



# **Cereal processing**

## **Level-II**

**Based on May 2019, Version 2 Occupational standards**

**Module Title: Operating a Cereal Cleaning and Conditioning Process**

**LG Code: IND CRP2 M06 LO (1-3) LG (17-19)**

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## Table of Contents

### **LO #1- Prepare the cereal cleaning and conditioning equipment and**

### **process for operation..... 3**

Instruction sheet .....	3
Information Sheet 1- Confirming available raw materials.....	4
Self-Check 1.....	7
Information Sheet 2- Identifying and confirming cleaning and maintenance operational status .....	8
Self-Check 2.....	10
Information Sheet 3- Fitting and adjusting machine components, services .....	11
Self-Check 3.....	13
Information Sheet-4: Entering operation of equipment parameters .....	14
Self-Check 4.....	15
Information Sheet 5- Identifying operations of equipment and process .....	16
Self-Check 5.....	17
Information Sheet-6 Setup the bin system for production requirements. ....	18
Self-Check 6.....	22
Information Sheet-7 Checking and adjusting cereal cleaning and conditioning equipment.....	23
Self-Check 7.....	27
Information Sheet-8 Carrying out Pre-start checks at workplace requirements ....	28
Self-Check 8.....	30

### **LO #2- Operate and monitor the cereal cleaning and conditioning process**

### **..... 31**

Information Sheet-1 Starting and operating process with workplace policies and procedures.....	33
Self-Check 1.....	36
Information Sheet-2 Monitoring cereal cleaning and conditioning equipment .....	37
Self-Check 2.....	47
Information Sheet-3 Identifying variation in equipment operation and maintenance	48
Self-Check 3.....	52
Information Sheet-4 Reporting variation in equipment operation with workplace legislative .....	53
Self-Check 4.....	54
Information Sheet-5 Monitoring and confirming process grist with specifications .	55
Self-Check 5.....	57



Information Sheet-6 Monitoring the process to confirm impurity removal specification ..... 58  
 Self-Check 6..... 61  
 Information Sheet-7: Identifying, rectifying and/or reporting out-of-specification product ..... 62  
 Self-Check 7..... 64  
 Information Sheet-8 Maintaining the work area in housekeeping standards..... 65  
 Self-Check 8..... 70  
 Information Sheet-9 Conducting work with workplace environmental guidelines.. 71  
 Self-Check 9..... 74  
 Information Sheet-10 Maintaining workplace records as workplace information... 75  
 Self-Check 10..... 77  
 Operation Sheet 1 ..... 78  
 LAP TEST ..... 79

**LO #3 shut down the cereal cleaning and conditioning process..... 80**

Instruction sheet ..... 80  
 Information Sheet-1 Identifying shutdown procedure..... 81  
 Self-Check 1..... 83  
 Information Sheet-2 Shutdown the process with workplace procedures..... 84  
 Self-Check 2..... 86  
 Information Sheet-3: Identifying and reporting maintenance requirements..... 87  
 Self-Check 3..... 90



## LG #17

## LO #1- Prepare the cereal cleaning and conditioning equipment and process for operation

### Instruction sheet

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

- Confirming available raw materials
- Identifying and confirming cleaning and maintenance operational status.
- Fitting and adjusting machine components, services and related attachments
- Entering Processing/operating parameters.
- Identifying operations of equipment and process.
- Setup the bin system for production requirements.
- Checking and adjusting cereal cleaning and conditioning equipment performance.
- Carrying out Pre-start checks at workplace requirements

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:

- Confirm available raw materials.
- Identify and confirm cleaning and maintenance operational status.
- Fit and adjust machine components, services and related attachments
- Enter Process/operate parameters.
- Identify operations of equipment and process.
- Setup the bin system for production requirements.
- Check and adjust cereal cleaning and conditioning equipment performance.
- Carry out Pre-start checks at workplace requirements



## Information Sheet 1- Confirming available raw materials

### 1.1 Introduction

Cereals are cultivated grasses that grow in temperate and tropical region Cereals are the crop plants belonging to the grass family, poaceae/graminae. These are grown for their edible starchy seed or grain (one seeded fruit know as caryopsis). The important grain crops used as staple food are cereals such as rice, maize, millet, teff, sorghum, oat wheat and barley. Once a cereal crop is harvested, it may have to be stored for a period of time before it can be marketed or used as feed or seed. The length of time cereal can be safely stored will depend on the condition it was harvested and the type of storage facility being utilized.

Conditioning of grain has the single purpose of preserving the quality of grain. Low moisture content and low temperature have been shown to be essential for successful storage of grain for a long period of time. A number of processes are available for conditioning of grain thereby ensuring safe storage. When seed are brought in from the field, they contain undesirable materials such as pieces of stems, dust, weed seeds, other crop seed, and off-size, discolored, broken, and otherwise impaired units of the crop seed. Before the seed can be sold for planting through regular trade channels, enough of the undesirable materials must be removed to enable the seed to meet quality standards demanded by the farmers and required by law.

In addition to removal of undesirable materials, seed often need to be treated with a fungicide before marketing. Preparation of seed for market, therefore, involves a series of mechanical operations designed to remove undesirable materials, apply a chemical treatment as needed, and to package the seed in some container suitable for distribution and marketing. These various operations/processes are termed Seed conditioning, and encompasses, more specifically, operations such as receiving, pre-conditioning

Page 4 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1
			October 2020



(debearding, hulling, partial cleaning, etc.), conveying, cleaning, sizing, up-grading, treating, and packaging.

## 1.2 Confirming available raw materials

As an agro-raw material and its manufactured products assume great commercial significance and status, crop specialization, modernization in agriculture and industry takes place by creation of capital. This is demonstrated by the area's heavy demand of agricultural inputs mainly fertilizers, irrigation equipment and agricultural light machinery. Farmers cultivate the crop more carefully with an economic and commercial sense and tend to specialize in a few profitable crops. Manufacturing sector also improve itself by improved technology and development of industrial complex. Specialization of crops and manufactured products is often observed as underlying the process of Industrialization.

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. The whole agricultural products supplying raw materials to agro -industries are almost consumed locally. The following crops supply major cereal raw materials are rice, oats, rye, barley, wheat and triticale and maize

Page 5 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1
			October 2020



**Figure 1 .Common cereal grains (anticlockwise from bottom) rice, oats, rye, barley, wheat and triticale and maize (centre). Photo: T Westcott**



Self-Check 1.	Written test
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Name \_\_\_\_\_ ID \_\_\_\_\_ Date \_\_\_\_\_

**Directions:** Answer the questions listed below.

**I choose the best answer**

1. which of the following is not include in cereal raw materials?(5point)

A wheat B maize C Sesame D barley E all F none

**II. Write short answer/s**

1. Define cereals.(5point)
2. Write at least four common cereal raw material.(5point)





## Information Sheet 2- Identifying and confirming cleaning and maintenance operational status

### 2.1 Cleaning machinery equipment's

Cleaning is the complete removal of food soil using appropriate detergent chemicals under recommended conditions. 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. Clean the outside part of the equipment (the machine) using a vacuum cleaner to prevent dispersal of dust in the environment and in the surrounding area; or use a moist cloth. Do not use compressed air. Wash the equipment (the machine), after vacuuming the dust, with a low-pressure water jet.

Equipment can be categorized with regard to cleaning method as follows:

- Mechanical Cleaning. Often referred to as clean-in-place (CIP). Requires no disassembly or partial disassembly.
- Clean-out-of-Place (COP). Can be partially disassembled and cleaned in specialized COP pressure tanks.

### 2.2 Operational maintenance of machinery

Operational maintenance is the care and minor maintenance of equipment using procedures that do not require detailed technical knowledge of the equipment's or system's function and design. This category of operational maintenance normally consists of inspecting, cleaning, servicing, preserving, lubricating, and adjusting, as required. Such maintenance may also include minor parts replacement that does not require the person performing the work to have highly technical skills or to perform internal alignment.

Some operational maintenance responsibilities can be as simple as inspecting the machine to spot any changes or issues. This allows the operator to detect a potential danger, such as loose fasteners or debris that could contribute to an accident. Basic cleaning, including removing debris or excess grease from a machine, is also considered part of operational

Page 8 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1 October 2020
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maintenance. Depending on the type of equipment in use, operators may also be responsible for replacing worn out filters or cartridges, or removing and replacing a worn belt, cutting tool, or grinding stone. Operational maintenance may entail keeping machinery well lubricated to reduce the risk of friction or failure. Many basic machine adjustments needed during the course of operation also fall within this category of preventative maintenance

As the term implies, operational maintenance, is performed by the operator of the equipment. Its purpose is threefold:

- to make the operator aware of the state of readiness of the equipment;
- to reduce the delays that would occur if a qualified technician had to be called every time a simple adjustment were needed; and
- to release technicians for more complicated work

Maintenance activities fall into three general categories:

- **Routine maintenance:** Activities that are conducted while equipment and systems are in service. These activities are predictable and can be scheduled and budgeted. Generally, these are the activities scheduled on a time-based or meter-based schedule derived from preventive or predictive maintenance strategies. Some examples are visual inspections, cleaning, functional tests, and measurement of operating quantities, lubrication, oil tests, and governor maintenance.
- **Maintenance testing:** Activities that involve using test equipment to assess condition in an offline state. These activities are predictable and can be scheduled and budgeted. They may be scheduled on a time or meter basis but may be planned to coincide with scheduled equipment outages. Since these activities are predictable, some offices consider them “routine maintenance” or “preventive maintenance.” Some examples are governor alignments and balanced and unbalanced gate testing.
- **Diagnostic Testing:** Activities that involve using test equipment to assess the condition of equipment after unusual events, such as equipment failure/ repair/replacement or when equipment deterioration is suspected.

Page 9 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1
			October 2020

**Self-Check 2.****Written test**

Name \_\_\_\_\_ ID \_\_\_\_\_ Date \_\_\_\_\_

**Directions:** Answer the questions listed below.**I choose the best answer (4points)**

1. Which of the following is included in operation maintenance?  
A. inspecting, B. Cleaning D. Lubricating D all

**II. Write short answer/s**

1. What is important of cleaning of machinery equipment's (5point)  
2. List types of maintenance activity of equipment's.(5point)

**Note: Satisfactory rating – 7 points****Unsatisfactory – below- 7points**

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



## Information Sheet 3- Fitting and adjusting machine components, services

### 3.1 Introduction

Regular checks & adjusting equipment performance are important for cereal cleaning in order to maintain equipment efficiency and avoid frequent breakdowns. Fitting is Make correct and proper the machine/equipment components for the pre-processing of cereal cleaning. Adjusting is Prepare/ checking the cleanliness, power and operation of cereal cleaning machines, equipment and containers Machine tools are capable of producing work at a faster rate, but there are occasions when components are processed at the bench. Sometimes it becomes necessary to replace or repair a component, which must fit accurately with another component on re-assembly. This involves a certain amount of hand fitting. The accuracy of work done depends upon the experience and skill of the fitter.

### 3.2 Fitting and adjusting machinery

Ensure that all power sources are turned off when the machine is not in use. This includes electrical and pneumatic power. Understand the lockout procedure and use it before fitting, adjusting, inspecting, maintaining, servicing or cleaning the equipment to help prevent anyone from accidentally turning on power to the machine. Read the manual for any special operational instructions for each piece of equipment.

