			Others	
	Coupling damaged		**Lubrication**	No oil	
	Coupling rubber broken	**X**		Little oil	**X**
	Others			Dirty oil	
Sealing	Lip seal defective	**X**		Water in oil	**X**
	Housing seal defective			Breather defective	
	Others			Others	

Self-check 2	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

I Say true or false the following question.

1 Finally any reporting activity should be reported and recorded in a compiled form (1point)

Test II: Short Answer Questions

1. What is Reporting maintenance activity_____ (5 point)
2. Write down Five Steps to Create a Maintenance Report?_____(5 point)
3. Write down Reporting maintenance activity description**?** _____(4 points)

Note: Satisfactory rating ≥ 7.5 points Un satisfactory ≤7.5 points

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LG #26	LO #4 - Complete maintenance tasks

Instruction sheet

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

- Returning Equipment to operating order.
- Storing tools *and materials*
- Notifying relevant personnel
- Maintaining Housekeeping standards
- Conducting Work

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:

- Return Equipment to operating order.
- Store tools *and materials*
- Notify relevant personnel
- Maintain Housekeeping standards
- Conduct Work

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
4. Accomplish the Self-checks
5. Perform Operation Sheets

6 Do the “LAP”.TEST

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1.1 Returning Equipment to operating order.

Work orders are essential elements for maintenance because they provide relevant details about upkeep, repair, or operations work, such as replacing parts, performing an inspection or returning an asset to operating condition.

The following points are considered during returning equipment:

Equipment users:-

Including clinic and operating theatre staff, can be trained to perform many of the simple care and maintenance duties that need to be done on a regular basis, such as dusting, cleaning, lubricating, protecting, and checking equipment, including safety checks.

Equipment Test: - is a process of performing check on tools/machinery after maintaining it in order to prevent the tools from damage or faulty output of the machine.

It is important to perform checks on tools because; if we use it without testing, it may completely damage or out-off use /function.

Returning equipment: - to service is a potentially hazardous task, with the risks increased due to time pressures. Equipment deficiencies, human error, time pressures, and poor judgment all increase the probably of an incident. Understanding these increased risk factors and having a good mitigation plan will go a long way toward reducing these risks. When returning equipment for operating order after repair

While you are going too restarted to operate that equipment, be sure which fulfil the working parameter requirements and get a confirmation from the technicians.

Working parameters to be monitored include but not limited to:-

a) equipment performance (e.g. speed, output, variations)
b) equipment component performance
c) sequences and timing of operation
d) materials changes (desired and not desired)

- **Work order**
- It is a written means of communicating information about a task. For example, an electrician may receive a work order to complete a project at a construction site or to repair installation parts. A maintenance work order provides details about repair or operations such as replacing a part, returning an asset to operating condition, or performing an inspection. A work order is a communication tool that should include all the necessary information to perform a task and specify which team member should carry out particular jobs
- **Work order process**: - work order process is a system for ensuring accountability and delivery for every step required to complete a work request. A well-defined work order process will reduce equipment downtime and help keep good communication from start to finish. Every maintenance work order

has a life cycle with few main phases that can be broken down into several steps that we have listed

Date	**Tool**	**Maintenance check points**	**Signature**	**Maintenance required**	**Signature**
14-10 /2011	Spades	Handle	Mr. A	None	
		Shaft	Mr. A	Splinters shaved off	Mr. B
		Blade	Mr. A	None	

Maintenance Performed	Date	**Signature**
Splinters shaved off	16-10/2011	Mr. B

Self-check 1	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

I Say true or false the following question.

1 Equipment Test: is a process of performing check on tools/machinery after maintaining it in order to prevent the tools from damage.(1point)

Test II: Short Answer Questions

1) What does mean Equipment users_____ (3 point)
2) What is Equipment Test?_____(3 point)
3) What is Returning equipment? _____(4 points)
4) Write down Working parameters _____ (4point)

Note: Satisfactory rating ≥7.5points unsatisfactory ≤7.5 points

Information Sheet 2	Storing tools and materials

2.1 Storing tools and materials

Extreme temperatures and/or humidity levels can affect the life and lasting quality of the product contact tools and equipment. Extremely cold temperatures or long exposure to very cold temperatures can cause fracturing of tools and possible physical hazards in a food facility.

High-humidity areas that do not allow for proper tool drying can support the growth of microbial hazards.

There should be sufficient storage location and procedures for a range of power tools in a work place.

- ✓ After completing maintenance activity tools that are used for maintenance activity should be restore appropriately.
- ✓ Equipment that has been maintained also to be restored properly.
- ✓ Hand tools are stored safely in appropriate location according to standard operational procedures and manufacturers' recommendations.

It’s important that the tools used around confectionary processing maintain their hygienic qualities.

