Cereal processing

Level-II

Based on May 2019, Version 2 Occupational standards

Module Title: Preparing Cereal Storage and Receive Raw material

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LG #09	LO #1- Prepare to work in bulk material storage area

Instruction sheet

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

- Interpreting and confirm work program.
- Identifying OHS hazards, risks and implementing control measures.
- Selecting and maintaining suitable personal protective equipment
- Selecting, checking and maintaining tools and equipment.
- Environmental implications in the bulk material storage area

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:

- Interpret and confirm work program.
- Identify OHS hazards, risks and implementing control measures.
- Select and maintain suitable personal protective equipment
- Select check and maintain tools and equipment.
- Environmental implications in the bulk material storage area

Information Sheet 1- Interpret and confirm work program

1.1 Introduction

Materials that are usually available in large quantities and therefore require a lot of storage space are often stored in bulk storage areas. In bulk storage, each row of the bulk storage area represents a single storage bin.Bulk material handling is the process of packaging, processing and/or transporting bulk materials in preparation for shipment or sale. Bulk materials include dry materials like wood chips, cereals, coal, loose stone and gravel, ore and sand, as well as mixed wastes. All storage areas must be kept neat, clean and tidy. An important aspect of this is to remove waste. Seed storage is the preservation of seeds under controlled environmental conditions to maintain seed viability (germination and vigour) for long periods from harvest until the seed is finally required for sowing and other purpose. Grain storage and handling facility includes grain receive, grain movement, grain cleaning, reclaim, storage and possibly drying and cleaning operations. Seed storage actually starts in the field when the seed reaches physiological maturity, i.e. when the seed ceases to receive the full protection of the mother plant and is exposed to the external environment in terms of moisture, temperature, biotic pressures etc. when the seed ceases to receive the full protection of the mother plant and is exposed to the external environment in terms of moisture, temperature, biotic pressures etc.

1.2 Interpretation and confirm work program

Workplace inspections help prevent incidents, injuries and illnesses. Through a critical examination of the workplace, inspections help to identify and record hazards for corrective action. Health and safety committees can help plan, conduct, report and monitor inspections. Regular workplace inspections are an important part of the overall occupational health and safety program and management system, if present. Areas around storage structures and equipment should be kept clean and weed free, to assist in removing grain spills. It is essential to plan a cleaning program and to have specific cleaning equipment. Equipment, which need not be expensive, would include an air compressor and fittings, air guns, vacuum cleaner, firefighting pump and hose and brooms.

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 II: Short Answer Questions

1. Define work plan program (5point)
2. Write important work plan program in work place (5point)

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

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

Information Sheet 2- Identifying OHS hazards, risks and implementing control measures

2.1 Identifying OHS Hazards, Risks

A hazard is something that can cause harm, e.g. electricity, chemicals, working up a ladder, noise, a keyboard, a bully at work, stress, etc. A risk is the chance, high or low, that any hazard will actually cause somebody harm. Identifying OHS hazards is the process of investigating any activity, situation, product, service or thing that could affect the health, safety and welfare of persons at the place of work. One of the "root causes" of workplace injuries, illnesses, and incidents is the failure to identify or recognize hazards that are present, or that could have been anticipated.

A critical element of any effective safety and health program is a proactive, ongoing process to identify and assess such hazards. Hazards associated with machinery and equipment are often easily identified, the ways in which people can gain access to or may be exposed to, hazards require a detailed understanding of how they do their job. If good working practices are observed then the service personnel are not exposed to any special biological hazards. Be careful to follow the manufacturer's procedure when lighting and turning off the flame. Personal protective equipment (PPE) can prevent injuries, but are generally not as effective as higher order controls, as they rely more on worker behavior, maintenance programs and supervision.

The workgroup should be encouraged to participate in hazard identification by actively reporting hazards as they arise and to make suggestions as to the controls needed to rectify the hazardous situation. When looking for hazards consider the systems of work comprising of people and equipment, work methods and procedures, materials, and the work environment; suitability of tools, equipment, materials and systems for the task; how people use the tools, equipment and materials the experience of the persons performing the task or process or in the vicinity of the task or process while it is being performed; if something goes wrong with any tools, equipment, materials or work systems how will it

affect employees and other people. Employees and other people may be affected by hazards such as noise, fumes or work processes etc.

When there is more than one risk we need to prioritise the risks so that we can act on the highest risk first. While we must prioritise and act on risks in order of priority, in reality, we may be able to fix simple hazards immediately, so we must also use our common sense when prioritising. Prioritising is good practice when we need to allocate resources and keep records of the process.To identify and assess hazards, employers and workers:

- Collect and review information about the hazards present or likely to be present in the workplace.
- Conduct initial and periodic workplace inspections of the workplace to identify new or recurring hazards.
- Investigate injuries, illnesses, incidents, and close calls/near misses to determine the underlying hazards, their causes, and safety and health program shortcomings.
- Group similar incidents and identify trends in injuries, illnesses, and hazards reported.
- Consider hazards associated with emergency or no routine situations.
- Determine the severity and likelihood of incidents that could result for each hazard identified, and use this information to prioritize corrective actions.

Figure 2.1: OHS hazard

2.2. Implementing control measures

Workplace health and safety laws require the highest order control be applied. Higher order machinery and equipment risk controls are preventative by nature, are effective and durable for the environment it is used in, and deal directly with the hazard at its source. Intrinsic hazards that may arise because of the nature of the organization operations and activities, products or services, plant and machinery, and the work environment itself may require specific action plans based on the hierarchy of controls. Controls may also include documented policies and procedures. The four ways are based on the hierarchy of controls provided for the OHS Regulations.

The controls adopted should always be the highest level that can be reasonably attained. That is you should eliminate the hazard and if that is not reasonably practicable then you should consider changing equipment and materials and so on. This is an expressed requirement of the OHS Legislation. Separation is a simple and effective machinery and equipment risk control and may be achieved by distance, barrier or time. Managing health and safety hazards is key to operational excellence in the work place - regardless of its size. Where possible, you should always try to remove or eliminate hazards from the workplace, for example by using a different process, or changing the way a job is done. If it is not possible to eliminate the hazard, below are 6 steps to determine the most effective measures to control workplace hazards and to minimize risk.

- **Design or re-organize to eliminate hazards**

It is often cheaper and more practical to eliminate hazards at the design or planning stage of a product, process or place used for work For example, remove trip hazards on the floor or dispose of unwanted chemicals.

- **Substitute the hazard with something safer**

If it is not reasonably practical to eliminate the hazards and associated risks, you should minimize the risk

- **Isolate the hazard from people**

This involves physically separating the source of harm from people by distance or using barriers. For example, Introducing a strict work area, using guard rails around exposed edges and holes in the floors, using remote control systems to operate machinery, enclosing a noisy process from a person and storing chemicals in a fume cabinet.

- **Use engineering controls**

An engineering control is a control measure that is physical in nature, including a mechanical device or process. For example this can be done through the use of machine guards, effective ventilation systems and setting work rates on a roster to reduce fatigue.

- **Use administrative controls**

Administrative controls are work methods or procedures that are designed to minimize exposure to a hazard. Establish appropriate procedures and safe work practices such as; limit exposure time to a hazardous task so that fewer employees are exposed, routine maintenance and housekeeping procedures, training on hazards and correct work methods and use signs to warn people of a hazard.

- **Use Personal Protective Equipment (PPE)**

Provide suitable and properly maintained PPE and ensure employees are trained in its proper use. Examples include gloves, earplugs, face masks, hard hats, gloves, aprons and protective eyewear. PPE limits exposure to harmful effects of a hazard but only if

workers wear and use the PPE correctly.

Figure 2.2 Hazard control action

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 (4 point)

1. Which of the following included in hazard control? (4 point)

A. Elimination B. Administration C. Substitution D. Engineering E.All

Test II: Short Answer Questions

1. Define Hazard (5 point)
2. Important of hazard identification (5point)
3. List and discuss hazard control method (5point)

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

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

Information Sheet 3- Select and maintain suitable personal protective equipment

3.1 Select and maintain suitable personal protective equipment

Where exposure to machinery and equipment hazards cannot be eliminated or substituted for machinery and equipment of improved design, risk controls must be applied to the hazards to Prevent or reduce the risk (chance) of injury or harm. Workplace health and safety laws require the highest order control be applied. Higher order machinery and equipment risk controls are preventative by nature, are effective and durable for the environment it is used in, and deal directly with the hazard at its source.

Lower order machinery and equipment risk controls, such as personal protective equipment. The action of moving parts may have sufficient force in motion to cause injury to people. Must be provided with safe access that is suitable for the work they perform in, on and around machinery and equipment. A stable work platform, suited to the nature of the work that allows for good posture relative to the work performed, sure footing, safe environment and fall prevention (if a fall may occur), is a basic requirement

Where it is not possible for emissions to be controlled at their source, or removed or reduced through effective ventilation, extraction or diversion, the use of personal protective equipment (PPE) as a final measure must be considered to ensure safety. PPE is a lower order control and can only be used where higher order controls are not possible or are not totally effective. Selection and use of PPE requires careful consideration, as there are many different types that reduce the risk of injury of contact or exposure to a hazard.