- Adjustments in harvesting equipment
  - ✓ Combine harvester adjustments:
    - Adjust machine speed
    - Adjust cylinder concave clearance and cylinder speed.
    - Adjust cutter bar height
    - Reel adjustment
- Service include the following
  - ✓ power
  - ✓ vacuum
  - ✓ compressed and instrumentation air
  - ✓ Warm water

Page 11 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1 October 2020
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**Figure1. Fitting and adjusting machine components**



Self-Check 3

Written test

Name \_\_\_\_\_ ID \_\_\_\_\_ Date \_\_\_\_\_

**Directions:** Answer the questions listed below.

**I. Write short answer/s**

1. Define fitting and adjusting equipment respectively (5point)
1. important of fitting and adjusting of equipment(5point)

**Note: Satisfactory rating –5 points      Unsatisfactory – below-5 points**

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



## Information Sheet-4: Entering operation of equipment parameters

### 4.1 Introduction

Defined as the management of the asset on a day-to-day basis, operations management includes; device monitoring, control and performance assessment, environmental monitoring and logistics management. The latter category could include; O&M scheduling (including organizing personnel), responding to faults, as well as co-ordination with equipment manufacturers and suppliers, service providers, consenting bodies and harbour authorities. Integral functions also include the sale of generated electricity, co-ordination with utility companies and the distribution grid, marketing, administration, accounting, dealing with warranty issues and human resources management. A vital part of operations management is the ability to determine how the device is performing at the deployment site and when support vessels are required to perform O&M activities. The latter requirement is clearly dependent on the vessel characteristics, vessel availability and environmental conditions.

### 4.2 Operation of equipment parameters

The cleaning sieve machine of cereal is suitable for cereal cleaning before grain storage. It is also suitable for cleaning and classifying in the industries of milling, feed, rice, chemicals, food, oil extraction and other industries. This machine can clean raw materials through the replacement of different pore size sieve. A sudden change in a parameter of equipment can cause a process leading to:

- wastage of raw materials
- production of off special materials
- equipment shutdown
- equipment downtime
- increased production costs
- environmental damage
- Potential personnel hazard.

Page 14 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1
			October 2020



**Self-Check 4**

**Written test**

Name \_\_\_\_\_ ID \_\_\_\_\_ Date \_\_\_\_\_

**Directions:** Answer the questions listed below.

**I. Write short answer/s**

1. Write important of operation of equipment parameters (5point)

**Note: Satisfactory rating – 2.5 points      Unsatisfactory – below- 2.5 points**

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





## Information Sheet 5- Identifying operations of equipment and process

### 5.1 Identifying operations of equipment and process

During starting and operating the cereal seed cleaning equipment, the basic operating principles followed may include:

- Selection of Appropriate materials and equipment used in of cereal cleaning
- Checking main equipment components,
- Checking status and purpose of guards,
- Maintaining equipment operating capacities and applications,
- purpose and location of sensors and related feedback instrumentation
- The safe operation and maintenance of cereal cleaning materials and equipment.
- Hazard and risk identification.
- Emergency operating and defensive operating procedures ensuring working loads are secure and within specifications.
- Appropriate use, maintenance and storage of personal protective equipment.
- Outdoor work includes protection from solar radiation, hazardous noise, mechanical vibration and organic and other dusts.
- Protection of people in the workplace.

Page 16 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1
			October 2020



Self-Check 5

Written test

Name \_\_\_\_\_ ID \_\_\_\_\_ Date \_\_\_\_\_

**Directions:** Answer the questions listed below.

**I. Write short answer/s**

1. Write basic operating principles of equipment (5point)

**Note: Satisfactory rating – 2.5 points      Unsatisfactory – below- 2.5 points**

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



## Information Sheet-6 Setup the bin system for production requirements.

### 6.1 Introduction

One of the first steps to complete when implementing a warehouse management system or any inventory system is to set up the warehouse in a manner that will utilize your space and increase efficiency. Things to consider when setting up your warehouse are bin locations, bin types, zones, signage and labeling. The main goal is to increase the space for storage of inventory and improve inventory accessibility for all of the daily operations like receiving, picking, packing, and shipping). Bin is a large container or enclosed space for storing something in bulk, such as cereal, oilseed, and coal.

### 6.2 Setup the bin system for production requirements

Grain is often dried in a grain dryer before being stored in the bin. Bins may be round or square, but round bins tend to empty more easily due to a lack of corners for the stored material to become wedged and encrusted. The stored material may be powdered, as seed kernels, or as cob corn. Due to the dry nature of the stored material, it tends to be lighter than silage and can be more easily handled by under-floor grain unloaders. To facilitate drying after harvesting, some grain bins contain a hollow perforated or screened central shaft to permit easier air infiltration into the stored grain. Characteristics good Bin are:

- Appropriate level for the bins.
- Avoid using worn augers and mechanical spreaders that will damage the seed while filling.
- Aerate the bin as soon as it is filled to remove the heat, regardless of the moisture.
- Aerate the stored cereal seed to maintain temperature
- Check the bin every couple of weeks throughout the season for signs of crusting, aerate if needed.
- Be sure the bin is ready for unloading

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Page 18 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1 October 2020
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**Figure1. Silo bin contains 27 variations of stone, sand and gravel, Copenhagen, Denmark**

### **6.3 Bin hazards/ Dry-material**

Safety conduct requires knowledge of the potential hazards and then exercising the necessary degrees of caution to avoid hazards. Preventive measures aimed at avoiding hazards must be directed towards the elimination of unsafe acts and unsafe conditions.

Elimination of unsafe acts calls upon supervisors to take remedial action when someone does not heed laid down safety regulations because these unsafe acts set a bad example.

It only takes a minor incident to frustrate the safety diligence of all the other workers in the team, apart from the fact that their safety might also be placed in jeopardy as well.

Unsafe conditions include poor housekeeping, safeguarding machinery and lack of personal protective equipment.

There have also been many cases of silos and the associated ducts and buildings exploding. If the air inside becomes laden with finely granulated particles, such as grain dust, a spark can trigger an explosion powerful enough to blow a concrete silo and adjacent buildings apart, usually setting the adjacent grain and building on fire. Sparks are often



caused by (metal) rubbing against metal ducts; or due to static electricity produced by dust moving along the ducts when extra dry.

The two main problems which will necessitate silo cleaning in dry-matter silos and bins are bridging and rat-holing. Bridging occurs when the material interlaces over the unloading mechanism at the base of the silo and blocks the flow of stored material by gravity into the unloading system. Rat-holing occurs when the material starts to adhere to the side of the silo. This will reduce the operating capacity of a silo as well as leading to cross-contamination of newer material with older material. There are a number of ways to clean a silo and many of these carry their own risks. However, since the early 1990s acoustic cleaners have become available. These are non-invasive, have minimum risk, and can offer a very cost-effective way to keep a small particle silo clean. Silos are hazardous, and people are killed or injured every year in the process of filling and maintaining them. The machinery used is dangerous and with tower silos workers can fall from the silo's ladder or work platform. Several fires have occurred over the years.

**6.4 Cleaning and handling the bin**

Any residual grain debris left inside a grain bin can be the source of insect or mould contamination in the new crop. The bins should be swept and vacuumed to remove all traces of dust, mould and old grain. Ensure that all fines, broken pieces of grain and dust are removed from any seams, ledges and flooring. Scrape, brush and thoroughly clean any areas that have caked on grain or mould and let dry thoroughly. Inspect the integrity of the grain bin walls for signs of rust and buckling. Rust caused by wet grain sitting against the grain bin sides can create rapid metal corrosion. Bins showing rust may have structural damage and should be inspected by an expert before the bin is put back in service. Repairs and repainting may be required. Cleaning and maintaining the oilseed bins early in the season gives the time to handle unexpected issues with long before the frenzy of harvesting and storing the crop bounty. Once bins are empty; then a visual inspection of the entire structure is warranted. Start by walking the perimeter of the bin and assessing the condition of the grain bin base.

Page 20 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1
			October 2020



**Figure 2. Cleaning of bin storage**

- Bin Inspection
  - ✓ Once grain has been stored in the bins, regular but frequent inspections at intervals of say once every week or two weeks must be conducted to monitor the grain quality, signs of deterioration or infestation.
  - ✓ Inspect top of grain mass if accessible, around aeration ducts and vents, at manholes, unload conveyors for signs of live insects or webbing.
  - ✓ Signs of crawling and flying insects on the top of the grain pits may be an indication of damage already done within the grain pile.
  - ✓ During the inspection check for signs of rain or water leakage and the integrity of the structure in general.



<b>Self-Check 6</b>	<b>Written test</b>
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Name \_\_\_\_\_ ID \_\_\_\_\_ Date \_\_\_\_\_

**Directions:** Answer the questions listed below.

**I. Choose the best answer**

1. Which of the following is consider in setup of bin (4point)

A. locations, B. bin types, zones, C. labeling. D. all E None

2. Which of the following is not characteristic of bin? (4point)

A. easy for loading and unloading B easy for cleaning Good Aeration D. all E .none

**II. Write short answer/s**

1. What are difference between modern and tradition seed storage system? (5 point)

**Note: Satisfactory rating – 6.5 points      Unsatisfactory – below- 6.5 points**

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

Page 22 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1 October 2020
---------------	---	-------------------------------	----------------------------



## Information Sheet-7 Checking and adjusting cereal cleaning and conditioning equipment

### 7.1 Introduction

Cleaning in agricultural processing generally means the removal of foreign and undesirable matters from the desired grains/products. This may be accomplished by washing, screening, Hand picking etc. Cleaning grain can substantially improve its quality and hence its grade and price. Cleaning involves the removal of foreign matter such as stones, plant material from harvesting such as husks, pods etc. and broken grain and dust produced during threshing. At the same time it is possible to remove insect damaged and mouldy grains by hand picking.

Cleaning is often done manually by winnowing. This involves tossing the grain into the wind which carries off the lightest impurities, while the heavier grain falls onto a mat. However, this does not separate the heavier impurities. Conditioning of grain has the single purpose of preserving the quality of grain. Low moisture content and low temperature have been shown to be essential for successful storage of grain for a long period of time. A number of processes are available

This depends on type of work equipment, its use and the conditions to which it is exposed. An inspection should concentrate on those safety-related parts which are necessary for the safe operation of work equipment and, in some cases; this may require testing or dismantling. However, not all safety-critical features on a particular item of work equipment may require inspection at the same intervals. An inspection can vary in its extent, as the following demonstrate:

- quick checks before use (eg electric cable condition on hand-held power tools, functional testing of brakes, lights on mobile machinery)
- weekly checks (eg presence of guarding, function of safety devices, tyre pressures, the condition of windows, and mirrors)

Page 23 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1
			October 2020





- more extensive examinations, undertaken every few months or longer (eg general condition of a ladder, close examination of a safety harness, portable appliance testing)

The use of checklists can assist but these, and the records made, should be tailored to the particular type of work equipment to minimize the burden to what is strictly necessary for safety. Requiring too much detail too often can lead to inspection activity becoming burdensome with the risk of a superficial 'tick box' approach or even, in some cases, the inspection activity ceasing altogether. You only need to inspect what is necessary for safety. Work equipment which is exposed to conditions causing deterioration that could result in a dangerous situation should be inspected at suitable intervals, and after every event liable to jeopardize its safety. The frequency of inspection may vary depending on environmental conditions (eg equipment subject to harsh outdoor conditions is likely to need more frequent inspections than if used in an indoor environment).

The frequency of inspection should be determined through risk assessment, taking account of the manufacturer's recommendations, industry advice and your own experience. It may be appropriate to review the frequency of inspection in the light of your experience. Intervals between inspections can be increased if the inspection history shows negligible deterioration, or shortened where experience shows this is necessary to prevent danger.

It is important to inspect the inside of the store.

- At the start of each day check the store for signs of water leakage, check the floor and tops of bag stacks for signs of damage (rodent or insect)
- Check for holes in the bags that need to be repaired
- Check for insects in the store, inspect for moving insects eating grain, and use a torch to inspect the dark areas of the store.