Leaving contact tools unorganized and in unsanitary locations when not in use is not advised. Proper storage in a clean, protected storage area ensures good hygiene and helps extend tool life. Limiting the storage of tools within their assigned areas is often recommended.

Fig 1.7 Tools and equipment storage after maintenance

Fig 1.8 Power Tools and equipment storage after maintenance

Self-check 2	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

I Say true or false the following question

1 High-humidity areas that do not allow for proper tool drying can support the growth of microbial hazards.(1point)

Test II: Short Answer Questions

1. What is Restoring equipment?_____ (4 point)
2. What does mean Proper storage of tools?_____ (5 point)
3. What does mean Proper storage of tools?_____(5 point)

Note: Satisfactory rating ≥7.5 points Un satisfactory ≤7.5 points

Information Sheet 3	Notifying relevant personnel

3.1 Notifying relevant personnel

Relevant Personnel: - means all full-time, part-time, or contract personnel whose job responsibilities related in any way to the processing, marketing, sale, or distribution of confectionary or any other products by the Divestiture Assets, at any time.

Relevant Persons means, with respect to any individual, partnership, joint venture, corporation, trust, Limited Liability Company, unincorporated organization or other entity ("Person"), such Person's officers, directors, employees, agents, distributors and other Persons acting for or on behalf of such Person.

3.1.1 Five key points for notifying relevant personnel on job

1. Relevant Experience

Make sure that the jobs, experience, and accolades that you do include are relevant to the position you're applying for.

2. The Right Skills

This is a great time to run wild with those keywords found in the job description. If they're looking for someone with Clean Bathrooms, be sure to list it as a skill.

Participated in facility safety committee in order to ensure all OSHA guidelines were met.

3. Quantifiable Achievements

Achievements and awards relevant to the position speak louder than a high GPA, especially if you can quantify your achievement with a number.

4. Your Unique Qualities

Recruiters and hiring managers are looking at hundreds of resumes. Let yours stand out, and try not to sound too boring.

Job duties: janitorial work, med cart repair, vehicle maintenance, traveling to other sites.

5. Strong Content

If you've had a lot of jobs, this shouldn't necessarily be a list of all of them. This is a document designed to market you to a potential employer, so choose the strongest content.

Responsibility of relevant personnel

- Maintain compliance with the regulations of OSHA.
- Monitor facility for signs of potential security risks and contacted management and
  In-Store Loss Prevention when problems were identified.
- Maintain standard of cleanliness of Wal-Mart facility.
- Perform cleanliness of all assess of retail facility for consumer/employee use
- Ensure Occupational Health and Safety Act guidelines were being followed properly for: Hazardous communications.
- Maintain proper OSHA standards for set up and break down of equipment

Self-check 3	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

I Say true or false the following question

1 Maintain compliance with the regulations of OSHA is Responsibility of relevant personnel**.(1point)**

Test II: Short Answer Questions

1) What does mean Relevant Personnel? _____ (3 point)
2) What is Relevant Persons?_____(3 point)
3) Write down at least four key points for notifying relevant personnel?___ (4points)
4) Write down Responsibility of relevant personnel _____ (4point)

Note: Satisfactory rating ≥7.5 points unsatisfactory ≤7.5points

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Information Sheet 4	Maintaining Housekeeping standards

4.1 Maintaining Housekeeping standards

A housekeeping SOP (Standard Operating Procedure) is a documented, step-by-step process on how to effectively perform housekeeping procedures, such as daily cleaning and maintenance tasks.

Every confectionary processing professional understands that clean facilities are critical to product safety. They're also critical to the safety, health, and morale of everyone who works in your plant. The Occupational Safety and Health Administration (OSHA) issues general "housekeeping" guidelines for every workplace

During housekeeping" guideline we should follow the following points:

- **Clean, dry floors**

Clean, dry floors are a priority in every workspace. Whether planning a new facility or considering renovations, make sure your floor is made of material appropriate to your plant's needs. If your production involves wet processes, install proper drainage, and provide mats or elevated platforms for safe standing.

- **Clear walkways**

Slips, trips, and falls are a leading cause of nonfatal workplace injuries. Make sure walkways and passageways are clear and navigable. Mark passageways with clear signage, and install mirrors to eliminate blind spots. Watch for trouble spots in your floors caused by uneven joints, torn carpeting, protruding nails, or loose boards.

- **Effective sanitation**

Food processing facilities have to be especially careful about spreading pathogens, both to workers and to food. The right vacuum filtration system will remove contaminants and keep them trapped, rather than releasing them back into the air. Know and use basic agents of sanitation on all your navigable surfaces.