Incorrect use of PPE, or purchasing inappropriate PPE, can contribute to serious workplace incidents. PPE that is uncomfortable, restrictive or heavy may create secondary hazards, and, as a result, constant supervision may be necessary to ensure it is used effectively. Once the controls have been implemented then the effectiveness of the controls must be monitored and reviewed.The proper use of protective equipment in

the process requires training, monitoring and encouragement and the following precautions should be followed.

Table 3.1. Description of personal protective equipment (PPE)

Types of Protective Clothing	Description	In picture
	Protect against harmful in workplace	
Goggle	Protect eyes from dust (harmful)	
	Protect hand (skin) against harmful	 Gloves
Rubber boots	Protect feet ,ankles, and lower legs from harmful	
Head protection	Protect head from danger objects falling from above	

Self-check 3	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 (4 point)

1 Which one is personal protective equipment?

A. Safety goggles B. Safety shoes C. Overall D. gloves

E. ear protection F. all

2 Which of the following is important PPE?

A. reduce the of injury or harm B, reduce exposure to a hazard C.A and B D All

Test II: Short Answer Questions

1 List PPE used at storage area (5 point)

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

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

Answer Sheet

1. _____
2. _____
3. _____

Information Sheet 4- Selecting, checking and maintaining tools and equipment

4.1 Selecting, checking and maintaining tools and equipment

Cleaning machinery before and after harvest prevents the breeding of insects. Headers are especially important in maintaining the hygiene of grain stored on farm, as they are known to be the most common source of infestation in on-farm storage. The time and effort involved in cleaning a header is well spent, because it will minimize insect infestation. Some growers clean the header by flushing it out with the first batch of grain. This is inadequate as there are always some insects which remain and the flushing grain may contaminate other grain. After cleaning out and disinfesting the header, treat it with dryacide powder as per label rate and directions. After cleaning out augers treat with Dryacide powder or Alfacron as per label rate and directions.

Clean out silos and storage structures using compressed air, vacuuming, brushing or washing as appropriate. Clean up around storages, removing weeds and rubbish. Mow around the storage facility and ensure easy access to it. Ensure any grain residues and old bags are removed and destroyed. When inspecting empty storages, look for ways to make the structures easier to keep clean. Cracks and crevices should be sealed or filled to prevent grain lodging and insect infestation. Treat silos and storage structures with Dryacide (powder or slurry where directed) or approved insecticide as directed.

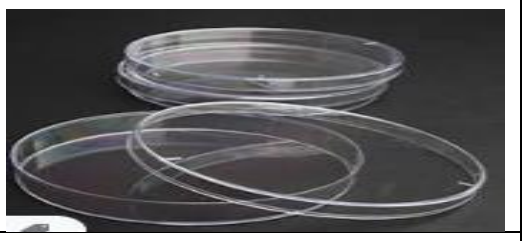
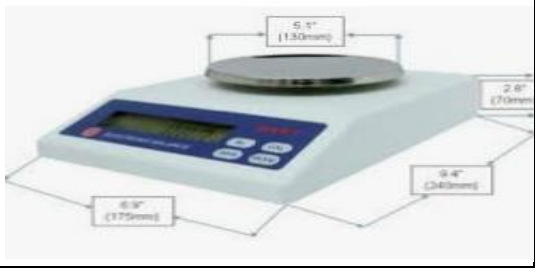
Grain insects will hide in dark crevices, under grass and leaves surrounding storage areas, between steel sheeting joints in silos and sheds, around inlets and outlets, inside conveyors and headers or wherever grain is stored. Sheds and bulk stores usually have areas which retain significant amounts of grain and dust and require careful cleaning. Older silos too often have poor 'grain shedding' joins and ledges. Bags should also be kept clean of grain residues or else thrown out. Grain spilt during loading and unloading should be cleaned up and destroyed straight away. Areas around storage structures and equipment should be kept clean and weed free, to assist in removing grain spills. It is essential to plan a cleaning program and to have specific cleaning equipment.

Equipment, which need not be expensive, would include an air compressor and fittings, air guns, vacuum cleaner, firefighting pump and hose and brooms.

Effective machinery and equipment risk controls reflect some or all of the following characteristics:

- The hazard is controlled at its source
- Contact or access to the hazard is prevented
- Sturdy construction (correct materials with few points of potential failure)
- Fail-safe (failure of the control system to be effective will result in machinery shut-down)
- Tamper-proof design (as difficult as possible to bypass)
- presents minimum impediment to machinery and equipment operator
- Easy to inspect and maintain

Table 4.1 Tools and equipment in bulk storage

Tools and equipment	**Description**	**In picture**
Combine harvester	threshing, separating,	
Silos	Improved storage types	
Petridis	To test quality(germination capacity of seed	
Moisture tester	Used to test moisture content of seed before storage	
Digital balance	Used to balance seed for quality test	

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 II: Short Answer Questions

1. Write important of selecting, checking and maintaining tools and equipment (5 point)
2. list and describe tools and equipment's used storage area (5 point)

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

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

Answer Sheet

1. _____
2. _____
3. _____

Information Sheet 5- Environmental implications in the bulk material storage area

5.1 Environmental implications in the bulk material storage area

Most crop seed is stored before being used by the farmer but during the storage period, it can deteriorate considerably. While good storage conditions can slow the rate of deterioration, seed germination and vigor cannot be improved, regardless of the storage facilities. Indeed, ageing, and loss of germination and vigor cannot be stopped, but they can be reduced by providing good storage conditions. Successful seed storage depends primarily on the percentage of relative humidity and temperature in the storage facility. Since deterioration slows when seeds are stored under cool and dry conditions, temperature and relative humidity should be considered together when planning for safe storage.

This combined effect is the basis of Harrington's rule of thumb: "For good seed storage the sum of the % relative humidity in the storage environment and the storage temperature (in °F) is 100 (applicable at temperatures ≤ 50 °F)." The effects and interactions of temperature, relative humidity and moisture content on stored seed and its associated pests and diseases are complex. Temperature and relative humidity affect the amount of moisture in the air and influence the equilibrium moisture content of seed. Noise nuisance from materials handlers includes noise generated from the movement of trucks, front-end loaders and forklifts, particularly early in the morning or late at night, and reversing alarms on mobile plant. The applicant will also need to demonstrate that relevant indicative noise levels specified in clause 5 of the Environment Protection (Noise) Policy 20072 (Noise Policy) would not be exceeded at the nearest sensitive receiver, both during the day and at night. This may require a report from an acoustic engineer stating that noise from all fixed and transient noise sources on site will meet the Noise Policy at the nearest sensitive receivers; otherwise the acoustic report should recommend measures to achieve this. Landfill sites when considering a site for a

materials handling facility, consideration needs to be given to the presence of any closed or operational landfills.

Correct grain hygiene is the basis for successful on-farm storage. Infestation generally occurs during or following harvest. The saying, Prevention is better than cure, certainly applies to grain hygiene. It is easier and better to prevent an infestation than to treat an established one. Maintaining a clean and tidy workplace also provides a safer environment.

Environmental factors include

- Moisture content
- Relative humidity
- Temperature
- Gas during storage

Self-check 5	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 (4 point)

1. Which of the following include in environmental factors affect bulk material storage area? (4 point)

A rain fall B. Temperate C. moisture content D all

Test II: Short Answer Questions

1. Write impact environment factor on seed storage area (5 point)
2. Write important of preparing storage area for seed?(5 point)

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

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

Answer Sheet

1. _____
2. _____
3. _____

LG #10	LO #2- Prepare storage area

Instruction sheet

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

- Cleaning and disposing wastes storage site
- Maintaining storage site
- Preparing storage site with OHS standards.

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:

- Clean and dispose wastes storage site
- Maintain storage site
- Prepare storage site with OHS standards.

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 Cleaning and disposing waste in storage site

1.1 Cleaning Storage Site

Cleaning is the complete removal of waste using appropriate detergent chemicals under recommended conditions. Before you attempt to clean an area, there are several considerations that need to be made. You need to understand the scope of cleaning that is required, at what time you will be able to clean an area and the equipment and chemicals that you will need to complete the job. It is important that personnel involved have a working understanding of the nature of the different types of food soil and the chemistry of its removal.

Cleaning may be carried out with soap and clean water. All the surfaces and corners should be washed and dried thoroughly, using plenty of clean absorbent paper, or clean cloth, to ensure that every corner is completely dry. Any remaining moisture can promote the growth of bacteria. If the canopy is made of Perspex, clean it with soap and water, but do not use abrasive compounds.

- Keep the store absolutely clean! Remove any spilt grain immediately as it attracts rodents
- Store bags in tidy stacks set up on pallets, ensuring that there is a space of all-round the stack
- Store any empty or old bags and fumigation sheets on pallets, and if possible in separate stores
- Keep the store free of rubbish in order not to provide the animals with any places to hide or nest! Bum or bury it!
- Keeps the area surrounding the store free of tall weeds so as not to give the animals any cover! They have an aversion to crossing open spaces.
- Keep the area in the vicinity of the store free of any stagnant water and ensure that rainwater is drained away, as it can be used as source of drinking water.