Page 24 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1
			October 2020



Figure1.seed cleaning stoner machine Machine Destoner

Integrated Grain Cleaning



**Cereal cleaning and conditioning equipment include the following**

- intake equipment
- day bins
- Screens
- Separators
- aspirators
- extractors/destoners
- scourers
- scales
- dampers
- Measure/mixers
- impact grinders
- materials handling equipment
- conditioning bins
- mechanical/pneumatic stock transfer equipment
- automatic water addition equipment



<b>Self-Check 7</b>	<b>Written test</b>
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Name \_\_\_\_\_ ID \_\_\_\_\_ Date \_\_\_\_\_

**Directions:** Answer the questions listed below.

**I. Write short answer/s**

1. Write important of cereal cleaning .(6point)
2. What are important of checking cereal cleaning (4point)

**Note: Satisfactory rating - 5 points      Unsatisfactory – below- 5 points**

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

Page 27 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1
			October 2020



## Information Sheet-8 Carrying out Pre-start checks at workplace requirements

### 8.1 Introduction

Pre starts often involve routine inspections conducted by the machine or equipment operator. Prior to operating any cereal cleaning equipment, the operator of that equipment completes a visual assessment, check levels, wear, indicator lights, or signs of damage. The Prestart checklist ensures the operators assessments are recorded and saved, this acts not only as a verification that checks are done, but also an accountability measure for operators of that equipment to take responsibility for their equipment.

### 8.2 Carrying out Pre-start checks at workplace

Prestart checks must be made to ensure equipment is not damaged on startup and also to prevent possible injury to personnel during start up, the operational status of safety systems must be checked.

- Check that equipment is plugged in correctly. For example you should never use double adapters to plug in multiple devices. If more than one
  - Device needs to be connected to power you would always use a power board.
- Ensure that the electrical cords are in good condition and not frayed or broken
- Ensure that equipment is properly ventilated. Most machines can get very hot and need to have a proper airflow around them to avoid damage.
- Start equipment in accordance with the organizations or manufacture's guidelines.
- Use safety guards or safety clothing (if applicable). Some equipment can have areas that can cause injury such as cutting blades and overheated
- They will generally have safety guards or may require safety clothing (such as eye or ear protection) to be worn. You should also;
- Log on and off equipment (where applicable) in accordance with the organizations producers. This is to ensure security of the information
  - Contained in computers or other equipment that contains confidential information.

Page 28 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1
			October 2020



- Never try to repair a computer or clear paper jams in a photocopier while the machine is still turned on. This could result in injuries such as
  - Electrocutation if the machinery is faulty
- Turn off all equipment when it is not in use. This prevents machines from overheating and perhaps causing damage, and saves on cost.
- Using business equipment in an unsafe manner is a hazard, not only to your own health and safety, but also to those around you, and possibly even the premises.
- The reason why they are carried out:
  - ✓ Workers safety ( no injury involved)
  - ✓ Working/fitted probably
  - ✓ Electrical equipment is suitable
  - ✓ Electrical equipment is in good condition

Page 29 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1
			October 2020



<b>Self-Check 8</b>	<b>Written test</b>
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Name \_\_\_\_\_ ID \_\_\_\_\_ Date \_\_\_\_\_

**Directions:** Answer the questions listed below.

Choose the best answers

1. Which of the following is included in Pre-start checks (4points)

A Use safety clothing B. Check that equipment is plugged in correctly C. Ensure that equipment is properly ventilated D. all E. None

**II. Write short answer/s**

2. What is Pre-start checks at workplace (5points)

3. Important of Pre-start checks at workplace (5points)

**Note: Satisfactory rating - 7points      Unsatisfactory – below- 7 points**

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

Page 30 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1
			October 2020



## LG #18

## LO #2- Operate and monitor the cereal cleaning and conditioning process

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

- Starting and operating process with workplace policies and procedures.
- Monitoring cereal cleaning and conditioning equipment
- Identifying variation in equipment operation and maintenance.
- Reporting variation in equipment operation with workplace legislative.
- Monitoring and confirming process grist with specifications.
- Monitoring the process to confirm impurity removal specification.
- Identifying, rectifying and/or reporting out-of-specification product.
- Maintaining the work area in housekeeping standards.
- Conducting work with workplace environmental guidelines
- Maintaining workplace records as workplace and recording requirements

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:

- Start and operate process with workplace policies and procedures.
- Monitor cereal cleaning and conditioning equipment
- Identify variation in equipment operation and maintenance.
- Report variation in equipment operation with workplace legislative.
- Monitor and confirm process grist with specifications.
- Monitor the process to confirm impurity removal specification.
- Identify, rectify and/or report out-of-specification product.
- Maintain the work area in housekeeping standards.
- Conduct work with workplace environmental guidelines





- Maintain workplace records as workplace and recording requirements

**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 Starting and operating process with workplace policies and procedures

### 1. Introduction

What are Policies and Procedures? Policies and procedures go hand-in-hand but are not interchangeable. A policy is a set of general guidelines that outline the organization's plan for tackling an issue. Policies communicate the connection between the organization's vision and values and its day-to-day operations. A procedure explains a specific action plan for carrying out a policy. Procedures tell employees how to deal with a situation and when. Using policies and procedures together gives employees a well-rounded view of their workplace. They know the type of culture that the organization is striving for, what behavior is expected of them and how to achieve both of these.

Policies and procedures are helpful for making your workplace run more efficiently, but they are only effective if you enforce them. Enforcement of the guidelines guarantees your organization's operational procedures and decision-making processes are uniform and consistent across cases. When you don't enforce your procedures, you put your organization at risk. If an employee or external person comes forward with an allegation against your company, having formal policies and procedures in place strengthens your case.

### 1.2 Starting workplace policies and procedures in the Workplace

When creating a policy or procedure for your workplace, start by reviewing the mission statement, vision and values. According to the New South Wales Government Industrial Relations, "a workplace policy should:

- set out the aim of the policy
- explain why the policy was developed
- list who the policy applies to

Page 33 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1 October 2020
---------------	---	----------------------------	----------------------------



- set out what is acceptable or unacceptable behavior
- set out the consequences of not complying with the policy
- provide a date when the policy was developed or updated

### 1.3 The Importance of Policies and Procedures

Regardless of your organization’s size, developing formal policies and procedures can make it run much more smoothly and efficiently. They communicate the values and vision of the organization; ensuring employees understand exactly what is expected of them in certain situations. Because both individual and team responsibilities are clearly documented, there is no need for trial and-error or micromanaging. Upon reading the workplace policies and procedures, employees should clearly understand how to approach their jobs.

Formal policies and procedures save time and stress when handling HR issues. The absence of written policies results in unnecessary time and effort spent trying to agree on a course of action. With strict guidelines already in place, employees simply have to follow the procedures and niggers just have to enforce the policies. Implementing these documents also improves the way an organization looks from the outside. Formal policies and procedures help to ensure your company complies with relevant regulations. They also demonstrate that organizations are efficient, professional and stable. This can lead to stronger business relationships and a better public reputation.

To implement effective policies and procedures at your workplace, follow these steps to get the best results.

- Consultation
- Tailor the policy to your business
- Define obligations clearly – be specific!
- Make the policy realistic
- Publicize the policies and procedures
- Train all employees in policies and procedures
- Be consistent in your policy implementation

Page 34 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1
			October 2020



- Review all policies and procedures regularly
- Enforce the workplace policies and procedure

Page 35 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1
			October 2020



<b>Self-Check 1.</b>	<b>Written Test</b>
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Name \_\_\_\_\_ ID \_\_\_\_\_ Date \_\_\_\_\_

**Directions:** Answer all the questions listed below.

**I. Write short answer/s**

1. Define policies and procedures in work place (5point)
11. Write Importance of Policies and Procedure in workplace(5point)

**Note: Satisfactory rating - 5 points      Unsatisfactory – below- 5 points**

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

Page 36 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1
			October 2020



## Information Sheet-2 Monitoring cereal cleaning and conditioning equipment

### 2.1 Introduction

Cleaning grain can substantially improve its quality and hence its grade and price. Cleaning involves the removal of foreign matter such as stones, plant material from harvesting such as husks, pods etc. and broken grain and dust produced during threshing. At the same time it is possible to remove insect damaged and mouldy grains by hand picking. Cleaning is often done manually by winnowing. This involves tossing the grain into the wind which carries off the lightest impurities, while the heavier grain falls onto a mat. However, this does not separate the heavier impurities.

Conditioning of grain has the single purpose of preserving the quality of grain. Low moisture content and low temperature have been shown to be essential for successful storage of grain for a long period of time. A number of processes are available for conditioning of grain thereby ensuring safe storage. The treatment of grain with water and heat before grinding in order to change its structural and biochemical properties. Conditioning improves the milling qualities of grain because the coats become more viscous and elastic than the endosperm and thereby may be removed more easily.

### 2.2 Cereal cleaning equipment

Seed cleaning equipment is not necessary to have expensive seed cleaning equipment to clean seed for small-scale production. Winnowing will still be necessary to remove smaller chaff. Many seeds can be screened with several different mesh sizes of hardware cloth. Aside from hardware cloth, a lot of other materials are useful for making seed screens. Aluminum window screen can be used for small seeds. You'll also find various meshes of screen available in the housewares section of department stores. Cabinets from electronic devices often have round or oblong holes which are useful for cleaning some types of seed. Special meshes can be ordered from mail-order hardware specialty catalogs. It is useful to collect a large variety of mesh sizes and shapes to handle a wide variety of seed types.

Page 37 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1
			October 2020



Most light seed can be winnowed quickly and efficiently with mixing bowls and a hair dryer. It takes a little practice determining the correct amount of seed to put in the bowl, setting the proper fan speed, and the distance of the dryer from the bowl. It helps to jiggle the bowl up and down or to swirl the seed in the bowl. There must be little or no wind when you work with light seed. Until you have a little practice it is best to put a tarp on the ground, in case you need to sweep up your mistake and start over. Heavy seed is best winnowed by pouring the seed from one container to another in front of box fan, or alternatively directing the air discharge hose from a vacuum cleaner into a large (16" diameter) mixing bowl. When dealing with large volumes or certain types of seed it is helpful to use mechanical equipment for winnowing.

- Cleaning grain makes storage and handling easier. Insects attack broken kernels and grain dust quickly than grains. Again, heat and moisture caused by the respiratory activity of grain cannot escape quickly from piles of unclean grain thus creating condition favorable for mould and fungal growth.
- All chaff, dust and other foreign materials recovered at the cleaner and reception pit, any reject grain, empty bags due to the consignment are loaded back to the truck. The truck proceeds to the weighbridge for weighing tare weight and documentation for the delivery completed.
- As the cleaned grain is conveyed, a suitable approved insecticide or fumigant is added into the grain stream at the recommended rate.
- The grain is moved into a designated bin for storage. The plant operator updates the respective bin card and the grain fumigation forms.

