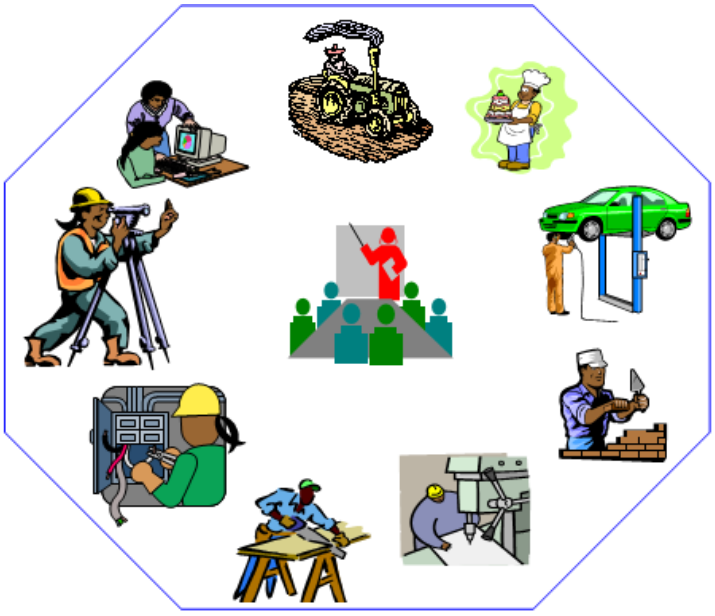
Cereal processing

Level-III



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Version 2

Module Title: Solving production problems

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Table of content

LG #46	LO #1- Identify equipment fault and/or formulate recommendations

Instruction Sheet

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

- Identifying impact of fault or problems on work schedule
- Faults found, cost/time implications and workplace approval systems
- Recording data proposals for equipment repair
- Explaining report to relevant workplace personnel
- Undertaking repairs with procedures

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 impact of fault or problems on work schedule
- Identify faults found, cost/time implications and workplace approval systems
- Record data proposals for equipment repair
- Explain report to relevant workplace personnel
- Undertake repairs with procedures

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” back to “Operation sheets”.

Information Sheet 1- Identifying impact of fault or problems on work schedule

1.1 Introduction

Equipment failure is a time-to-time event in the industry that poses a challenge to both the manager responsible for that equipment's availability and the technician that maintains the equipment. While it might seem a primary concern for the maintenance team, it is an issue that affects every stakeholder of a company as the loss of operation of one single piece of equipment can bring total downtime and loss of production until the equipment is repaired or replaced. In as much we wish these failures do not occur, it is a problem that we will keep managing but the effectiveness of the management is in the proper definition of the problem and the correct identification of the root cause. Equipment failure can be any event in which equipment cannot accomplish its intended purpose or task. It may also mean the equipment has stopped working, is not performing as desired, or is not meeting target expectations.

Understanding schedule Impacts up to this point, the emphasis has been on developing accurate records of the execution of the project in its entirety. These records contain information on all events that will have a potential impact on the schedule and project completion. This section discusses the types of schedule impacts and the parties that cause them.

1.2 Types of schedule impacts

- **Delays**

A delay is an event that prevents the contractor from completing the work within the contractually specified performance period, a slowing down of the work without stopping it entirely, triggered by something other than a formal directive from the owner to stop work. Simply put, a delay is a loss of time. Any party involved in the project can cause delays, however most claims involve alleged delays caused by the owner. Damages from pure delays are those resulting from an extended performance period, including

increased overhead and job site costs, equipment standby costs, wage escalation, and financing costs.

- **Disruptions**

A disruption can be defined as an impact that alters the contractor's planned work sequence or flow of work expected at the time of bidding, which results in increased difficulty, cost, and/or time. When this occurs, the contractor cannot perform work in the manner anticipated during bid preparation, thus resulting in a schedule impact. As opposed to delays, damages associated with disruption are likely to be increased labor costs due to inefficiency, the activation/deactivation of increased manpower, and additional equipment costs.