Figure 1.1.Manual cleaning

Figure 1.2 Mechanical cleane

1.2 Disposing Wastes in the Storage Site

Disposal of waste should be done regularly throughout the day in order to remove the possibility of bad smells and to eliminate the possibility of attracting pests and vermin. All waste is usually taken to a central area where it is stored until it is collected by outside contractors. This area must be located far away from the public areas in a separate designated area. The area may have many separate bins with lids or there may be one or more large bulk storage bins. The storage area should be kept as cool as possible to avoid rubbish rotting and smelling until it can be collected. In large properties this may be daily or several times per week depending on volume. The rubbish storage area should have access to hot water for cleaning and preferably have an easy to clean floor. Types of waste are food waste, dry waste, and recycled waste, medical and infectious waste return waste.

Types of waste

- **Food waste**: This is generated primarily from restaurants and kitchen areas although there may be some from staff lunch rooms.
- **Dry waste**: the amount of dry waste produced by hotels has been dramatically reduced due to the increase and availability of recycling. There is still dry waste produced such as used paper towels and cigarette butts and food wrappings
- **Recycled Waste**: This includes newspapers and magazines cardboard boxes Bottles and cans metal items old fridges and washing machines Toner cartridges.

Figure1.3 Waste of disposal

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 (4 point)

1. Which of the following used for cleaning of storage area

A. clean B soap water C.A and B D all

Which of the following included in waste

A. Dry waste B weed seed C. Recycle waste D. All

2 Waste is one types of hazard

A. True B. False C. A and B

Test II: Short Answer Questions

1. Define waste (5 point)
2. List important of cleaning storage site (5 point)

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

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

Answer Sheet

1. _____
2. _____
3. _____

Information Sheet 2- Maintaining storage site

2.1 Maintaining storage site

Maintenance is the upkeep of all furniture, fittings and equipment to an exacting standard within the property so that all areas look consistently new and pristine. Regular inspections should be carried out to determine the condition of the building, particularly its electrical installations, locks, roof, and structural integrity in general. Any necessary repairs must be carried out as soon as possible to prevent the damage from getting worse. In any property large or small, there will be a variety of maintenance tasks to be completed either daily, periodically or as required. Good maintenance of any property is vital if the property is to remain viable and safe.

Maintenance of any property involves the upkeep of the exterior, interior, fixtures, fittings and furniture as well as plant and equipment. Maintenance may be carried out by on site qualified technicians or by a variety of contractors, or a combination of both. There is a huge cost in maintaining any building. Good maintenance of any property is vital if the property is to remain viable and safe. Maintenance of any property involves the upkeep of the exterior, interior, fixtures, fittings and furniture as well as plant and equipment. Storage facilities, equipment storage and maintenance facilities should be designed to prevent the accidental discharge of chemicals, fuels, or contaminated wash water from reaching water sources. In addition, storing and maintaining equipment properly will extend useful life and reduce repairs. Maintenance may be carried out by on site qualified technicians or by a variety of contractors, or a combination of both.

Best Maintenance practices are

- Store and maintain equipment in a covered area complete with a sealed impervious surface.
- Seal floor drains unless they are connected to a holding tank or sanitary sewer with permission from the local wastewater treatment plant.

- Store pesticide and fertilizer application equipment in areas protected from rainfall. Rain can wash pesticide and fertilizer residues from the exterior of the equipment and possibly contaminate soil or water.
- When possible, replace solvent baths with recirculating aqueous washing units. Soap and water or other aqueous cleaners are often as effective as solvent-based products and present a lower risk to the environment.
- Always use appropriatePPEwhen working with solvents.
- Never allow solvents or degreasers to drain onto pavement or soil, or discharge into water bodies, wetlands, storm drains, sewers, or septic systems.
- Collect used solvents and degreasers in containers clearly marked with contents and date. Schedule collection by a commercial service.
- Blow off all equipment with compressed air to reduce damage to hydraulic seals

Figure 2.1 Seed Storage site

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 II: Short Answer Questions

1 Important of maintain storage site (5 point)

2 What are activity practiced in maintain of storage site? (5 point)

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

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

Answer Sheet

1. _____
2. _____
3. _____

Information Sheet 3- Preparing storage site with ohs standards

2.1 Preparing storage site related to OHS standards

Storage site is cleaned of weeds, dust and spillage to organization requirements. Refuse is disposed of according to regulatory requirements. Site is maintained in a clean and tidy condition according to organization requirements. Storage site is prepared according to OHS standards. The presence of water or water damage, presence and activity of pests including insects, mounds, birds and rodents, dead vertebrate pest in storage, breakdown of storage security and Integrity, e.g. holes, cracks, poor sealing or general physical deterioration, storm damage, and/or level of hygiene will need to be seen to.

Always wear and use the correct protective clothing and safety equipment for the job you are doing. Use it in the correct way and never play with it or damage it. Always store it in the correct place so that it is readily available. Do not take short cuts with protective clothing as this could lead to accidents and injury either to you or other people. Always make sure that the clothing is the correct fit for you. To reduce the number of accidents associated with workplace equipment, employers must train employees in the proper use and limitations of the equipment they operate. In addition to powered industrial trucks, this includes knowing how to safely and effectively use equipment such as conveyors, cranes, and slings. Stored materials must not create a hazard for employees.

Employers should make workers aware of such factors as the materials' height and weight, how accessible the stored materials are to the user, and the condition of the containers where the materials are being stored when stacking and piling materials. To prevent creating hazards when storing materials, employers must do the following.

- Keep storage areas free from accumulated materials that cause tripping, fires, or explosions, or that may contribute to the harboring of rats and other pests;
- Place stored materials inside buildings that are under construction and at least 6 feet from hoist ways, or inside floor openings and at least 10 feet away from exterior walls;

- Separate no compatible material; and
- Equip employees who work on stored grain in silos, hoppers, or tanks, with lifelines and safety belts.

Self-check 3	Written test

Name…… ID…… Date…….

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

Test II: Short Answer Questions

1. How to prepare storage area? (5 point)
2. What is OHS hazard in storage area? (5 point)

.

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

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

Answer Sheet

1. _____
2. _____
3. _____

Operation Sheet 1– Procedures of Preparing storage site

Material required: PPE moisture tester, seed, shovel, wheel barrow and others

Procedures for preparing seed storage

1. Site selection: select the site which is suitable for storage of seed
2. Wear Personal protective equipment: which protect from hazard in work activity
3. Clean storage site: remove all waste in ands round storage site
4. Disposing the waste: collect all waste in one place and dispose it.
5. Test the quality of seed : Test moisture, other parameter of quality before store seed
6. Stored seed : seed to storage site
7. Clean all material used in this activity (tools, equipment and PPE)
8. Maintain storage site
9. Record each activity in each step

LAP TEST 1	Performance Test

Name…… ID……..

Date……

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within **1** hour. The project is expected from each student to do it.

Task-1 Perform storage site preparation

LG #11	LO #3 Prepare storage

Instruction sheet

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

- Preparing bulk material storage
- cleaning of all residues in Bulk material storage
- checking for structural safety, damage and repair bulk material storage
- preparing temporary storage with OHS standard

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:

- Prepare bulk material storage

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- Preparing bulk material storage

1.1 Preparing bulk material storage

Correct grain hygiene is the basis for successful on-farm storage. Infestation generally occurs during or following harvest. The saying, Prevention is better than cure, certainly applies to grain hygiene. It is easier and better to prevent an infestation than to treat an established one. Maintaining a clean and tidy workplace also provides safer environment. From season to season, stored grain pests will multiply in grain left lying around storage structures and grain handling equipment. A bag of infested grain may produce over a million insects in one year. These insects will move to other sources of feed and start new infestations. Hygiene methods which eliminate insect breeding areas form the basis of successful grain storage.

Storage site is cleaned of weeds, dust and spillage to organization requirements. Refuse is disposed of according to regulatory requirements. Site is maintained in a clean and tidy condition according to organization requirements. Storage site is prepared according to OHS standards. The presence of water or water damage, presence and activity of pests including insects, mounds, birds and rodents, dead vertebrate pest in storage, breakdown of storage security and Integrity, e.g. holes, cracks, poor sealing or general physical deterioration, storm damage, and/or level of hygiene will need to be seen to.

Bulk solid storage silos are generally connected to other equipment and / or machinery. Therefore, mechanical or pneumatic conveying systems are needed to transfer bulk material between silos and other equipment. Additionally, in large industrial plants where high volumes of bulk materials are processed, a series of silos may be integrated together for higher storage capacity.

Advantages of silos in bulk material storage

- It is preferred over bag storage for the following reasons
- Large quantities of food grain can be stored
- No difficulty in loading and unloading of grain
- No need to purchase storage containers like gunnies
- Insect incidence is less than bag storage, even this can be eliminated by fumigation in situ
- Avoids waste from leaking bags
- Easy inspections- saves labor and time.