Page 38 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1
			October 2020



**Figure1. Wheat cleaning**

**Machines of cereal cleaning and conditioning equipment include**

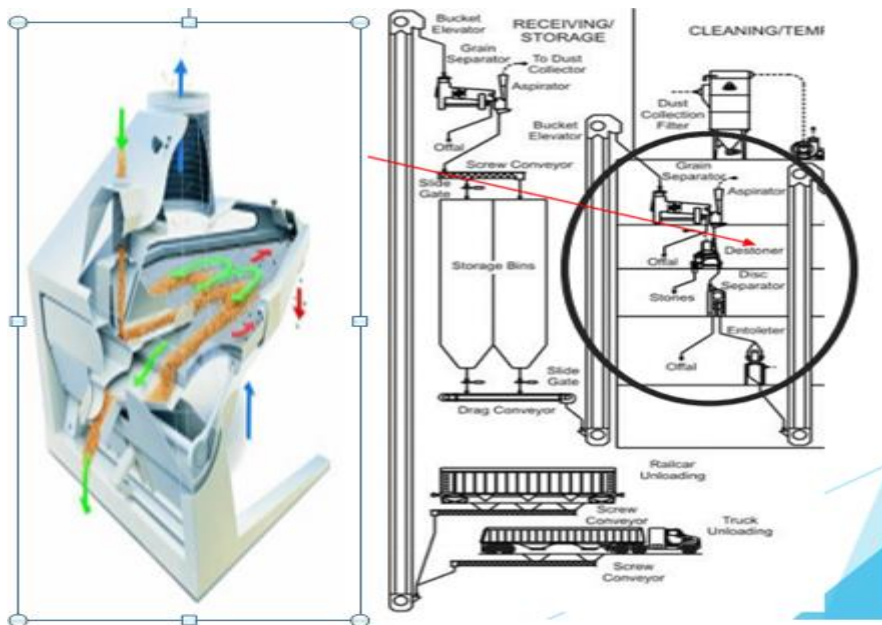
- intake equipment
- day bins
- Screens
- Separators
- aspirators
- extractors/destoners
- scourers
- scales
- dampers
- Measure/mixers
- impact grinders
- materials handling equipment
- conditioning bins
- mechanical/pneumatic stock transfer equipment
- automatic water addition equipment

**Destone machine:** are used for the pre-cleaning and cleaning during the processing

- Eliminate Heavy Impurities such as Stones
- Design offers less flexibility than the gravity Separator and requires more fine-tuning.
  - ✓ Separates the material into four groups by density:
  - ✓ Stones and other Heavy Impurities
  - ✓ Whole Clean Grain



- ✓ Low Density and Damaged Kernels
- ✓ Dust
- The volume of air and the inclination of the deck can be adjusted to suit the grain characteristics and the degree of separation required.



**Figure 2. Destone machine**

Milling Separator: Used separation based on particle size

- Consists of Several Sieves
- May be Combined with Aspirator Sections



**Figure 3. Milling separator**

Scour working principle friction of:

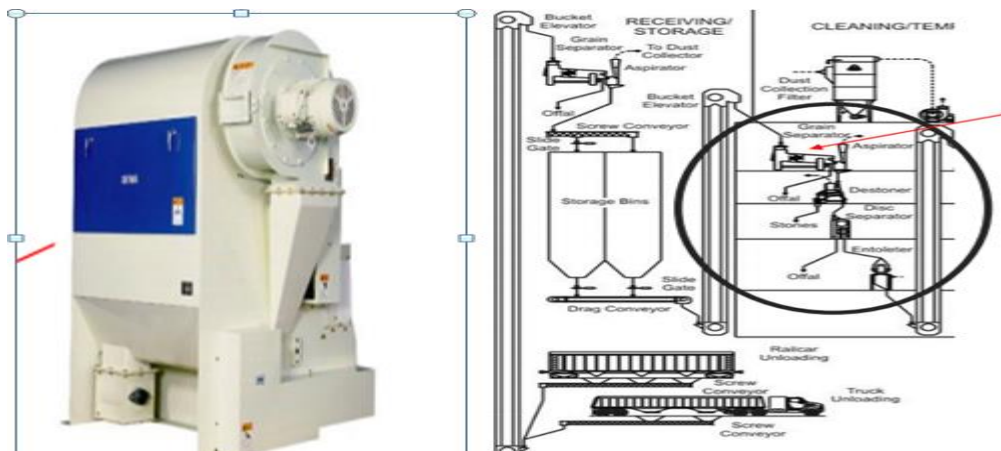
1. Grain against Screen
2. Grain against Rotor Segments
3. Grain against Grain



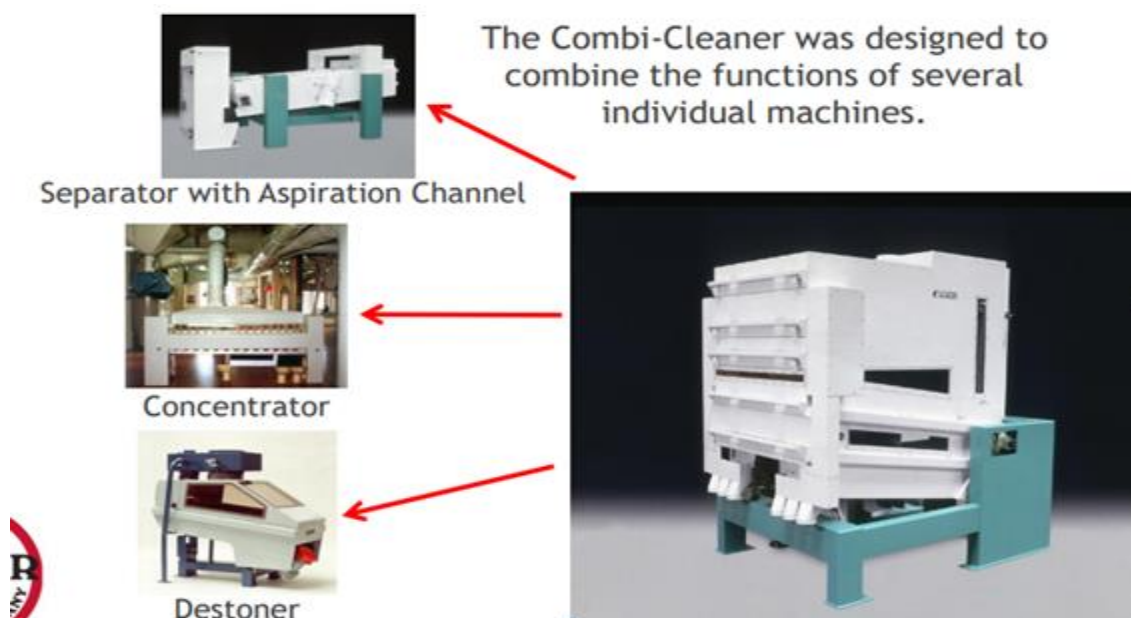
**Figure 4. Scourer**

**Important: Aspiration**  
**Channel after Scourer for**  
**Removal of Remaining Dust**

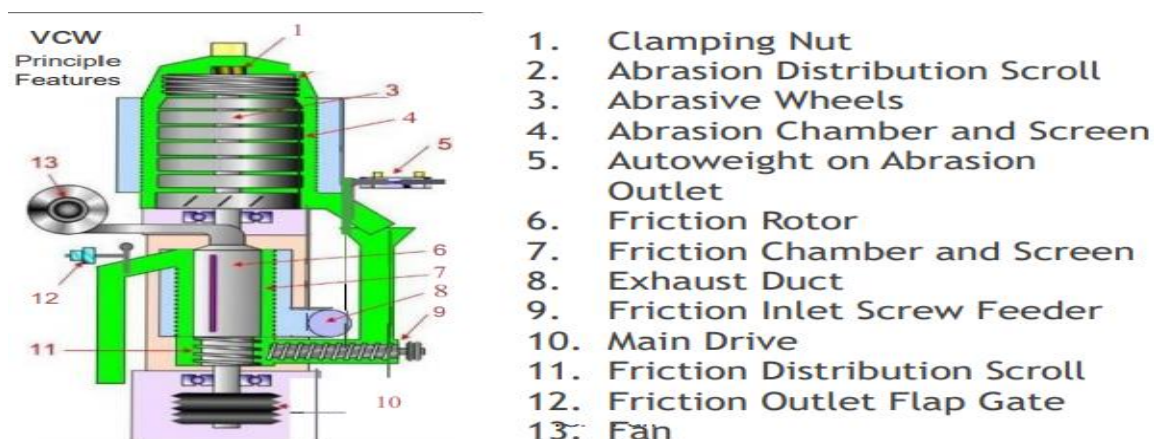
- Aspirator:
  - ✓ Remove Light Materials
    - Shriveled Grains of Wheat
    - Chaff
    - Joints of Straw
    - Dust
  - ✓ Remove Scourings
    - Crease Dirt
    - Bran Particles
  - ✓ Separate Infested Grain
  - ✓ Mildest Form of Wheat Cleaning



**Figure 5. Aspirator**



**Figure 6. Combi-Cleaner**



**Figure 7. Debranner**

### 2.3 Conditioning of grain

The treatment of grain with water and heat before grinding in order to change its structural and biochemical properties. Conditioning improves the milling qualities of grain because the coats become more viscous and elastic than the endosperm and thereby



may be removed more easily. It also improves the bread-baking properties of flour, owing to the action of heat on the protein complex of the moistened grain. In addition, the gluten becomes more pliable, and enzyme activity increases a beneficial factor in the fermentation of dough. Conditioning of grain, known as “soaking grain,” was introduced in Russian mills in the early 19th century.

In this process water acts as a regulator of grain toughness, affecting its various parts differently. For the coats, rich in capillaries and containing large amounts of cellulose and hemicellulose, water acts as a plasticizer, helping to intensify deformation caused by increased toughness. For the endosperm, water acts to decrease toughness, helping to reduce resistance to grinding. Heat accelerates all the conditioning processes and regulates the flow of moisture in grain in the necessary direction, thus helping to alter its physicochemical properties. In practice, cold and hot conditioning is both used. Cold conditioning the manual processing of grain involves optimum moistening (different for each variety) and then keeping the grain in soaking bins until it is permeated with moisture.

**2.4 Appropriate conditions for storage**

Proper conditions to store grain effectively are those which prevent or discourage the growth of microorganisms and insects. Such conditions involve control and maintenance of:

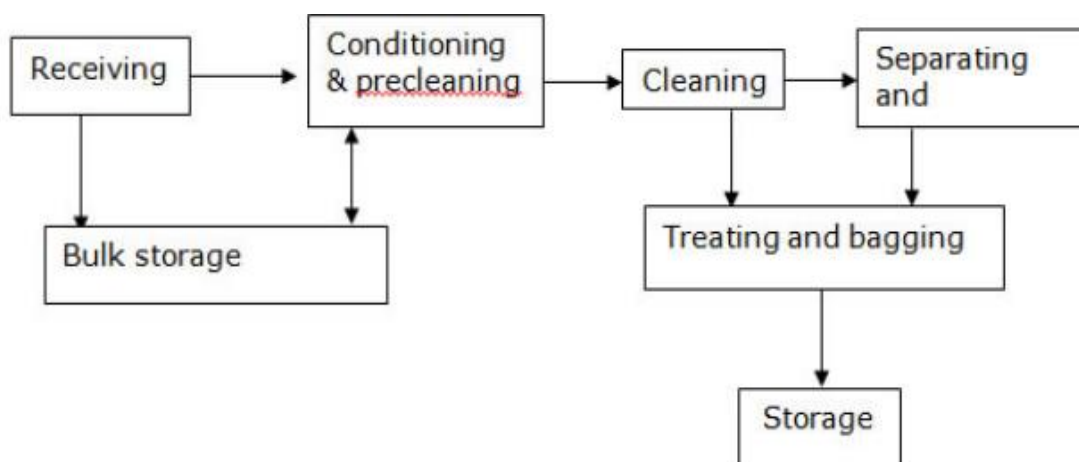
- Moisture content of grain
- Temperature of the grain
- Condition and soundness of the grain
- Oxygen supply of the storing environment.
- Advantages of conditioning
  - ✓ Allows for harvesting tough grain and thereby reduces losses from weather and wildlife.
  - ✓ Extends available harvest period.