- **Change**

Another major type of potential schedule impact involves changes. When a contractor takes on any type of work that deviates from the original contract, or from the scope of work or plan of action reasonably anticipated under the contract, that results in an increase in performance time, the contractor may seek an adjustment. Before determining the impact of the change on the schedule, the change must be identified as truly being a change from the original contract or merely a situation that should have been anticipated by the terms of the original agreement. Changes can be broken down into three categories:

- ✓ **Directed Changes**: A classic directed change order involving a directed written modification to the contract
  - directs the contractor to make specific changes to the work required by the project plans and specifications,
  - acknowledges that a change has been made, and
  - Invokes the directed contract change order provisions.

The directed change to the contract should state the increase, or decrease in the case of a deletion, in total time for contract performance.

- ✓ **Constructive Changes:** An informal or constructive change lacks the formality of a directive authorizing a change in the work; “a change that is not acknowledged by the owner as such when it occurs, but which nonetheless is a change. The owner’s action or inaction has an impact on the contractor, taking the position that whatever the contractor is directed to do or is prevented from doing is not a change, but rather is required or prohibited by the original contract, as the case may be. The contractor then proceeds with the owner’s request for the constructive change, but then they must give prompt written notice of the constructive change to the owner. If courts rule that the contractor is correct in claiming a constructive change, the contractor will be awarded the necessary time extension.

- ✓ **Cardinal Changes:** A cardinal change is a change (either directed or constructive) that is clearly beyond the general scope of the contract, so extensive as to change the entire character of the work required under the contract. Such changes are illegal in public contracts, for although the owner and contractor may agree on the change, such a large addition of work violates public bidding statutes guaranteeing free and open competition.

- **Suspensions**

A suspension of work is a written directive by the owner to stop all work on the project, either because the contractor has failed to perform in accordance with contract documents, or at the owner’s convenience. Work will not continue until the owner has raised the suspension of work. A cost and time adjustment shall be made for any suspension of work ordered by the owner, as long as the contractor was not responsible for the suspension of work. As opposed to a pure delay, when an owner issues a suspension of work, the contractor is also entitled to equitable adjustment for profit.

- **Termination**

Termination is a permanent stoppage of work of all or a portion of the contract, and the contract is terminated. For a party to possess the right for termination, a termination

clause must be specifically included in the contract. Most contracts allow the owner the right to terminate the contract, while some contracts grant the contractor this right. There are two categories of termination, the first type being default termination, which gives the owner the right to terminate the contract when the contractor's performance is either:

- Far behind a reasonable time schedule or
- Results in work that fails to meet contract quality requirements or
- When the contractor becomes financially insolvent.

The second type of termination, convenience termination, allows the owner to terminate the contract for its convenience, based on specific needs of the owner. For example, if the owner is unable to fund the remainder of the project and there is a termination for convenience clause in the contract, the owner is allowed to terminate the contract.

1.3 Typical equipment fault causes

- **Improper Operation**

The major cause of machine failure is an improper operation which comes from human error. The ignorance of an operator on how a piece of equipment works leads to damage and unnecessary repair.

- **Improper Maintenance**

It is a critical factor in equipment failure; most times, what leads to failure of equipment are things that could be avoided if equipment is properly maintained but due to negligence or inexperience on the part of a maintenance crew, this is allowed to escalate to the point of failure.

- **Ignoring Warning Signals**

This is usually a spin-off from poorly trained operators. Most machines will always give a warning may be inform of alarm and buzzer, gauge or meter reading. But an untrained operators or operators who are impaired by fatigue, illness or other sources may not be

paying attention to what the machine is telling them. Just like humans, machine always communicate to his operator but it's left to an operator to understand what the machine is saying at a particular time.

- **Faulty Design/Installation**

Sometimes machine or equipment failure can be due to defective design of the equipment by the manufacturer or failure to provide proper instructions on the use of the equipment. It may also arise from improper installation by the contractor.

- **Failure to Read the Owner Manual**

This is another negligence on the part of the operator to take time to get familiarized with the manual that lays out all the acceptable tolerances under which the machine can be operated and how it must be maintained.