- Reduced floor space
- Clean and contamination free storage
- Low operational costs
- Very low level of dust emission
- Easier stock and inventory control of bulk material
- Optimum filling and discharge rates
- Easier integration to industrial processes.
- Suitable for interior and exterior use

Figure1. Silo bulk material storage type

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 II: Short Answer Questions

1. Define storage(5 point)
2. Define bulk material storage (5 point)
3. Important of grain storage (5 point)

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

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

Answer Sheet

1. _____
2. _____
3. _____

Information Sheet 2- cleaning of all residues in bulk material storage

2.1 cleaning of all residues in Bulk material storage

It is the set of activities performed on equipment periodically by improving the operational atmospheres, to prevent any possible failures. The activities performed are checking of all fasteners and bolts, checking of lube oil conditions, checking of other ancillary facilities like cooling water, seal cooling system, seal quenching system, operating parameters like suction pressures, temperature, discharge pressure, any abnormal noise, condition of seals or packing's etc. The abnormalities are corrected without disturbing the functioning of the plant. Preventive maintenance check depends upon the criticality of the equipment.

Cleaning bulk material storage is a process to maximize the efficiency ofstorage silosthat hold bulk powders or granules. In silos, material is fed through the top and removed from the bottom. Typical silo applications include animal feed, industrial powders, cement, and pharmaceuticals. Free movement of stored materials, on a first-in, first-out basis, is essential in maximizing silo efficiency. The goal of silo efficiency is to ensure that the oldest material is used first and does not contaminate newer, fresher material. There are two major complications in silo efficiency:rat holingandbridging. Rat holing occurs when powders adhere to the sides of silos. Bridging occurs when material blocks at the silo base.

Manual cleaning is the simplest way to clean silos. This entails lowering a worker on a rope to free material inside the silo. Manual cleaning is dangerous due to the release of material and the possible presence of gases. In cases of bridging, an additional danger exists as the exit hole needs to be robbed from underneath, exposing the worker to falling powder.

There are many reasons to choose our cleaning process, including:

- Maintains longevity and structural integrity of bin
- Utilizes and increases storage and inventory capacity
- Less down time, resulting in larger profit margins
- Increased efficiencies of associated mechanical components
- Reclamation of material in bins
- Reduced dockage due to rodents and insects
- Increased safety margin

Figure 2.1.Heavy equipment for dry cleaning

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 II: Short Answer Questions

1. List important cleaning of all residues in Bulk material storage (5point)
2. What are residues to be cleaned from bulk storage are? (5point)

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

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

Information Sheet 3- Checking for structural safety, damage and repair bulk material storage

3.1 Checking for structural safety, damage

Bulk materials are introduced into the silos by pneumatic transport systems or mechanical conveyors, which transport the materials inside pipes, driven by air and even over long distances. The stored product is then extracted from the bottom of the silo using appropriate extraction systems. The storage of bulk materials needs to be not only cost-effective but also safe, and systems should be easy to integrate in production processes. Bulk materials such as sawdust, wood shavings, lime, etc. can be easily stored in storage silos, which allow you to:

- contain a significant amount of product (up to 12,000 m^3) within a controlled environment;
- reduce the risk of fire or explosion;
- save time in the transfer of materials from one process step to another;
- Recover space that can be allocated to other purposes

3.2 Repair Bulk Material Storage

Repair Bulk Material Storage is the set of activities performed on equipment periodically by improving the operational atmospheres, to prevent any possible failures. The activities performed are checking of all fasteners and bolts, checking of lube oil conditions, checking of other ancillary facilities like cooling water, seal cooling system, seal quenching system, operating parameters like suction pressures, temperature, discharge pressure, any abnormal noise, condition of seals or packing's etc. The abnormalities are corrected without disturbing the functioning of the plant. Preventive maintenance check depends upon the criticality of the equipment.

It is the set of activities performed on equipment periodically by improving the operational atmospheres, to prevent any possible failures. The activities performed are checking of all fasteners and bolts, checking of lube oil conditions, checking of other

ancillary facilities like cooling water, seal cooling system, seal quenching system, operating parameters like suction pressures, temperature, discharge pressure, any abnormal noise, condition of seals or packing's etc. The abnormalities are corrected without disturbing the functioning of the plant. Preventive maintenance check depends upon the criticality of the 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.

Test II: Short Answer Questions

1. List advantage of Checking for structural safety, damage of bulk storage (5point)

2. What is important of repair bulk material storage?(5point)

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

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

Answer Sheet

1. _____
2. _____
3. _____

Information Sheet 4- Preparing temporary storage with OHS standard

4.1 Preparing temporary storage with OHS standard

All storage systems must be designed to adequately protect and preserve the quality of the grain. Whole grain can sprout under certain conditions and will also attract moulds, insects and rodents. Grain going into temporary storage must be dry. Aeration cools the grain to enhance storability but is not adequate to remove moisture from grain. Many types of buildings such as pole buildings used for machinery storage, empty barns, and stud framed shops or garages can be used for grain storage. Make sure the building location is well drained. If the building does not have a concrete floor, place the grain on plastic to prevent moisture moving from the ground to the grain.

Even with a concrete floor, it is advisable to cover the concrete with plastic, especially if the concrete is cracked. Moisture vapor will move through concrete and into the grain if the soil below the concrete is wet. Most farm buildings are not built to withstand lateral loads other than those normally sustained from wind pressure, so they will need to be strengthened to support grain pressure. Check with the building manufacturer about safe depth of grain to use in existing commercial buildings.

- **Important of seed storage**
  - ✓ Feeding ever growing human population
  - ✓ Fluctuation in price and market demand or shortage and famines
  - ✓ Agricultural products need to store for season to season and year to year demand
  - ✓ Off season requirements i.e., potatoes, onion, fruits etc.
  - ✓ When a bumper production of particular commodity then storage is required
  - ✓ Pilling/ provision for large scale processing
  - ✓ Prevention of original varieties from extinction (Germ Bank)
  - ✓ Preservation of nutritional quality

Based on Length of time for storage grain storage systems classify into

- Temporary storage
- Long term storage
  - ✓ **Temporary storage** Temporary grain storage may be necessary when on site storage capacities are likely to be exceeded during unusually large harvests, or for opportunity storing/buying of large quantities of grain at an economical price.
  - ✓ **Long term storage**: grain in long term storage should be held cool and dry. Options include smooth wall steel silos, corrugated steel silos bins, concrete silos and underground pits. Steel silos are the most common method of long term storage for grain at feedlots, but underground pit storage is an alternative for longer term storage.

Whichever kind of storage method a farmer uses, there are certain principles upon which every method is based. Every storage container, no matter what it looks like or what it is made of, should:

- Keep grain cool and dry
- Protect grain from insects
- Protect grain from rodents

Figure 1.Temporary storage

Figure 2. long term storage types

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 II: Short Answer Questions

1. Define Temporary storage (5 point)
2. Write types of storage based on length time (5 point)
3. Under what condition grain should be stored (5 point)
4. Write important seed storage (5 point)

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

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

Answer Sheet

1. _____
2. _____
3. _____

Operation Sheet 1- Preparing temporary storage

Material required: PPE moisture tester, seed, shovel, wheel barrow and storage bag or other temporary storage material.

Procedures for preparing seed storage

1. Site selection: select the site which is suitable for temporary storage of seed
2. Wear Personal protective equipment: which protect from hazard in work activity
3. Clean storage site: remove waste from temporary storage site
4. Disposing the waste: collect all waste in one place and dispose it.
5. Test the quality of seed: Test moisture, other parameter of quality before store seed
6. Stored seed: store seed in prepared temporary storage
7. Clean all material used in this activity (tools, equipment and PPE)
8. Maintain storage site
9. Record each activity in each

LAP TEST 1	Performance Test

Name…… ID……..

Date……

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within **1** hour. The project is expected from each student to do it.

Task-1 Establish(Erect) temporary storage

LG #12	LO #4- Prepare bulk material handling

Instruction sheet

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

- Cleaning of contaminated bulk material handling
- Adjusting and setting bulk material handling
- Preparing bulk material handling

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:

- Clean of contaminated bulk material handling
- Adjust and settee bulk material handling
- Prepare bulk material handling

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- Cleaning of contaminated bulk material handling

1.1 Introduction

Bulk material handling typically involves the engineering, designing, and manufacturing of equipment that handles and processes bulk materials. It is the method by which bulk powders, granules, flakes, pellets, major and minor ingredients are stored, transferred, and packaged in various containers. Bulk material handling is crucial to all industries that handle various bulk products. Some of theprocess industriesinclude agriculture, food, beverage, animal feed, pet food, tobacco, chemical, polymer, plastics, rubber, compounds, ceramic, mining, asphalt, mineral, coatings, paint, paper, and metals. Each of these industries and many others use dry bulk materials to manufacture their products.

1.2. Cleaning of contaminated bulk material handling

Bulk material handling machinery is cleaned free of contamination and residues according to organization requirements. Bulk material handling equipment is adjusted and set according to organization requirements .Bulk material handling equipment is prepared ready for use according to manufacturer's instructions and OHS standards. Storage Containers Required. It shall be the duty and responsibility of every person in possession, charge or control of any establishment where garbage or refuse is created or accumulated to at all times keep or cause to be kept adequate portable storage containers of approved size, type and construction and to deposit or cause to be deposited all garbage, rubbish or waste in said storage containers. Each storage container shall be kept clean inside and out by the customer. Covers shall not be removed except when necessary to place garbage and refuse in the storage container or to remove the same therefrom. All putrescible solid waste shall be drained of surplus liquids and shall be securely wrapped in paper or placed in watertight bags before being placed in the storage containers.