Page 44 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1
			October 2020

- ✓ Earlier harvest is possible.
- ✓ Drying tough or damp grain can reduce or eliminate spoilage in storage.
- ✓ May improve market grade and acceptability of grain.
- ✓ May afford alternative market outlets for grain.
- ✓ May eliminate necessity of swathing to obtain dry grain.
- ✓ May improve malting quality by reducing kernel peeling and cracking during combining. However, most maltsers will not knowingly buy grain which has been artificially dried.
- ✓ Since artificially dried grain usually contains near maximum allowable water content, the extra weight generates more dollars when sold.
- ✓ Steps in Conditioning

The steps in seed conditioning are shown in the usual order of performance

- ✓ Receiving
- ✓ Drying
- ✓ Pre cleaning
- ✓ basic cleaning
- ✓ Sizing and/or upgrading



**Figure 2. Basic flow and essential steps in seed**



Visit the following link for more information

1. <https://www.coursera.org/lecture/postharvest/2-2-3-grain-cleaning-methods-and-equipment-LZYzo?authType=google>
2. <https://www.youtube.com/watch?v=JLd9sfpZZu0> (Integrated Grain Cleaning Machine Destoner)
3. <https://www.youtube.com/watch?v=JLd9sfpZZu0>(Cleaning and destoner machine)
4. blob:<https://www.youtube.com/0b725ec1-53c5-4e6d-aa20-7ef816d3aac2>
5. De-stoner cleaner
6. <https://www.youtube.com/watch?v=uZbwDPrl3ks>(Magnetic Destoner for Rice )

Page 46 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1
			October 2020

**Self-Check 2****Written Test**

Name \_\_\_\_\_ ID \_\_\_\_\_ Date \_\_\_\_\_

**Directions:** Answer all the questions listed below.**I .Choose the best answers**

1. Which of the following is not cleaned from grain (4points)  
A. Foreign matter B. Weed seed C. Clean seed D all

**II. Write short answer/s**

1. Write at least four cereal cleaning equipment (5point)
2. What are important of cleaning of cereal(5point)
3. define condition of grain(5point)

**Note: Satisfactory rating – 8.5 points****Unsatisfactory – below- 8.5points**

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





## Information Sheet-3 Identifying variation in equipment operation and maintenance

### 3.1 Introduction

The maintenance of buildings and equipment may be the most important element of good housekeeping. Maintenance involves keeping buildings, equipment and machinery in safe, efficient working order and in good repair. It includes maintaining sanitary facilities and regularly painting and cleaning walls. Broken windows, damaged doors, defective plumbing and broken floor surfaces can make a workplace look neglected; these conditions can cause incidents and affect work practices. So it is important to replace or fix broken or damaged items as quickly as possible. A good maintenance program provides for the inspection, maintenance, upkeep and repair of tools, equipment, machines and processes.

### 3.2 Identifying variation in equipment operation and maintenance

In order to ensure work equipment does not deteriorate to the extent that it may put people at risk, employers, the relevant self-employed and others in control of work equipment are required by power to keep it maintained in an efficient state, in efficient order and in good repair'. If you are self-employed and your work poses no risk to the health and safety of others, then health and safety law may not apply to you. The frequency and nature of maintenance should be determined through risk assessment, taking full account of the manufacturer's recommendations the intensity of use operating environment (eg the effect of temperature, corrosion, and weathering) user knowledge and experience the risk to health and safety from any foreseeable failure or malfunction

Safety-critical parts of work equipment may need a higher and more frequent level of attention than other aspects, which can be reflected within any maintenance programme. Breakdown maintenance, undertaken only after faults or failures have occurred, will not be suitable where significant risk will arise from the continued use of the work equipment.

Page 48 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1
			October 2020



The manufacturer's instructions should describe what maintenance is required to keep the equipment safe and how this can be done safely. These instructions should always be followed, unless there are justifiable reasons for not doing so (eg where more frequent maintenance is necessary, due to intense use, adverse environmental conditions or when other experience shows this need). Maintenance on a less frequent basis than the manufacturer's recommendation should be subject to careful risk assessment and the reasons for doing so should be reviewed at appropriate intervals. For example, where there is already an inspection regime, perhaps for lightly used equipment, less frequent maintenance may be justified because of the condition monitoring already provided by the inspection programme.

There is no requirement for you to keep a maintenance log, although it is recommended for high-risk equipment. Maintenance logs can provide useful information for the future planning of maintenance, as well as informing maintenance personnel of previous action taken. However, if you have a maintenance log, you must keep it up to date.

- Typical equipment faults and related causes to be identified
  - ✓ Signs and symptoms of faulty equipment and
  - ✓ Early warning signs of potential problems

### 3.3 Undertaking maintenance operation

Steps should be taken to manage any risks arising from maintenance activity. Manufacturer's instructions should make recommendations on how to safely undertake maintenance of their work equipment and, unless there are good reasons otherwise, these should always be followed. Where possible, equipment should normally be shut down and any residual / stored energy safely released (eg pneumatic pressure dumped, parts with gravitational / rotational energy stopped or brought to a safe position). For high-risk equipment, positive means of disconnecting the equipment from the energy source

may be required (eg isolation), along with means to prevent inadvertent reconnection (eg by locking off). Formal systems of work, such as a permit to work, are required in some cases

Page 49 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1
			October 2020



to safely manage high-risk maintenance operations. In some cases, it may not be possible to avoid particular significant hazards during the maintenance of work equipment so appropriate measures should be taken to protect people and minimize the risk.

These may include:

- physical measures, eg providing temporary guarding, slow speed hold-to-run control devices, safe means of access, personal protective equipment (PDF), etc
- management issues, including safe systems of work, supervision, monitoring
- personnel competence (training, skill, awareness and knowledge of risk)

It is important that these situations are properly assessed. Staff undertaking maintenance may need to undertake significant on the job risk assessment (essentially considering what could go wrong and how to avoid injury), as the situation may develop and change in ways that could not be foreseen at the outset.

Maintenance work should only be undertaken by those who are competent to do the work, who have been provided with sufficient information, instruction and training (power regulations 8 and 9). With high-risk or complex equipment, these demands may be significant and, in some cases, may be best undertaken by the manufacturer or specialist contractors. But, in many cases, maintenance can be done in-house by suitably trained, competent staff. For some maintenance work, eg the changing of abrasive wheels, there is well-established industry training schemes. In other cases, such as for the use of small-scale scaffold towers, sufficient training may be provided by the hirers of such equipment. In others, such as hand-held chainsaws, training on the safe maintenance of the equipment is normally provided as an integral part of the basic training in the safe use of the equipment.

### **3.4 Types of maintenance**

- **Scheduled maintenance**

This includes the repair or replacement of worn components identified from a routine inspection or condition monitoring. These measures are preventative in nature to avoid the failure of components which are necessary to the normal operation of the device. The alternative may be total loss of the asset, or damage and injury to other water users or

Page 50 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1 October 2020
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adverse environmental impact. It may be necessary to carry out minor maintenance or inspection tasks [12] on a regular basis at the site, with larger operations carried out either at the site or nearby port at longer intervals.

- **Unscheduled maintenance**

In contrast to scheduled maintenance which can be planned far in advance, it may be necessary to repair or replace failed or damaged components at short notice to enable the continued operation of the device. The complete recovery of the device may be necessary. Reactive intervention may occur due to particular short duration events, caused by extreme weather conditions or impact by vessels/marine mammals. Although the replacement and inspection of critical components will feature in scheduled maintenance actions, early component failure may occur due to serial batch defects or the failure of other components.



**Figure1. Maintenance of cleaner machine**

Page 51 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1
			October 2020



<b>Self-Check 3.</b>	<b>Written Test</b>
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Name \_\_\_\_\_ ID \_\_\_\_\_ Date \_\_\_\_\_

**Directions:** Answer all the questions listed below.

**I Choose the best answer**

1. Maintenance is carried out after identification equipment machinery (4points)  
1. A. false                      B. True                      C. A and B

**II. Write short answer/s**

1. What are important of equipment maintenance?

**Note: Satisfactory rating – 4.5 points                      Unsatisfactory – below- 4.5 points**

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



**Information Sheet-4 Reporting variation in equipment operation with workplace legislative**

**4.1 Introduction**

Accurate records about workplace by employers /workers will give the information of the cereal cleaning activities. Different formats shall use to record for each information during cereal cleaning process. Checklists prepared to guide the recording process. It further states that any information that is capable of being produced by a machine and subject to the regulations any record that is capable of being produced from a machine readable record under the control of industry by means of computer hardware and software or any other information storage equipment and technical expertise normally used by the industry. It is important to note that not all records will be released in response to a freedom of information request. Contact your freedom of information coordinator for more information

**4.2 reporting equipment operation with workplace legislative**

Records and reports are important for their content and as evidence of communication, decisions and actions. The industries managers and boards are accountable to the industry. Records support openness and transparency by documenting and providing evidence of work activities and by making them available to the industry. Records support quality program and services, inform decision making, and help meet organizational goals.

- Work place Legislative requirements include
  - ✓ The Food Standards Code, including labelling, weights and
  - ✓ Measures legislation covering food safety,
  - ✓ Environmental management,
  - ✓ Occupational health and safety,
  - ✓ Anti-discrimination and
  - ✓ Equal opportunity.

Page 53 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1
			October 2020

**Self-Check 4.****Written Test**

Name \_\_\_\_\_ ID \_\_\_\_\_ Date \_\_\_\_\_

**Directions:** Answer all the questions listed below.**I .Write short answer/s**

1. What are included in Work place Legislative requirements (5point)
2. What are important reporting equipment operations in workplace? (5point)

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

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



## Information Sheet-5 Monitoring and confirming process grist with specifications

### 5.2 Introduction

Grist is grain that has been separated from its chaff in preparation for grinding. Monitoring is the process by which the continuous activities to be done from the pre-processing to final point of the processes in industry. Specifications for raw materials are required in order to fulfill the needs and demands of the consumers, processors and traders. Depending upon the target group the specifications will be varying. Once the specifications are established the movement of the raw material either in the national market or international market would become easy. They strongly provide a common ground for commercial negotiations among traders national and international traders.

### 5.3 Monitoring and confirming process grist with specifications

The general indicators for quality are freshness, free from unwanted material, free from spoiled material, uniform size and weight, however the specific indicators for quality will be varying depending upon the end use. Considering the quality parameters, specifications for various food materials have been developed. The food that is used for various processed products should meet the quality specifications set for that specific product. Standard specifications provide criteria to characterize the nature of a commodity, usually on a pass or fail basis. Most countries have a national standards institution which may issue specifications for commodities as well as methods of testing. Many countries adopt or modify international standards, e.g. International Organization for Standardization (ISO), into their national system

- **Colour:** Cereal grains are pigmented and range through the colour spectrum from very light tan or almost white, to black. Where extractive milling is required, highly-pigmented varieties may give low yields of white flour.
- **Composition:** Composition, e.g. protein, carbohydrate, lipids and their breakdown products, qualitatively influences product acceptability, by affecting texture and taste. Quality changes evolve slowly in stored grain and more rapidly in milled or processed

Page 55 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1
			October 2020





intermediary products. Some grain components, for example husk, are inedible and quantitatively influence product yield and gross nutrients available to the consumer.

- **Bulk Density:** Each type or variety of grain when in optimum health, fully mature, etc. has a characteristic bulk density.
- **Odour, aroma:** Most grain types, when fresh, have a distinctive natural odour or aroma. This is generally accepted as an indicator of good quality, although some people prefer grain which smells 'old 'or even fermented. Size, shape: Rice, as a whole-grain food, is classified by size (length) and shape (length: breadth ratio). Other grains also have its size considered in their specification. In general a small range in size assists with processing and handling.

#### 5.4 Way of monitoring grist with specifications

- Inspecting/checking
- measuring
- testing as required by the process
- Visual observation

Page 56 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1
			October 2020



Self-Check 5.	Written Test
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Name \_\_\_\_\_ ID \_\_\_\_\_ Date \_\_\_\_\_

**Directions:** Answer all the questions listed below.

**I. Write short answer/s**

1. What is monitoring process grist with specifications mean? (5point)
2. How monitoring of grist with specifications is carried out? (5point)

**Note: Satisfactory rating - 5 points      Unsatisfactory – below- 5 points**

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

Page 57 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1
			October 2020



## Information Sheet-6 Monitoring the process to confirm impurity removal specification

### 6.1 Introduction

Physical, biological and chemical hazards can contaminate grain destined for food and feed markets. Use the information on this page to identify visible hazards associated with stored grain. Providing clean and impurities free grains to the customer are the primary purpose of grains cleaning line. But nowadays, grain processing industries are facing major problems to clean impurities from the grain. To remove impurities like black stone, mud balls, and other paramagnetic impurities from the grains, they don't have new generation technology. At the same time, some large cleaning line uses different technology to separate mud balls and black stone from grains but even after using that technology not providing the satisfying result to the processing line owners.