- **Safe storage**

Make sure clutter doesn't encroach on your workspaces. Items left in passageways or workspaces can endanger traffic flow and present ergonomics issues and injuries. Ensure your routes and workspaces stay clear by providing proper storage and organization. If that storage is overhead, make sure there's no risk of falling objects injuring anyone below.

- **Fire awareness**

Fire hazards in food processing arise primarily from flammable fluid leaks or dust accumulation. Hydraulic fluids used in food processing equipment must now be USDA-approved. . OSHA also publishes a poster that lists the many types of food-related combustible dust.

Self-check 4	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

I Say true or false the following questions

1 Every confectionary processing professional understands that clean facilities are critical to product safety.(1point)

Test II: Short Answer Questions

1) What is housekeeping SOP ----------(4point)
2) What does mean (OSHA)?----------(5 point)
3) Write down general "housekeeping" guideline**s** for every workplace?----------(5 points)

Note: Satisfactory rating ≥7.5 points unsatisfactory ≤7.5 points

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Information Sheet 5	conduct work

5.1 Conducting work with workplace environmental guidelines

Having a safe and healthy physical work environment, including amenities and facilities, is critical to eliminating and controlling risk in the workplace. This includes ensuring the work environment, facilities and amenities are compliant with legislative and other identified requirements.

To manage these issues, your disciplinary process might cover two areas: employee performance and general workplace conduct.. It might even include violent behavior and other crimes.

Principles of conducting work identified as:

- Organize work to maximize efficiency and productivity of confectionary product.
- Train and motivate workers to implement work systems;
- Monitor both the work and work systems to ensure desired results are attained.

Point of consideration during conducting work**:**

- **Nature of Work Performed**

The requirements of amenities and facilities will depend on the type of work being performed and the equipment being used. For example, persons handling chemicals or conducting hot and arduous activities may need to access shower and change room facilities. Persons working remotely may require shelter sheds, food and water.

- **Size and Location of the Work Area**

Consideration should be given to the location such as the work area being in a building, remote area or outdoors. The work area may be multiple locations/sites

over an extensive area. The workplace may not be in proximity to physical amenities.

- **The Composition of the Workforce**

The workforce may be comprised of people of different sexes, religious beliefs and those people with special needs. This will influence the provision of amenities and facilities to accommodate the various needs.

- **Type of Workplace**

Different requirements may need to be applied where the workplace is permanent or temporary. The workplace may be permanently fixed, mobile or even temporary based on one off work (promotional activities), seasonal work types, work involving one off situation with different duration (hours, days or weeks).

- **Access**

Consideration should be given to the ability of a person to access the amenities and facilities. The means of access to the facility or amenities should be safe and accessible for all persons who require access.

- **Maintenance**

The work environment, facilities and amenities are required to be maintained in a safe and healthy condition, and need to be hygienic, secure and in a serviceable condition. This includes replenishment of consumables, repair of broken or damaged furnishings and equipment and ensuing cleanliness of these areas

Legislative Requirements:

Regulation 40: A person conducting a business or undertaking at a workplace must ensure, so far as is reasonably practicable, the following:

a) the layout of the workplace allows, and the workplace is maintained so as to allow, for persons to enter and exit and to move about without risk to health and safety, both under normal working conditions and in an emergency,
b) work areas have space for work to be carried out without risk to health and safety,
c) floors and other surfaces are designed, installed and maintained to allow work to be carried out without risk to health and safety,
d) lighting enables:
    i. each worker to carry out work without risk to health and safety, and
    ii. persons to move within the workplace without risk to health and safety, and
    iii. safe evacuation in an emergency,
e) ventilation enables workers to carry out work without risk to health and safety,
f) workers carrying out work in extremes of heat or cold are able to carry out work without risk to health and safety,
g) work in relation to or near essential services does not give rise to a risk to the health and safety of persons at the workplace.

Regulation 41: A person conducting a business or undertaking must ensure, so far as is reasonably practicable, the provision of adequate facilities for workers, including toilets, drinking water, washing and eating facilities. These facilities must be in good working order, clean, safe and accessible. When considering how to provide and maintain facilities that are adequate and accessible, a person conducting a business or undertaking must consider all relevant matters including:

a) the nature of the work being carried out at the workplace
b) the nature of the hazards at the workplace
c) the size, location and nature of the workplace
d) the number and composition of the workers at the workplace.

Self-check 5	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

I Say true or false the following questions

1 Having a safe and healthy physical work environment, including amenities and facilities, is critical to eliminating and controlling risk in the workplace.(1point)

Test II: Short Answer Questions

1. What are Principles of conducting work?_____ (4 point)
2. What does nature of work performed**?**_____(5 point)
3. What is Point of consideration during conducting work?_____(5 points)

Note: Satisfactory rating ≥7.5points unsatisfactory ≥7.5 points

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