Storage containers shall not be overloaded to the extent covers cannot be securely replaced. Where the director of public works or his designee deems necessary, a suitable raised platform, hanger or device shall be provided so that storage containers shall not freeze onto the ground or rest in water or on ice or be tipped over by animals. At the time of collection, storage containers shall be placed at accessible locations approved by the director of public works or his designee.

Storage containers shall be loaded in such a manner as to be conveniently handled without spilling contents. Containers without handles or lids or with sharp edges or holes shall be considered solid waste and after written notice to the customer has been left with the container on the previous collection date, may, without liability, be collected and discarded by the solid waste collector. It shall be the duty of every person in possession, charge or control of any establishment to keep the area surrounding a storage container clean and free of any materials which may appear to be garbage, rubbish or waste. Any such material may without liability be collected and discarded by the solid waste collector.

- Clean grain to remove chaff, weed seeds, and broken kernels.
- Handle grain gently to minimize cracked and broken kernels.
- Store grain at the recommended moisture.
- Aerate stored grain to maintain a cool, uniform, recommended temperature.
- Check stored grain frequently and take immediate action to eliminate problems

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 II: Short Answer Questions

1. Define Bulk material handling (5 point)
2. Write important Cleaning of Contaminated Bulk Material Handling? (5 point)
3. List waste to be cleaned from bulk storage area (5 point)

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

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

Answer Sheet

1. _____
2. _____
3. _____

Information Sheet 2- Adjusting and setting bulk material handling

2.1 Adjusting and setting bulk material handling

Bulk material handling equipment is adjusted and set according to organization requirements. Bulk material handling equipment is prepared ready for use according to manufacturer's instructions and OHS standards. Bulk material handling apparatus are used in connection with the storage and movement of bulk materials such as grain, sand, gravel, coal. Adjust machine speed. Check the machine speed to see that the combine is operating at the recommended revolutions per minute.

The manufacturer's operator manual will give the basic speed of machine. This may be given as beater shaft speed, engine speed at rated blower speed, threshing cylinder speed etc. Adjust cylinder concave clearance and cylinder speed. These adjustments have a great effect on the rack and shoe losses in the combine over threshing breaks up the straw and cause the rack and shoe to be over-loaded. Adjustments are provided for varying the speed of cylinder to suit the kind of crop being harvested. Too slow cylinder speed or too wide concave clearance may result into back feeding at cylinder. A compromise between cylinder speed and concave clearance should be maintained. Adjust cutter bar height, the height of cut should not be lower than required otherwise too much material will overload the rack and on too high heads or ear of grain will be left in the field.

Bulk handling material equipment can be made up of all kinds of individual pieces of equipment, depending on the application a system serves. Typically, though, they are composed of a mixture of stationary and moving equipment. Some examples of stationary bulk material handling equipment include screw conveyors, conveyor belts, tubular drag conveyors, stackers, hoppers, wagon tipplers or railcar dumpers, bucket elevators and top loaders. Some examples of commonly employed moving or mobile equipment include: mobile hopper loaders and unloads, shuttles, moving floors and various shuttles. To complete a bulk material handling system, systems may also be

integrated into large structures, such as storage facilities like storage silos, stockyards or stockpiles.

Bulk material handling, however, is not confined strictly to the land. Rather, bulk material handling systems are used all the time when loading and unloading cargo ships. In fact, increasingly, a type of bulk material handling equipment called the continuous ship unloaded is replacing the gantry crane in ports around the world. Common examples of bulk cargo include grains (rice, wheat, maize, oats, barley, rye, etc.), gravel, coal, cements, dry edible agricultural products (livestock feed, peanuts, flour, seeds, raw or refined sugar, starches, etc.), iron, bauxite and petroleum or crude oil. To load bulk material onto a cargo ships, handlers may have to use equipment like a shovel bucket or a spout. Using items like these, they will pour or dump bulk cargo materials into the ship hold. This method can also be applied to the loading of bulk material into railroad cars or wagons and the bodies of tanker trucks, trailers or semi-trailers.

Materials storage equipment from huge storage silos to small bins or hoppers, a bulk material handling system should have a location where materials are stored until they are needed for processing. Harvesting equipment are the machines which are used for cutting and harvesting the crop to separate the grain from straw. Harvesting is the process of cutting and collecting the mature crop from the field. The goal of good harvesting methods is to maximize grain yield, and to minimize grain damage and quality deterioration. Bulk material handling machinery is cleaned free of contamination and residues according to organization requirements.

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 II: Short Answer Questions

1. Define adjusting and setting bulk material handling (5 point)
2. Important of adjusting and setting bulk material handling (5 point)
3. What is adjusted and setting bulk material handling in bulk storage? (5 point)

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

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

Answer Sheet

1. _____
2. _____
3. _____

3.1 Introduction

A cereal is any grass cultivated (grown) for the edible components of its grain (botanically, type of fruit called caryopsis),composed of the endosperm, germ, and bran. The term may also refer to the resulting grain itself (specifically "cereal grain"). Cereal grain crops are grown in greater quantities and provide more food energy worldwide than any other type of crop and are therefore staple crops. Edible grains from other plant families, such asbuck wheat(Polygonaceae),quinoa(Amaranthaceous) andchia(Lamiaceae), are referred to aspseudo cereals.

In their natural, unprocessed,whole grainform, cereals are a rich source ofvitamins,minerals,carbohydrates,fats, oils, andprotein. When processed by the removal of the bran, and germ, the remainingendospermis mostlycarbohydrate. In somedeveloping countries, grain in the form ofrice,wheat,millet, ormaizeconstitutes a majority of daily sustenance. Indeveloped countries, cereal consumption is moderate and varied but still substantial.

3.2 Prepare and test cereal handling machinery

Correct sampling is an operation that requires most careful attention. Emphasis cannot therefore be too strongly laid on the necessity of obtaining a properly representative sample of grain. Careless or inaccurate sampling could lead to misunderstanding and unwarranted financial adjustments. Samples shall be fully representative of the lots from which they are taken. Therefore, as the composition of the lot is seldom uniform, a sufficient number of increments shall be taken and carefully mixed, thus giving a bulk sample from which are obtained, by successive divisions, the laboratory samples.

In general, sampling is conducted in such a way that the sample represents the population, but in the same case a sample is taken from an especially good or bad section. Without understanding the sampling method of the test sample, one cannot evaluate correctly about the quality of the material being inspected. By the result of some sort of a test of a portion of the material with its quality criterion to judge whether each article is non-defective or defective, or with an acceptability criterion to judge whether a

lot is acceptable or not, the portion of the material in a sample used to judge the whole material, improper sampling will lead to inappropriate grading even with correct testing.

The invention relates to a method for preparing edible cereal grain including, consecutively: a soaking step, during which the moisture of the cereal grain is increased to at least 20%; a step of cooking the cereal grain; a step of drying the cereal grain, during which the moisture of said cereal grain is reduced to less than 30%; a step of flattening the cereal grain; and a step of expanding the cereal grain, characterized in that the method includes a step of heating the cereal grain, during which the temperature of said cereal grain is increased so as to modify the plasticity properties of said grain in order to facilitate the flattening thereof. The invention can be used in the industrial preparation of food products, in particular of cereal grains.

The present invention relates to the general technical field of the industrial preparation of food products within a production line, in particular the preparation of cereal grains intended for human and / or animal consumption, for example grains of rice .The present invention relates in particular to the general technical field of processes for preparing a cereal grain in a production line intended, for example, to pre-cook said cereal grain, in particular by causing at least partial gelatinization of the cereal grain. Starch it contains. The present invention relates more particularly to a process for preparing a cereal grain intended for human and / or animal consumption, comprising successively a soaking step during which the moisture of the cereal grain is increased to at least 20%,a stoving step during which the cereal grain is subjected to a steam treatment, in order to gelatinize, at least in part, the starch contained in said cereal grain,a step of drying the cereal grain during which the moisture of said cereal grain is reduced to less than 30,a step of flattening the cereal grain during which the dimensions of said cereal grain are modified.

- Important of seed test for storage
  - ✓ To specify the standardized products
  - ✓ To prepare export commodity standards
  - ✓ To control exporters, surveyors and inspectors

- ✓ To provide inspection service
- ✓ To issue certificates for commodity standards on quality, volume, weight, and origin of products
- ✓ To prevent and suppress deception of commodities to be exported, and
- ✓ To collect statistics concerning manufacture, market needs, price level and value of exports and publicize such information to concerned persons so that they can use the information for production and export targets.

Self-check 3	Written test

Name…… ID…… Date…….