### 6.2 Monitoring the process to confirm impurity removal

Magnetic destoner used to remove impurities like iron particles, metal, mud balls, black stones and other kinds of paramagnetic impurities from the rice, wheat, and other grains. Magnetic destoner for the grains cleaning line to remove efficiently mud balls, black stone, and other iron impurities from the rice, grains, and other grain. The magnetic destoner has one belt which runs on a magnetic role which traps the paramagnetic contamination. In this process, the remaining mud balls and paramagnetic impurities are trapped. At the top of our machine, there is a feed hopper in which we have used two in line connections which are connected to the mill or cleaning line. Then the material falls down to the vibratory feeder and the unbalanced vibratory motor handles the vibratory feeder.

Page 58 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1
			October 2020

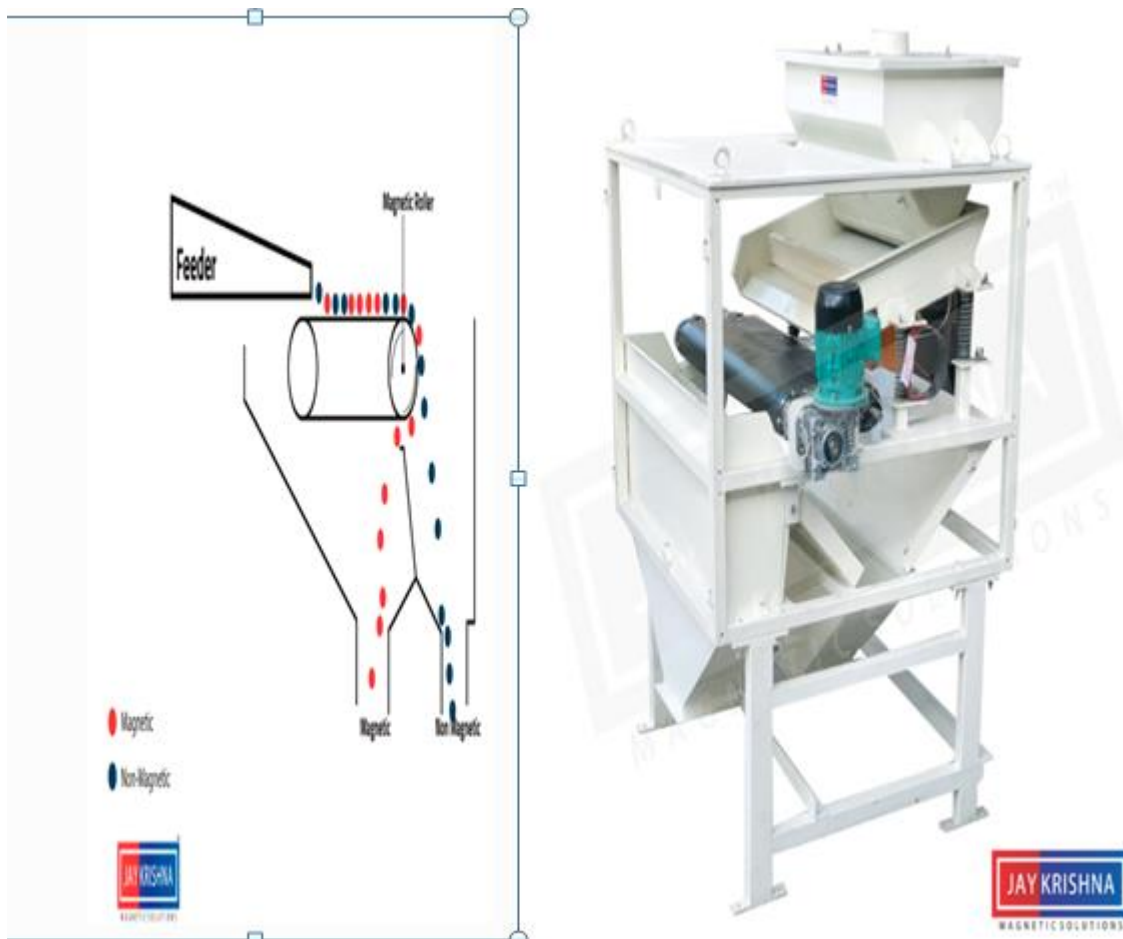
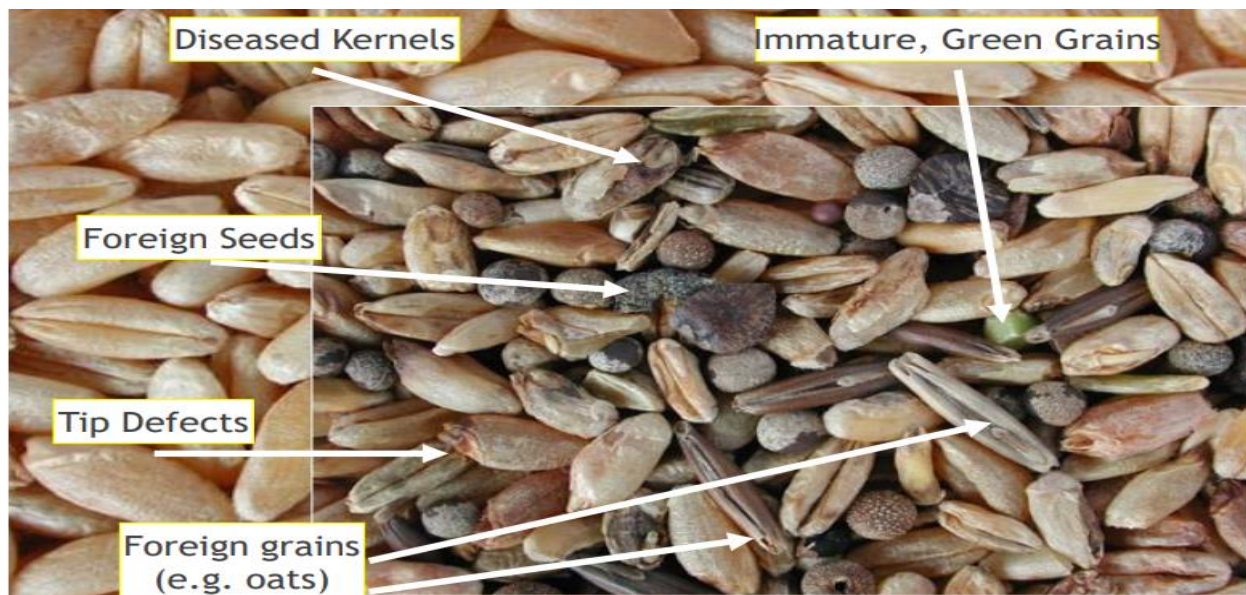


Figure1. Magnetic destoner

Both vibratory motor and feeder are mounted on the springs. The machine has a feed gate which controls the feed in two ways: primarily and secondarily machine has another gate at vibratory discharge. Materials fall down on a conveyor belt which is Teflon based belt.

The first step of the cleaning is the removal of tramp metal by means of a rotary type magnet separator. This is followed by screening in which the first on-stream cleaner should be provided with a rough scalping screen or perforated metal sheet to separate oversized trash and below that a second sieve to get rid of the sand. To separate light-weight particles, mainly hulls and dust, the second sieve must also be provided with an aspiration channel. As an average one can estimate 1% impurities will be obtained in this cleaning section. All foreign matter, organic and inorganic, other than seeds of the species under consideration

In this case, monitoring is used to assess the performance of cereal quality, set up by cleaners. Its goal is to improve the current and future outputs, outcomes and impact. Monitoring is a continuous assessment of activities based on early detailed information on the progress or delay of the ongoing assessed activities. Evaluation is also used to examine concerning the relevance, effectiveness, efficiency and impact of activities in the light of cereal cleaning/impurity removal in oilseeds.



**Figure 2. impurities part of wheat seed**



<b>Self-Check 6.</b>	<b>Written Test</b>
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Name \_\_\_\_\_ ID \_\_\_\_\_ Date \_\_\_\_\_

**Directions:** Answer all the questions listed below.

**I. Write short answer/s**

1. Write at least four impurities removed from cereal (5point)
2. Write important of removing impurities from cereal (5point)

**Note: Satisfactory rating - 5 points      Unsatisfactory – below-5 points**

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



## Information Sheet-7: Identifying, rectifying and/or reporting out-of-specification product

### 7.1 Introduction

For all products, specifications can be added as a clause to the agreement to ensure the goods quality. Naturally, no one party wants to find itself with an 'off spec' product. It is thus essential to know the name, units, and standards of the important Wheat specifications in the business if one wants to trade it. In this article, we will see what the top Wheat contract specifications are, along with their characteristics.

### 7.2 Identifying, rectifying and/or reporting out-of-specification product

Identification of product/processes outcomes used to check either the products or processes are out of specification or not because every products or processes have their own specifications and have effects on the outcome after processing. The main objective of Identifying and rectifying out-of-specification product/process outcomes is in order to take corrective action in response to out-of-specification results.

The specifications of cereal seed product have their own specification. Identifying and rectifying the processes and the products outcomes take place throughout the process and take actions when they occur, the processes or products will be out-of-specifications. Broken or Split seed is not included in the total defective seed or damaged seed category. Where applicable to a particular cereal seed a separate tolerance exists for Broken or Split. Broken or split seed is to be determined as a percentage of clean seed retained above the screen and expressed to the nearest 0.1%. Bleaching removes trace metals, color such as chlorophyll, soaps and oxidation products. Bleached oils are relatively colourless and have a low peroxide value.

Clean seed includes all seed material of the particular cereal seed being tested other than that defined as Impurities i.e., material retained above the screen after screening (where applicable) and/or removal of Impurities.

Page 62 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1 October 2020
---------------	---	----------------------------	----------------------------



There are a range of quality parameters that cause cereal seed commodities to be classified as Defective. The category in which a defect type is classified varies by commodity. Each defect type may:

- Have a separate tolerance (e.g., Broken or Split, Heat Damaged/Bin Burnt, Mouldy)
- Have a nil tolerance (e.g., musty seed)
- Be included in the category of Damaged
- Be included in the category of Defective
- Be included in the category of Defective but within that category have a maximum tolerance
- Not be applicable (e.g., for Peanuts, no Defective quality parameters are applicable)

All quality parameters within the damaged category are to be obtained from the clean seed material retained above the screen and combined. An individual seed may only be classified as one defect type within the damaged category. Where this applies, a seed is to be classified as the defect type with the tightest tolerance in the standard

The seed conditioner should be interested in the operational efficiency whether he is operating an existing facility or planning a new installation. Here, however, we are more concerned with technical efficiency which consists of, but is not necessarily limited to, the following:

- Removal of contaminants
  - ✓ Inert material
  - ✓ Weed seed
  - ✓ Other crop seed
  - ✓ Sizing of seed
  - ✓ Minimum seed loss
  - ✓ Removal of weather damaged, insect damaged, off-size, and

Page 63 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1
			October 2020





<b>Self-Check 7.</b>	<b>Written Test</b>
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Name \_\_\_\_\_ ID \_\_\_\_\_ Date \_\_\_\_\_

**Directions:** Answer all the questions listed below.

**I. Write short answer/s**

1. What is important of specification in the product? (5Ppoint)
2. List at least three out specification of cereal crop.(5Ppoint)

**Note: Satisfactory rating - 5 points      Unsatisfactory – below- 5 points**

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



## Information Sheet-8 Maintaining the work area in housekeeping standards

### 8.1 Introduction

Good housekeeping not only results in a cleaner workplace, but makes it safer as well. Good housekeeping reduces illnesses and injuries and promotes positive behaviors, habits, and attitudes. Employers are responsible for assessing each workplace before work begins to identify the potential hazards present, and determine ways to eliminate the hazards. An effective housekeeping program is an important element in workplace safety and health management systems. To avoid these hazards, a workplace must maintain order throughout a workday.