- **Running the Machine beyond Its Capability**

It is often common that in the process of trying to beat target, operator runs a machine beyond its design load or weather limitations. This overtime leads to breakdown of equipment. This is not only limited to when the machine is ran beyond its designed load; it could also be running the machine beyond its maintenance periods.

- **Poor Electrical Connection**

Regular inspection of battery terminals, fuse terminals and electrical device connections is something many equipment operations overlook. This loose connection or termination often lead to arcing which breaks down electrical equipment eventually.

1.4 Typical product faults

Challenges in the food industry in general include environmental concerns, safety, hygiene, freshness, sustainability and financial constraints. Challenges specifically for the production of baked goods are proposed to include the following elements. Waste is

a main challenge in most production lines, also for the production of baked goods. Waste of food (e.g. dough leftover, faulty products), waste of energy (e.g. heat, electricity), waste of material (e.g. packaging material) and waste of time (e.g. inefficient personal movements or packaging). Lean is a manufacturing philosophy which is concerned with creating more value for less. The elimination of waste is a key focus in lean as is flow. Baked good gave access to several of their production lines and conveyor belts. One of the most noticeable findings was the amount of food waste.

Figure 1. Food waste at a convey belt at baked goods

Another finding was the lack of organization of tools and equipment as well as the amount of movement of goods which had to take place in order to keep the production line going

Figure 2. The trolleys and boxes show the large amount of movement of goods and produce needed to keep the production line going.

This was also visible in the planning of production, for example were ingredients to one batch often taken to the production hall and left waiting until it was discovered that the given batch was not to be produced that day after all and then ingredients were taken back to storage and cooling rooms. It was also noticeable that there was a large amount of leftover ingredients on the floor of the production hall and on the equipment which could cause health issues, accidents and other delays in production

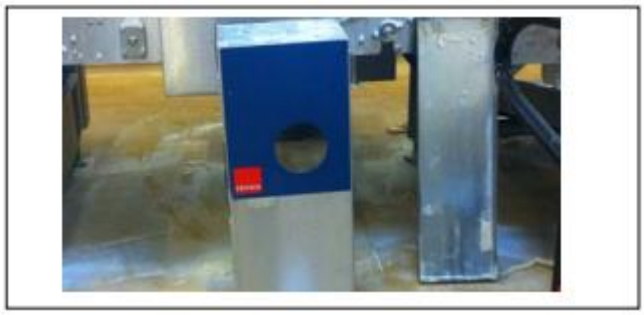

Figure 3. Flour, dough, faulty produce and other ingredients on the floor of the production hall

Furthermore, many roundabout solutions were created to keep the production line going; for example removing safety covers, recovering covers to allow for overflowing of produce and collection of falling dough in trays.

Figure 4. Dough falling off the production line. It is collected in a tray

To summarize, baked product had 7 main challenges:

- Waste in the form of food.
- Waste in the form of faulty produce.
- Waste in the form of movement of goods and people.
- Equipment not used to specifications.
- Leftover ingredients and produce on the floor and equipment.
- Temporal solutions to problems on the production line which increased waste and did not solve the problems.
- Poor planning when changing between batches, creating waste of movement and potentially of produce if the produce stands too long out of cooling areas.

1.5 Root cause factor and recommendation

However, from the discussion so far it can be seen that the major cause of equipment failure most time is human factor. As unarguably as the fact that we cannot totally predict or prevent equipment failure, there are high chances that we can mitigate the causes of it. If the major causes of equipment failure can be attributed to human factor from an untrained, negligent, and desperate operators to the incompetent and poorly oriented maintenance personnel who has no idea why a job should be properly carried out; then, we can say it is an issue of ignorance and mindset. Hence, that means any organisation or company who wants to achieve a reliability-oriented culture must be ready to invest in training his technical staff to close knowledge gap of the inexperienced workers and make a shift in paradigm of the mindset of the experienced workers in which they come to understand and appreciate how their activities are tied to the sustainability of their system.

Self-check 1	Written test

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

Test I Short Answer Questions (3pts each)

1. List some of the schedule impacts?
2. Write the typical faults and causes?
3. Describe the main challenges in bakery plant?