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

Test II: Short Answer Questions

1. Define cereal crops (5 point)
2. Write important of test cereal (5 point)
3. List the machine used to test cereal (5 point)

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

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

Answer Sheet

1. _____
2. _____
3. _____

Information Sheet 4- Preparing bulk material handling

3.1 Preparing bulk material handling

Bulk material handling is the process of packaging, processing and/or transporting bulk materials in preparation for shipment or sale. Bulk material handling is crucial to all industries that handle various bulk products. Some of theprocess industriesinclude agriculture, food, beverage, animal feed, pet food, tobacco, chemical, polymer, plastics, rubber, compounds, ceramic, mining, asphalt, mineral, coatings, paint, paper, and metals. Bulk materials include dry materials like wood chips, cereals, coal, loose stone and gravel, ore and sand, as well as mixed wastes. Bulk material handling equipment is used quite commonly in a number of industrial processes, including those in the construction, paper and pulp, logging and shipping industries. Often, bulk material handling systems are categorized by the types of materials they are designed to handle and/or the types of applications for which they are designed. Such materials include, of course, those mentioned above, along with any other dry materials in their bulk form.

One common type of bulk material handling system is the system that handles materials for manufacturing. For instance, saw mills and paper mills often use bulk material handling systems to pick up sawdust, logs and woodchips for further manufacturing. This type of bulk handling system is also used to feed coal-fired utility boilers and in flour mills. Similarly, other bulk material handling systems are designed to transport materials for processing. This is the case systems that process ore for concentrating and smelting. Still other systems are designed simply to transport bulk materials from a source location to a final location. This is quite common when the goal of an application is inventory control or when the goal of an application is inventory storage.

Whichever kind of storage method a farmer uses, there are certain principles upon which every method is based. Every storage container, no matter what it looks like or what it is made of, should:

- Keep grain cool and dry.
- Protect grain from insects.
- Protect grain from rodents.

Figure 3.1.Bulk material storage area

Self-check 4	Written test

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

1 Which of the following is true related with storage area?

A. Protect grain from rodents

B. Keep grain cool and dry.

C. Protect grain from insects.

D. All

2 Bulk material handling is crucial to all industries that handle various bulk products

A. True B. False C A and B

Test II Write short answer

1. Define bulk material handling (5point)
2. Important of preparing bulk material handling(5point)

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

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

Answer Sheet

1. _____
2. _____
3. _____

LG #13	LO #5- Receive raw material

Instruction sheet

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

- Maintaining cleanliness and orderliness of receiving bay.
- Storing policies and procedures receive bay
- Checking and validating of incoming stocks
- Identifying characteristics and categories of raw materials
- Inspection of received items for quality
- Recording stock levels and storing stock system.
- Rotating and storing stock.
- Application of labeling system in store policy.
- Dispatching of stocks
- Application of store price and code labels.

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 cleanliness and orderliness of receiving bay.
- Store policies and procedures
- Check and validate of incoming stocks
- Identify characteristics and categories of raw materials
- Inspection of received items for quality
- Record stock levels and storing stock system.
- Rotate and storing stock.
- Application of labeling system in store policy.
- Dispatch of stocks
- Application of store price and code labels

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	Maintaining cleanliness and orderliness of receiving bay

1.1 Introduction

Raw materials are materials or substances used in the primary production or manufacturing of goods. Raw materials are commodities that are bought and sold on commodities exchanges worldwide. Raw materials and other ingredients shall be inspected and segregated or otherwise handled as necessary to ascertain that they are clean and suitable for processing into food and shall be stored under conditions that will protect against contamination and minimize deterioration. Raw materials shall be washed or cleaned as necessary to remove soil or other contamination. Containers and carriers of raw materials should be inspected on receipt to ensure that their condition has not contributed to the contamination or deterioration of food.

1.2 Maintaining cleanliness and orderliness of receiving bay

Receiving means checking foods or meals delivered from vendors. The purpose of proper receiving practices is to ensure products ordered are delivered in the amount and quality indicated on the purchase order. In addition, the price of products delivered is verified at the time they are received and any variations in price are noted in writing. During receiving goods the following criteria of products are analyzed before entering in to storage place

Maintaining cleanliness and organization in the workplace is not easy. But it's something you may not be giving enough thought. The fact is, the cleanliness and organization of your workplace have a substantial impact on business and the well-being of your workforce. One thing is certain: workplace safety should be a top priority at all times. Slips and falls are the leading cause of workers' compensation claims. Illness is the No. 1 reason why employees call off work. Employees can't be productive if your environment is grimy and in disarray.

There are a number of reasons behind cleanliness of bay

- Boxes, cartons, packing materials, trolleys and other obstructions are trip hazards.
- Keeping the stock / inventory receiving area clean helps prevent goods becoming soiled (dirty) and stops staff becoming dirty.
- A tidy receiving area means that when goods are delivered they can be easily identified, mistakes will be minimized and checking the deliveries is made easier.
- Shelving should be kept tidy so that goods can be placed directly on them.
- Goods and cartons should not protrude where they can be damaged.
- If accidents occur, spills should be cleaned up straight away so that staff do not slip on them or walk the liquid into other parts of the store.
- Equipment such as pallet jacks and trolleys should be stored safely when not in use

1.3 Orderliness of receiving bay

- FIFO ensures proper rotation of foods in storage. When foods are received, put the oldest in the front and the newest in the back. Past-dated foods will lose their quality and sometimes become unsafe Inventory cycle. The ‘first in first out’ principle of stock rotation should always be applied. New stock should be stored behind old stock, or underneath it.
- LIFO: The last in, first out (LIFO) method assumes the reverse of the FIFO method: The products most recently purchased are used first. The value of inventory is represented by the unit cost of items in inventory the longest.

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 II: Short Answer Questions

1. Define receive bay (5 point)
2. Write important of maintain cleanness of receive bay (5 point)
3. Write important of maintain Orderliness s of receive bay (5 point)
4. Define FIF(5 point)

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

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

Answer Sheet

1. _____
2. _____
3. _____

Information Sheet 2- Store policies and procedures of receive bay

2.1 Store policies

Acting sustainably and responsibly towards society and future generations is an integral part of how we do business. We develop, manufacture and marketing our consumer products in accordance with principles that ensures their safety and promotes well-being, that do not endanger the environment and that therefore do justice to the trust placed in us. To live up to this claim, we only use materials that have previously passed through a multi-stage selection process involving our experts in a number of specialist functions. Wherever possible we seek to use naturally inspired active ingredients in order to cement our position as a forward looking company. First of all, our raw materials must meet stringent quality criteria, which we continuously update to comply with the latest regulations and international directives. This allows us to guarantee a level of quality and purity in keeping with the high demands that we ourselves and our customers place on our brands. Once all quality and purity criteria have been met, our toxicologists thoroughly check each raw material.

All available information regarding characteristics that could result in potential health risks are included in this process. After this, the raw materials are tested in vitro if required, using all relevant test procedures (e.g. cell cultures to obtain additional findings about interactions with living systems). This phase of the assessment process also allows us to dispense entirely with animal experiments for our cosmetic products. Once raw materials have been classified as safe according to these assessments, their skin compatibility in product applications is tested using volunteers. In the subsequent manufacture of our products, continuous optimization of occupational safety is of as much importance as compliance with the most stringent hygiene standards. We also take steps to ensure that our manufacturing processes are as environmentally friendly as possible.

To ensure we always keep abreast of the latest research, we maintain an in-depth dialog with the scientific community, government authorities and public organizations. Our relationships with product safety and environmental interest groups are just as important. Thus allowing us to actively participate in an exchange on critical issues. We analyze new findings and pointers from scientific literature, the media and interest groups for the irrelevance to our safety assessment. If such data leads to a reassessment of a material, the necessary measures are implemented within an appropriate time frame.

The potential consequences range from the immediate discontinuation of use and the recall of affected products through to replacement with more suitable materials over a longer period. We decide on the use of publicly controversial materials following a responsible, scientifically rigorous examination of the individual case that ensures they are completely safe. We analyze communication with our consumers carefully to identify potential improvements to our products as early as possible and to incorporate these findings into product development.

2.2 Procedures policies

The procedure for receiving of material is summarized below

- The materials are to be delivered by the supplier within the delivery time span fixed.
- At the time of receiving the materials, inspection is to be simultaneously done and the items not complying with the specification are to be forthwith rejected.
- In case of food items, the executive chef or Sous Chef will conduct an inspection. In case of other items, the respective departmental heads shall carry on the inspection.
- On receipt of the materials after inspection, the delivery note is to be signed by the receiving clerk acknowledgment the receipt of materials, inspection stamp is put on the delivery note and signed by the inspecting authority, with or without comments.

- In case of rejection of materials, the actual quantity received is to be written on the goods return voucher and signed by both receiving clerk and the supplier
- In case of excess supply, the additional items can only be received if it is approved by the concerned inspecting authority and countersigned by the financial controller/chief accountant.
- After receiving the materials, the receiving clerk shall prepare daily receiving report in quadruplicate.
- The distribution is account department, stores, food and beverage controls and the fourth copy is retained.

- .