### 8.2 Maintaining the work area in housekeeping standards

Proper housekeeping management provides for an orderly arrangement of operations, tools, equipment, storage facilities, supplies, and waste material. Good housekeeping is evidenced by floors free from grease and oil spillage; properly identified passageways; unobstructed accesses and exits; neat and orderly machinery and equipment; well-nested hoses and cords; properly stored materials; removal of excess waste material or debris from the working area; walkways free from ice and snow; surfaces, including elevated locations, free from accumulated dust; and adequate lighting. Maintaining these conditions contributes significantly to lower incident rates.

For example, consider the following consequences that can result from poor housekeeping:

- A trip or fall over lines and leads in walkways and work areas
- A slip or fall on an oily or slippery facility floor, vessel deck or other working surface
- A trip or fall from a dock or vessel
- An allergic reaction to a spilled chemical
- An eye injury from falling grit left in the overhead of a work site
- A fire as a result of oily rags left in an area where hot work is performed, or due to the accumulation of combustible dust
- Illness due to the unsanitary conditions of restrooms

Page 65 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1 October 2020
---------------	---	-------------------------------	----------------------------



- Electrical shock as a result of poorly maintained equipment or energy sources, such as broken, cracked or damaged insulation and connections of wiring
- Lacerations and amputations when poor maintenance results in inadequate lighting
- Exposure to hazardous substances from poor storage and ineffective labeling of hazardous chemicals
- Slip hazards where snow, ice, or standing-water is left on walkways

In shipyard employment, trip hazards and slippery walking surfaces are two of the most hazardous housekeeping issues. In many of these instances, injury could have been prevented had the employer ensured cleanup prior to the start of work, or required more effective storage of materials, rerouting of hoses and cords, and inspection procedures. Every effort should be made to run air, gas, and electrical lines overhead or underneath walkways. Frequent inspections and assessment of walkways and working surfaces should be conducted to address hazards before they become a danger to workers. Spilled materials, such as oil, grease, and water, must be immediately cleaned from walkways and working surfaces to eliminate slip hazards.

Even with a dedicated effort to keeping work areas clean, ship construction and repair requires that work be performed in tight and congested areas. A key to protecting workers from such obstacles and preventing injury is early detection and immediate action. Employers can keep workers safe by training all workers to:

- Take time to stack materials, boxes and packages properly.
- Clean up messes. Never let safety be someone else's job.
- Remove, repair, and/or report housekeeping hazards.
- Never jeopardize someone else's health and safety by obstructing the access to exits, electrical panels, or fire extinguishers.
- Avoid stringing cords, hoses or lines across walkways. Use "S" and "J" hooks and cable trees to keep lines out of walkways. If lines must cross walkways, cover the lines. Employers must:
  - Establish and maintain good housekeeping practices.

Page 66 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1
			October 2020



- Eliminate slippery conditions, such as snow, ice, and grease, from walkways and working surfaces as necessary. Where removal is not possible, access to such areas must be restricted and an alternate route established, or slip-resistant footwear provided.
- Store materials in a way that does not create hazards for workers.
- Ensure easy and open access to all exits (including ladders, staircases, scaffolds, and gangways), fire-alarm boxes, fire extinguishing equipment and fire call stations.
- Dispose of oils, paint thinners, solvents, rags, scraps, waste, or other flammable and combustible substances, or store them in covered fire-resistant containers, at the end of each work shift or when the job is complete, whichever occurs first.
- Maintain walkways so that they provide adequate passage and are:
  - ✓ Free from debris, including solid and liquid waste;
  - ✓ Clear of tools, materials, equipment, and other objects; and
  - ✓ Free from trip hazards as a result of the improper storage or placement of hoses and electrical service cords. Hoses and cords must be placed above or underneath walkways or covered.

### 8.3 Important of good housekeeping practices

Effective housekeeping results in:

- reduced handling to ease the flow of materials
- fewer tripping and slipping incidents in clutter-free and spill-free work areas
- decreased fire hazards
- lower worker exposures to hazardous products (e.g. dusts, vapours)
- better control of tools and materials, including inventory and supplies
- more efficient equipment cleanup and maintenance
- better hygienic conditions leading to improved health
- more effective use of space
- reduced property damage by improving preventive maintenance
- less janitorial work
- improved morale

Page 67 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1
			October 2020



- improved productivity (tools and materials will be easy to find)



**Figure1. cleaning workplace area**

#### **8.4 Apply food safety procedures to work practices.**

Cleaning and Sanitizing Program Since cleaning and sanitizing may be the most important aspects of a sanitation program, sufficient time should be given to outline proper procedures and parameters. Detailed procedures must be developed for all food-product contact surfaces (equipment, utensils, etc.) as well as for non-product surfaces such as non-product portions of equipment, overhead structures, shields, walls, ceilings, lighting devices, refrigeration units and heating, ventilation and air conditioning (HVAC) systems, and anything else which could impact food safety.

Cleaning frequency must be clearly defined for each process line (i.e., daily, after production runs, or more often if necessary). The type of cleaning required must also be identified. The objective of cleaning and sanitizing food contact surfaces is to remove food (nutrients) that bacteria need to grow, and to kill those bacteria that are present. It is important that the clean, sanitized equipment and surfaces drain dry and are stored dry so as to prevent bacteria growth. Necessary equipment (brushes, etc.) must also be clean and stored in a clean, sanitary manner. Cleaning/sanitizing procedures must be evaluated for adequacy through evaluation and inspection procedures. Adherence to prescribed written procedures

Page 68 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1 October 2020
---------------	--	----------------------------------	----------------------------



(inspection, swab testing, direct observation of personnel) should be continuously monitored, and records maintained to evaluate long-term compliance.

The correct order of events for cleaning/sanitizing of food product contact surfaces is as follows:

- Rinse
- Clean
- Rinse
- Sanitize.



<b>Self-Check 8.</b>	<b>Written Test</b>
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Name \_\_\_\_\_ ID \_\_\_\_\_ Date \_\_\_\_\_

**Directions:** Answer all the questions listed below.

**I. Write short answer/s**

1. Write important of good housekeeping practice in the work area (5 point)
2. What are consequences poor housekeeping practice (5point)

**Note: Satisfactory rating –5 points      Unsatisfactory – below-5 points**

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



## Information Sheet-9 Conducting work with workplace environmental guidelines

### 9.1 Introduction

Environmental implications associated with cereal cleaning are identified, assessed and reported to the supervisor. Environmental implications may be negative environmental impacts may result from excessive noise and exhaust emissions, the incorrect use and disposal of maintenance debris cereal seed residues, chemical residues), and hazardous substances (fuel, noise). Impacts may also include run-off flows of water and cleaning agents from servicing, maintenance and cleaning activities, soil disturbance and dust problems from high activity of cereal cleaning.

Routine cereal production activities can have detrimental environmental effects during each of the main phases of exploration, production, and decommissioning. During the exploration phase, impacts can result from indirect (sound and traffic) and direct physical (anchor chains, drill cuttings, and drilling fluids) disturbance. Additional direct physical impacts occur in the production phase as pipelines are laid and the volume of discharged produced water increases. Lastly, decommissioning can result in a series of direct impacts on the sea floor and can re-introduce contaminants to the environment. It is critical that all of the potential impacts of routine operations are accounted for when designing management strategies, whether local or regional, for offshore oil activities.

### 9.2 Conducting work with workplace environmental guidelines

Employees spend almost a quarter of their lives at work, which means workplace environments are a very important part of most people's lives. Working in a safe, healthy environment is important for your physical safety, mental well-being and work productivity. Bad air quality and ventilation, as well as asbestos-riddled structures, can lead to sick building syndrome, which can compromise the health and comfort of your employees. Not only can poor workplace environments reduce productivity, but research has shown they

Page 71 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1 October 2020
---------------	---	----------------------------	----------------------------





may be linked to asthma, lung cancer and other medical problems. Employers need to take affirmative steps to ensure the health and welfare of their workers. Confronting the problem makes business sense by way of health management savings as well as low absenteeism and contained insurance premiums. To make sure your business is complying with the law, you should consult EPA and OSHA guidelines and follow directives. If necessary, contact an environmental consultant to determine cost effective ways to handle workplace environment issues. Here are three things you can do to combat environmental health issues in the workplace:

- Educate yourself on environmental issues in business to ensure compliance.
- Consult environmental experts to handle health issues in the workplace.
- Train your employees on environmental issues in business.

### 9.3 Work place environmental guidelines

Checking of work environment should include

- Ventilations
- Lighting
- Noise

### 9.4 Hazard Identification in Workplace

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 nonroutine situations.

Page 72 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1
			October 2020

- Determine the severity and likelihood of incidents that could result for each hazard identified, and use this information to prioritize corrective actions.

### 9.5 Implement Control measure of hazard

- Design or re-organize to eliminate hazards
- Substitute the hazard with something safer
- Isolate the hazard from people
- Use engineering controls
- Use administrative controls
- Use Personal Protective Equipment (PPE)



**Figure1 Symbol Description Hazard in in work place**



<b>Self-Check 9.</b>	<b>Written Test</b>
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Name \_\_\_\_\_ ID \_\_\_\_\_ Date \_\_\_\_\_

**Directions:** Answer all the questions listed below.

1. What is important environmental guidelines in workplace(5points)
2. Write at least three how Hazard Identified in Workplace(5points)
3. Write at least four control method of hazard (5points)

**Note: Satisfactory rating - 2 points      Unsatisfactory – below- 2 points**

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



## Information Sheet-10 Maintaining workplace records as workplace information

### 10.1. Introduction

Records will be specified in the organization's recordkeeping processes and procedures and include one or more of the following: hard copy, such as documents, images, reports and forms. electronic, such as documents, images, reports, forms, databases and spreadsheets. Carefully selected workplace rules can protect your from legal claims and help you maintain an orderly and positive work environment.

### 10.2. Maintaining workplace records as workplace information

Collecting workplace information each workplace relies on the exchange of information to carry out its daily business. Information is passed from employee to employee, customer to employee, supervisor to team member, supplier to customer, and so on. Dealing effectively with information and records is necessary and important for all organizations. The quantity and variety of information kept by an organization can be huge. Information needs to be sorted into related groups so that it can be stored easily and found when needed. An organization's success depends largely on how well it manages its information. You need to be familiar with the type of information used in your job and the way records are organized so you can collect, file, store and find information quickly and easily. Finding and using information is a large part of many jobs, so knowing how to deal with it is an important workplace skill.

- Collecting information that meets the organization's needs
- Using equipment and technology to obtain information
- Maintaining security and confidentiality when handling information

Page 75 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1
			October 2020



### 10.3. Types of workplace information or records

Workplace information to be records in work place include

- Operation and monitoring the Standard Operating Procedures (SOPs)
- Specifications
- Production schedules and instructions,
- Manufacturers' advice
- Standard forms and reports.