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 II: Short Answer Questions

1. Define Store Policies (5 point)
2. Define Procedures policies (5 point)
3. Important of Store Policies and Procedures policies in receive bay (5 point)

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

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

Answer Sheet

1. _____
2. _____
3. _____

Information Sheet 3- Checking and validating of incoming stocks

1.1 Checking and validating of incoming stocks

Stockmeans all the products your business has for sale. Stock is also all the raw materials or parts your business keeps and uses to make products or provide services. The following are some of the most commonly used procedures which can easily be adopted by most stock rooms:

- Check all purchases/deliveries to confirm that the quality is acceptable and that all products are within the durability date. Foods which arrive in damaged packaging may have been contaminated by foreign bodies, pests or micro-organisms.
- If products are transferred to larger or alternative storage containers, the containers should be labeled to show the contents and the date of arrival or the date by which they should be used. All containers should be closeable to prevent infestation by pests or accidental contamination by foreign bodies or micro-organisms
- Packaged food products should be kept off the floor and away from walls, with adequate space between stock to enable regular inspection for pests and aid cleaning.
- Raw foods and cooked foods should be kept apart during storage and display. In fridges and freezers, cooked foods should be stored above raw food
- The ‘first in first out’ principle of stock rotation should always be applied. New stock should be stored behind old stock, or underneath it.
- Always check the durability date before using the selected stock. If out-of-date, report the fact to the supervisor or discard. Check remaining similar stock.
- Carry out a periodic stock check, the frequency of which will depend on the type and normal durability of the stock carried. A few products of a highly perishable nature may need to be checked daily.

Self-check 3	Written test

Name…… ID…… Date…….

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

Test II: Short Answer Questions

1. Define Stocks (5 point)
2. Write important of Checking and validating of incoming stocks (5 point)

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

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

Answer Sheet

1. _____
2. _____
3. _____

Information Sheet 4- Identifying characteristics and categories of raw materials

4.1 Identifying characteristics

Raw materials and other ingredients shall be inspected and segregated or otherwise handled as necessary to ascertain that they are clean and suitable for processing into food and shall be stored under conditions that will protect against contamination and minimize deterioration. Raw materials shall be washed or cleaned as necessary to remove soil or other contamination. Containers and carriers of raw materials should be inspected on receipt to ensure that their condition has not contributed to the contamination or deterioration of food.

Material scheduled for rework shall be identified as such equipment, containers, and utensils used to convey, hold, or store raw materials, work-in-process, rework, or food shall be constructed, handled, and maintained during manufacturing or storage in a manner that protects against contamination. Effective measures shall be taken to protect against the inclusion of metal or other extraneous material in food. Compliance with this requirement may be accomplished by using sieves, traps, magnets, electronic metal detectors, or other suitable effective means.

Food, raw materials, and other ingredients that are adulterated within the meaning of the act shall be disposed of in a manner that protects against the contamination of other food. If the adulterated food is capable of being reconditioned, it shall be reconditioned using a method that has been proven to be effective or it shall be reexamined and found not to be adulterated within the meaning of the act before being incorporated into other food.

Compliance with this requirement may be accomplished by any effective means, including one or more of the following:

- Using ingredients free of contamination.
- Employing adequate heat processes where applicable.
- Using adequate time and temperature controls.

- Providing adequate physical protection of components from contaminants that may drip, drain, or be drawn into them.
- Cooling to an adequate temperature during manufacturing.
- Disposing of batters at appropriate intervals to protect against the growth of microorganisms.

4.2 Categories of raw materials

Though all the raw materials are obtained naturally, they can be divided into 3 types based according to where it is derived from.

- Plant/tree-based– materials like vegetables, fruits, flowers, wood, resin, latex are obtained from plants and trees.
- Animal-based– materials like leather, meat, bones, milk, wool, silk are all obtained from animals.
- Mining-based– materials like minerals, metals, crude oil, coal, etc. are obtained by mining the earth.
- Apart from this, a manufacturing unit divides the raw materials into 2 main categories.
- Direct raw materials: The primary component from which a finished product is made is called direct raw materials. For example, wood is a direct raw material from which furniture like chair, tables, bed, etc. are made. Another example is leather used for making purses, shoes, bags, etc.
- Indirect raw materials: On the other hand, indirect raw materials are the materials that supplement in making the finished product from the direct materials. For example, the glue, nails, varnish, etc. used in making wooden furniture like chair, table, bed, etc. are all indirect raw materials. Similarly, the buckles, metal hoops, zips, glue, lining fabric, colors, etc. used in making leather purses, shoes, and bags are all indirect raw materials.

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 (4 point)

1 Which of the following included in raw material source?

A Plant based B. Animals based C. Mining based D. all E. none

Test II: Short Answer Questions

1. Define raw materials(5 point)
2. Important of raw material (5 point)

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

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

Answer Sheet

1. _____
2. _____
3. _____

Information Sheet 5- Inspection of received items for quality

5.1 Inspection of received items for quality

The main aim of inspection is to prevent the production of non-standard items. Theinspection of materialsis today of utmost importance and both quality and quantity must thoroughly be checked and inspected. It is important upon receiving a shipment to make sure that the material meets quality specifications. If it is of great importance that no defects in quality exist, you will probably want to run a quality check on each item of the entire shipment. In manufacturing process, you are able to detect defective materials, and it is clear that the problem lies with the supplier, and then the incoming quality check can be limited to assuring that there is no massive quality problem which would disrupt your production.

The following are the mainobjectives of the Inspectionof materials

- To maintain the quality of the product.
- To receive only the right quantity of materials.
- To make the supplier efficient and careful.
- To make right utilization of the money invested.
- To make the purchase and store staff more watchful and careful
- Increase in profitability.

Self-check 5	Written test

Name…… ID…… Date…….

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

Test II: Short Answer Questions

1. Define inspection of received items for quality (5 point)
2. Write important of inspection of received items (5 point)

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

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

Answer Sheet

1. _____
2. _____
3. _____

Information Sheet 6- Recording stock levels and storing stock system

1.1 Recording stock levels

Everything which is used to make products, provide services and to run business is part of stock. Stock level is the different levels of stock required for effective control of materials at a retail store, to avoid over- and under-stocking of materials.

There are mainly four types of stock levels

- Minimum stock level
- Maximum stock level
- Re-order level
- Danger level

Keeping stock records means writing down

- All stock that comes into your business, and
- All stock that goes out of your business.

Stock records are most useful for businesses which:

- Sell or use many different products or materials
- Sell or use a lot of each product or material
- Have products or materials that are expensive and attractive to steal.

How can stock control improve your business?

Good stock control helps you to:

- Keep the right goods and materials
- Keep the right amount of stock - not too much or too little
- Keep your stock in good condition
- Prevent stock from being lost or stolen
- Re-order stock at the right time

Stock records are useful because they tell you:

- what goods or materials you have sold or used
- How much of the goods or materials you have sold or used
- When the goods or materials were sold or used
- How much of the goods or materials you have in stock.

1.2 Storing Stock System

Storage means placing the products in the proper storage area. The purpose of proper storage is to ensure the security and quality of products stored until they are needed. Storage areas should always must be maintained at the proper temperature to ensure product quality, and locked to ensure product security. As a result the products in storage areas have been stored according to store policies such as,

- Store items using FIFO (First In, First Out).
- To do this, store new supplies behind old supplies so that the old supplies are used first.
- Store food and chemicals in separate areas.
- Date foods and place new foods behind current stock.
- Keep food in clean, sturdy containers to prevent pest and rodent infestation.
- Keep food off the floor and away from the walls.
- Keep the shelving and floor clean

Self-check 6	Written test

Name…… ID…… Date…….

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

Test II: Short Answer Questions

1. Define Stock Levels (5 point)
2. Write impact Recording Stock Levels (5 point)
3. Write impact Recording Stock Levels (5 point)

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

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

Answer Sheet

1. _____
2. _____
3. _____

Information Sheet 7- Rotating and storing stock

7.1 Rotating and storing stock

Rotate Stock means moving older stock to the front of the shelf in the cost or profit centers. Using this system means that the older stock is sold or used before the new stock and there is not a buildup of out of date stock. Rotating the stock also means that the stock will always be fresh.

Rotate stock and store according to FIFO (first in, first out) method assumes that products are withdrawn from inventory in the order in which they are received and entered into storage. Therefore, the products that remain in storage are judged to be the most recently purchased items. The value of inventory becomes the cost of the most recently purchased products.

LIFO (last in, first out) method assumes the reverse of the FIFO method. The products most recently purchased are used first. The value of inventory is represented by the unit cost of items in inventory the longest.