Among the specific expectations and work habits that must be followed and practiced in the work place, the following are very important: -

- Positive attitude,
- Traits of honesty and dependability,
- Work with others,
- Time management,
- Safety on the job,
- Good communication skills,
- Appropriate use of computers and internet,
- Appropriate behavior,
- Health



**Figure1. Collect and maintain workplace information**

Page 76 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1 October 2020
---------------	--	----------------------------------	----------------------------



<b>Self-Check 10.</b>	<b>Written Test</b>
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Name \_\_\_\_\_ ID \_\_\_\_\_ Date \_\_\_\_\_

**Directions:** Answer all the questions listed below.

**I. Write short answer/s**

1. What types of workplace information or records is include in work place ?(5point)
2. Write at least three ways of information recording ?(5point)

**Note: Satisfactory rating - 5 points      Unsatisfactory – below- 5 points**

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



## Operation Sheet 1- Procedures undertaking cereal cleaning process

Raw Material: wheat

- Materials required: magnetic separators, Aspirator ,Destoner, scourers
- PPE,
- Notebook and pen

### Procedures:

- Wear appropriate personnel protective equipment.
- Clean, check and adjust all necessary equipment
- Select raw material to be cleaned eg wheat.
- operate, maintenance and take corrective action when needed
- removal any metal traces, and other impurities by magnetic separators, Aspirator, Destoner, scourers
- Remove all the foreign material to obtain pure seeds.
- Grade the clean wheat
- store at appropriate place
- clean and store the equipment at the end of activity
- Record each activity in operation

Page 78 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1
			October 2020



<b>LAP TEST</b>	<b>Undertake cereal cleaning and conditioning equipment</b>
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Task-1. Undertake seed cleaning and conditioning equipment





<b>LG #19</b>	<b>LO #3 shut down the cereal cleaning and conditioning process</b>
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### Instruction sheet

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

- Identifying shutdown procedure.
- Shutdown the process with workplace procedures.
- Identifying and reporting maintenance requirements

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:

- Identify shutdown procedure.
- Shutdown the process with workplace procedures.
- Identify and report maintenance requirements

### 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 Identifying shutdown procedure.

### 1.1 Introduction

Shutdown is that state where all rotating equipment, heaters, and other unit operations are stopped. No attempt is made to keep the unit in a partially operating state. However, equipment is not inventoried, nor is anything purged except for the equipment that is being worked on. This type of shutdown is one that affects just a local operating unit. Equipment in that unit should be brought to a safe state, but it will be on standby, i.e., ready for immediate restart once conditions are back to normal. Normally, other units in the facility, including the utilities area, will continue operations at this level of shutdown. However, quick action may be required before the local shutdown leads to a shutdown of the whole process.

### 1.2 Identifying shutdown procedure

Shutdown includes steps to render the systems safe, such as removal of hazardous process materials and inert (asphyxiating) gases. The systems might be cleaned as part of the shutdown; cleaning is often a process unto itself requiring its own set of startup, operation, and shutdown procedures. Start up and shutdown procedures are clearly highly dangerous. Human error during these processes should therefore be avoided at all cost, as the effects can be truly disastrous. They have also implemented mechanical interlocks on a wide scale. Their procedures leave no room for different interpretations and process interlocking quite often is a formal and mandatory provision to ensure strict adherence to procedures on critical operations, such as start-up and shut-down procedures, relief valve change over and pigging operations. Following the installment of these procedures, these companies established excellent safety records and were able to substantially minimize accidents and spills. For example, if shutting down a piece of equipment impacts the ability to carry on with the operation, that's a good indication that it's a critical piece of equipment.

Page 81 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1 October 2020
---------------	--	----------------------------------	----------------------------



The following procedures should be taken into account to identify shutdown procedures.

- Shut down must be conducted using the standard procedures established for the Machine or equipment (not emergency procedures or other shortened/simplified method).
- Pull plug or throw switch to off position before cleaning or adjusting any machine and away from moving parts.

Page 82 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1
			October 2020



<b>Self-Check 1.</b>	<b>Written Test</b>
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Name \_\_\_\_\_ ID \_\_\_\_\_ Date \_\_\_\_\_

**Directions:** Answer all the questions listed below.

**I. Write short answer/s**

1. What is shutting down of cereal cleaning equipment? (5points)
2. What the factors to be account during shutting down procedures of equipment. (5points)

**Note: Satisfactory rating - 5 points      Unsatisfactory – below-5 points**

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

Page 83 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1
			October 2020



## Information Sheet-2 Shutdown the process with workplace procedures

### 2.1 Introduction

All employers are obligated to ensure staffs are trained in workplace emergency procedures. This may include what to do in case of a fire, earthquake, or other emergency; identifying locations of emergency exits; and processes to follow to evacuate the building in the case of an emergency. Shut down is a term used to describe the process of closing all systems of process control systems. Different shutdown procedures are appropriate to the process and workplace production requirements, including emergency and routine shutdowns and procedures to follow in the event of a power outage. Isolation, lock out and tag out procedures and responsibilities are appropriate.

Shut down the process include:

- Clean and sanitize equipment
- Take samples and conduct test
- Carry out routine maintenance

### 2.2 Shutdown the process with workplace procedures

The key point of lockout/tag out procedures is to shut down completely machinery and electrical equipment before repair, maintenance, and cleaning. Here's the six-step shutdown procedure:

1. Before shutdown. The authorized employee must know the type and magnitude of the energy, the hazards of the energy to be controlled, and the method or means to control the energy. The authorized employee must notify all affected employees of the lockout.
2. Shutdown. The authorized employee shuts down the machine or equipment by the normal stopping procedure, such as pressing the stop button, moving the switch to the "off" position, etc.

Page 84 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1 October 2020
---------------	---	----------------------------	----------------------------



3. Isolation. The main power switches, circuits, or additional sources of energy are moved to the “off” position or otherwise made inoperative.
4. Lockout. Locks are placed on switches or other energy sources in the “safe” or “off” position. During a group lockout, all members of the group must add their own locks to the group lockout devices and should never place a lock inside another individual’s lock. Warning tags should be placed with each lock.
5. Energy release. All potentially hazardous stored or residual energy, such as that in springs, elevated parts, rotating flywheels, hydraulic systems, electrical systems, and air, gas, steam, or water pressure, etc., is relieved, disconnected, or otherwise made safe by repositioning, blocking, bleeding down, etc. If there is a possibility of re accumulation of stored energy to a hazardous level, verification of isolation must be continued until the Servicing or maintenance is completed or until the possibility of such accumulation no longer exists.
6. Testing. After making sure that no personnel are exposed, and as a check on having disconnected the energy sources, the authorized employee operates the push button or other normal operating controls to make certain the equipment will not operate.

Policies and procedure in work area is carried out according to

- Company policies and procedures, regulatory and
- Licensing requirements, legislative requirements, and
- Industrial awards and agreements

Page 85 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1
			October 2020



<b>Self-Check 2.</b>	<b>Written Test</b>
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Name \_\_\_\_\_ ID \_\_\_\_\_ Date \_\_\_\_\_

**Directions:** Answer all the questions listed below.

**I. Write short answer/s**

1. what are included in shutdown process?(5points)
2. List step shutdown procedure(5points)

**Note: Satisfactory rating – 5 points      Unsatisfactory – below- 5 points**

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

Page 86 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1
			October 2020



## Information Sheet-3: Identifying and reporting maintenance requirements

### 3.1 Introduction

Shutdown Maintenance is maintenance that can only be performed while equipment is not in use. Shutting down machinery can be costly, but sometimes due to the nature of the defective part/machine, shutdown maintenance is the only viable maintenance procedure. Technicians will do all that they can to avoid a complete shutdown. In some industrial applications (power generation for example), a shutdown can mean enormous financial losses. Machine maintenance is the work that keeps mechanical assets running with minimal downtime. Machine maintenance can include regularly scheduled service, routine checks, and both scheduled and emergency repairs. It also includes replacement or realignment of parts that are worn, damaged, or misaligned. Machine maintenance can be done either in advance of failure or after failure occurs. Machine maintenance is critical at any plant or facility that uses mechanical assets. It helps organizations meet production schedules, minimize, and lower the risk of workplace accidents and injuries

### 3.2 Identifying maintenance requirements

Steps should be taken to manage any risks arising from maintenance activity. Manufacturer's instructions should make recommendations on how to safely undertake maintenance of their work equipment and, unless there are good reasons otherwise, these should always be followed. Where possible, equipment should normally be shut down and any residual / stored energy safely released (eg pneumatic pressure dumped, parts with gravitational / rotational energy stopped or brought to a safe position). For high-risk equipment, positive means of disconnecting the equipment from the energy source may be required (eg isolation), along with means to prevent inadvertent reconnection (eg by locking off). Formal systems of work, such as a permit to work, are required in some cases to safely manage high-risk maintenance operations.

Page 87 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1 October 2020
---------------	--	----------------------------------	----------------------------





In some cases, it may not be possible to avoid particular significant hazards during the maintenance of work equipment so appropriate measures should be taken to protect people and minimize the risk. These may include:

- Physical measures, eg providing temporary guarding, slow speed hold to run control devices, access, personal, etc.
- Management issues, including safe systems of work, supervision, monitoring
- Personnel competence (training, skill, awareness and knowledge of risk)

It is important that these situations are properly assessed. Staff undertaking maintenance may need to undertake significant on-the-job risk assessment (essentially considering what could go wrong and how to avoid injury), as the situation may develop and change in ways that could not be foreseen at the outset. Maintenance work should only be undertaken by those who are competent to do the work, who have been provided with sufficient information, instruction and training. With high-risk or complex equipment, these demands may be significant and, in some cases, may be best undertaken by the manufacturer or specialist contractors. But, in many cases, maintenance can be done in-house by suitably trained, competent staff.

### **3.3 Reporting maintenance requirements**

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.

Page 88 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1
			October 2020



Shut-down of cereal cleaning machines may include safe dismantling procedures (including turning off the power), maintaining a clear thoroughfare, identifying the hazards, securing, cleaning, checking and recording.

- The operational records of machines used for cleaning the cereal are completed and maintained according to enterprise requirements.
- Report all accidents
- Malfunctions, faults, irregular performance and damage to machines and equipment are detailed and reported according to enterprise requirements.
- At the end, cleaned, secured and stored according to OHS and enterprise requirements.

Page 89 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1
			October 2020



<b>Self-Check 3.</b>	<b>Written Test</b>
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Name \_\_\_\_\_ ID \_\_\_\_\_ Date \_\_\_\_\_

**Directions:** Answer all the questions listed below.

**I. Write short answer/s**

1. Define shutdown maintenance.(5points)
2. Write important of Identifying maintenance requirements. .(5points)

**Note: Satisfactory rating –5 points      Unsatisfactory – below -5 points**

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



## Reference

Ann Snook, 2019 Policies and Procedures in the Workplace

Blakeney *etc.*, 2009 A basic introductions to Australian wheat quality

blob:<https://www.youtube.com/2f3362c1-9037-478c-8d5e-60a7e2e38e06> Cereal cleaning machine

Facilities Instructions, Standards, and Techniques (FIST), 2009 Maintenance Scheduling for Mechanical Equipment

<http://dome-corp-na.com/buildings/bulk-storage-domes-and-barrel-buildings/>

<http://www.grainsystems.com/farm/storage/farmgrainbins.php>

<https://www.coursera.org/lecture/postharvest/2-2-3-grain-cleaning-methods-and-equipment-LZYzo>

<https://www.osha.gov/shpguidelines/hazard-identification.html#ai3>

[https://www.youtube.com/watch?v=6fhdqOh\\_UaY](https://www.youtube.com/watch?v=6fhdqOh_UaY) Seed cleaning and stoner machine manufacturer

<https://www.youtube.com/watch?v=lzSe-jemc1w>

<https://www.youtube.com/watch?v=JLd9sfpZZu0>(Cleaning and destoner machine)

<https://www.youtube.com/watch?v=JLd9sfpZZu0>(Integrated Grain Cleaning Machine Destoner)

Joanne, 2011 Machinery lock-out procedures that work

See Peek, 2020 A Guide to Environmental Issues in the Workplace,

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

Page 91 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1
			October 2020



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Page 93 of 94	Federal TVET Agency Author/Copyright	Cereal Processing Level-II	Version -1 October 2020
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