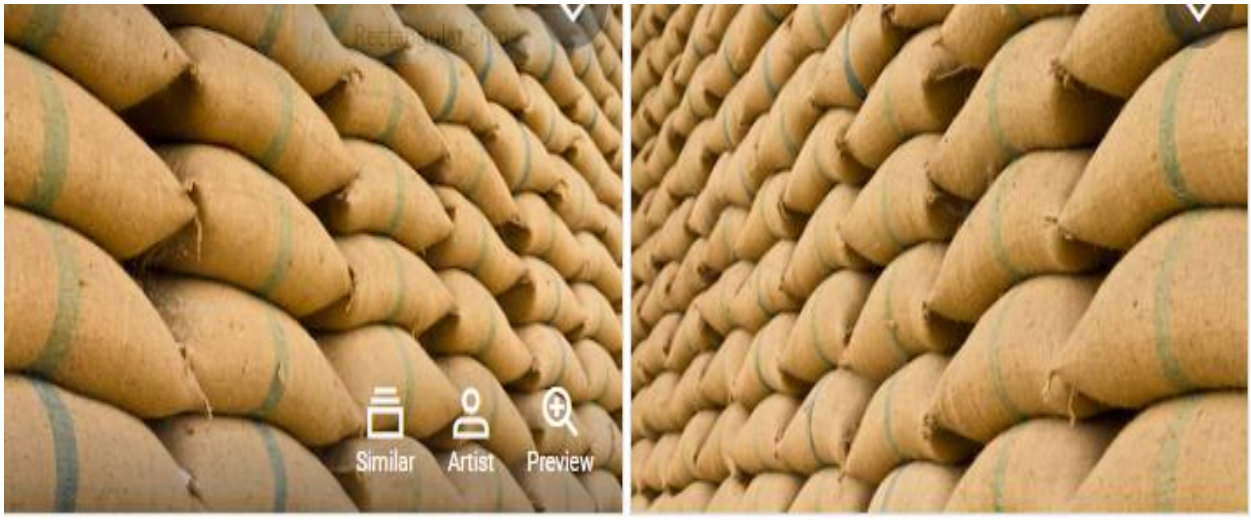


Figure 7.1 Seed stock

Self-check 7	Written test

Name…… ID…… Date…….

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

Test II: Short Answer Questions

1. Define rotating stock(5 point)
2. Write important of rotating stock (5 point)

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

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

Answer Sheet

1. _____
2. _____
3. _____

Information Sheet 8- Application of labeling system in store policy

8.1 Application of labeling system in store policy

Many frozen, perishable and semi-perishable supplies are already labelled with the delivery date and use-by date. But not all goods are labelled, so your workplace will have a labelling system. For example, with a large fresh meat delivery, the meat may be divided into smaller portions to be refrigerated or frozen, so you will need to label it. Labels may contain name of product and a description e.g. what is contained in cooked items, date of delivery use-by date and directions to staff Labels should not come into direct contact with the goods. Once you have your storage organized and each location or zone has a name or description, then you can move on to labelling all of your items.

The labelling system include

- batch code
- bar code
- identification numbering systems
- serial numbers
- symbols for safe handling
- ADG and HAZCHEM Codes

Self-check 8	Written test

Name…… ID…… Date…….

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

Test II: Short Answer Questions

1. List important of labeling of stored stock (5 point)
2. Which is included in the label system? (5 point)

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

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

Answer Sheet

1. _____
2. _____
3. _____

Information Sheet 9- dispatching of stocks

9.1 Dispatching of Stocks

When you are rotating stock and checking stock levels, you may find spoilt food, food that is out of date, food in damaged containers and hazardous substances. These unwanted goods must be disposed of in a way that does least harm to the environment. The Food Safety Code requires workplaces to keep food that is to be disposed of separate from other food. It must be labelled until it can be destroyed or disposed of so it can't be eaten by humans returned to the supplier. Further processed to make sure it is safe to eat e.g. immediately cooking food that has thawed. If food and other goods in your workplace are being thrown away, proper and safe waste disposal methods must be used. Every workplace will have its own procedures, but here are some guidelines. Waste disposal method of damaged stock are the wastes generated from the stock treated using 3-R plus.

- **Reduce** means that manage waste is to not produced it.
- **Reuse** means reuse products for the same use and for another process as input.
- **Recycle** means remanufacture the products or materials and sell it as a new product.

Self-check 9	Written test

Name…… ID…… Date…….

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

Test II: Short Answer Questions

1. Write important of dispatching stock
2. Write 3R of dispatch waste.

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

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

Information Sheet 10-	Application of store price and code labels

10.1 Application of store price and code labels

Code label including barcodes can make the whole process much easier but it can still be quite time-consuming. Many frozen, perishable and semi-perishable supplies are already labeled with the delivery date and use-by date. But not all goods are labeled, so your workplace will have a labeling system. For example, with a large fresh meat delivery, the meat may be divided into smaller portions to be refrigerated or frozen, so you will need to label it.

Labels may contain:

- name of product and a description e.g. what is contained in cooked items
- date of delivery
- use-by date
- directions to staff

Self-check 10	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 (4 point)

1. which of the following is included in labeling

A. name of product B. Date of delivery C. Use by date D. all E none

Test II: Short Answer Questions

1. List important of labeling

LG #14	LO #6- Complete maintenance operation

Instruction sheet

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

- Recording work place information
- Collecting, recycling and /or disposing wastes.
- Cleaning and storing tools and equipment

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:

- Record work place information
- Collect, recycle and /or dispose wastes.
- Cleaning and storing tools and equipment

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	Recording work place information

1.1 Recording work place information

Workplace information is recorded clearly and accurately in the format and at the time required by the organization. The maintenance file is a compilation of various documents and records relating to operation, maintenance, inspection, testing evaluation, and repair of the equipment. The methods selected for establishing adequate information retention and retrieval shall be determined by the equipment custodian. An electronic recordkeeping system may be used. If a computerized maintenance management system such as Maximo is used and maintenance records are not retained in the crane file, the crane file should state where the electronic maintenance records are kept. The crane maintenance file shall contain, as a minimum, the required current dated periodic inspection records and other documentation to provide the user with evidence of a safe and reliable maintenance program.

Keep dated reports of operational tests and the rated load test as long as the device is available for use. Inspection records should be retained in a format and location that provides for ease in accessibility. Maintenance file information should provide a source for comparing present conditions with past conditions to determine whether existing conditions show a trending pattern of wear, deterioration, or other comparable factors that may compromise safe, continued use of the equipment. Length of record retention shall be determined by the equipment custodian's established maintenance program.

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 II: Short Answer Questions

1. Write important of recording work place information
2. List recording method work place information

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

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

Information Sheet 2- Collecting, recycling and /or disposing wastes

2.1 Collecting Waste

Collection is a part of the process of waste management. It is the transfer of solid waste from the point of use and disposal to the point of treatment or landfill. Waste collection also includes the curbside collection of recyclable materials that technically are not waste, as part of a municipal landfill diversion program. Waste is collected and disposed of or recycled to minimize damage to the external environment.

2.2 Recycling waste

Recycling of waste is defined as any recovery operation by whichwastematerials are reprocessed into products, materials or substances whether for the original or other purposes.

It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations.

2.3 Disposing Wastes

Isremovinganddestroyingorstoringdamaged,usedorotherunwanteddomestic,agriculturalor industrialproductsandsubstances.Waste is collected and disposed of or recycled to minimize damage to the external environment. Tools and equipment are cleaned and store according to organization work procedures. Disposal includes burning, burial at land fillsitesoratsea,andrecycling the collection, processing, andrecyclingordepositionof the waste materials of human society. Waste is classified by source andcomposition. Broadly speaking, waste materials are either liquid or solid in form, and their components may be either hazardous or inert in their effects onhealthand theenvironment. The termwasteis typically applied to solid waste, sewage (wastewater), hazardous waste, andelectronic waste.

Figure1.Collected waste

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 II: Short Answer Questions

1. Define disposing waste (5point)
2. Write source of waste(5point)
3. List and discuss 3R way of disposing waste (5 point)

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

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

Information Sheet 3- Cleaning, storing tools and equipment

3.1 Cleaning

Tools and equipment are cleaned and stored according to organization work procedures. The workplace environment influences employees' productivity, performance and well-being. No matter the industry, maintaining a clean workplace may help keep staff members safe, healthy and efficient. However, busy production schedules and increasing workloads may cause standards to dip. While it may be tempting to put off dusting or other types of cleaning around the office or worksite, doing so may put employees at risk of suffering an injury or illness and may even impact performance levels. Maintaining a clean workplace is vital for employers to reduce their workers compensation claims and keep efficiency high.

Heavy contamination can be removed with mild soap solutions. Grease and oil can be removed with petroleum ether. The instrument should then be cleaned with a so/so mixture of distilled water and 96% ethanol. This solution is not suitable for cleaning the optics. The mechanical parts (coarse adjustment, fine adjustment, condenser focusing, and mechanical stage) should be periodically cleaned and lubricated with a drop of machine oil to make them run freely.

3.2 storing tools and equipment

The proper care and storage of tools and equipment are not only the concern of the management but of the workers who use the equipment.

Importance of proper storage of tools and equipment

- It is an important factor for safety and health as well as good business.
- Improves appearance of general-shop and construction areas.
- Reduces overall tool cost through maintenance.
- This also ensures that tools are in good repair at hand.
- Teaches workers principles of (tool) accountability.

Pointers to follow in storing tools and equipment:

- Have a designated place for each kind of tools.
- Label the storage cabinet or place correctly for immediate finding.
- Store them near the point of use.

Self-check 3	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 (4 point)

1. Which of the following are important time for cleaning of tools and equipment

A. Before work activity is carried out B. After a work activity is finished

C between work activities if needed D all E none

Test II: Short Answer Questions

1. What are important of seed cleaning?(5point)
2. What are important of storing of cleaned tools and equipment?

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

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

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The Association of Southeast Asian Nations (ASEAN), 2012 Trainee manual Clean and maintain industrial work area and equipment clean and maintain industrial work area and equipment

The Association of Southeast Asian Nations (ASEAN), 2012 Trainee manual Receive and store stock

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