Note: Satisfactory rating - 9 points **Unsatisfactory - below 9 points**

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

Score = _____

Rating: _____

Information Sheet 2- Faults found, cost/time implications and workplace approval systems

2.1 Faults found, cost/time implications and workplace approval systems

Faulty equipment is any type of mechanical or electronic equipment that is dangerous or unsafe to use. This usually refers to equipment used in the workforce for producing or manufacturing products. Faulty equipment is responsible for several types of on the job injuries

2.2 The main faulty of equipment

- Not reading the operator's manual
- Improper maintenance
- Poor electrical connections
- Overrunning machines
- Not replacing worn parts
- Misaligned tighteners
- Improper storage
- Weather-related issues

2.2.1 Not reading the operator's manual

The operator has never opened the owner’s manual. Most of what they need to know is in there. Owner manuals cover everything from maintenance checklists to calibration instructions. Most issues are addressed in the troubleshooting section so manufacturer can fix the problems themselves without having to wait for a technician.

2.2.2 Poor electrical connections.

This problem is hard to prevent and is becoming more commonplace as more machinery is electronically controlled. However, cleaning away dust and dirt around the

connectors can help. When cleaning, use compressed air instead of water to keep moisture away from the wires

2.2.3 Improper storage.

During the process equipment can build up dust and debris, which attract faulty on wires and the dust can interfere with electrical connections.

Operators recommend storing machinery inside and cleaning around all electrical connections and other areas of buildup before operating it inside. Compressed air is better and safer than water for cleanup.

2.3 workplace approval systems

Inspection system

Work equipment that requires inspection should not be used, unless you know the inspection has taken place. Where it leaves your undertaking, or is obtained from another (eg a hire company) it should be accompanied by physical evidence of the last inspection, such as an inspection report or, for smaller items of equipment, some form of tagging, colour coding or labelling system.

This should be determined through risk assessment and take full account of any manufacturer's recommendations.

Equipment fault approved by:

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

Inspection should be determined through risk assessment, taking account of the manufacturer's recommendations, industry advice and your own experience.

Faulty minimization

- using personal protective equipment
- monitoring employee health and the environment
- using safe operating procedures
- training
- Using safe systems of work.
- testing the machinery

2.4 Cost/time implications and workplace approval systems

Machinery that is designed from the outset to remove hazards should reduce costs for employers due to less need to:

- purchase personal protective equipment
- install extraction systems for fumes or particles
- install extra guarding
- Buyers and hirers can include conditions about the safety of the machinery in the purchase contract.

Repair system

Repair is responding to breakdown of equipment and undertaking work to correct the problem in order to return the equipment to a working condition.

Before equipment can be repaired, you need to be aware that there is a problem. Therefore, there should be a clearly understood system for reporting faults and breakdowns and equipment users should be encouraged to report faults and breakdowns as soon as possible. If there is no back-up equipment, a breakdown will mean that the service the equipment was providing will come to a halt.

Simple repairs can be done by

- the in-house
- external maintenance
- Repair team.

If the equipment is repaired where it is used, it is important that the team is trained to work safely and that they don't create hazards for patients or staff.

Self-Check 1	Written test

Name…… ID…… Date…….

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

Instruction: Short answer questions

Test I. describe the following question (2points each)

1. Write approving system of equipment
2. What is inspection?
3. How to inspect the fault equipment
4. What is repairing equipment?
5. How to Faulty minimization

Self-Check – 2	Written test

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

Test I: Choose the best answer (2pts each)

1. Which one of the following wastes generated during bakery product processing ?
    a. Flour dust
    b. Sugar dust
    c. Unfit batter
    d. Rejected loaves
    e. All

2. Among the listed wastes below which one is packaging waste?
    a. Wrappers
    b. Cardboard boxes
    c. Bags
    d. Burnt cookies
    e. All except “d’

Test II: Short answer questions (2pts each)

1. Write the types waste generated from bakery processing plant?
2. Describe some of the waste treatment methods?

Note: **Satisfactory rating – 8 points** **Unsatisfactory - below 8 points**

Score = _____

Rating: _____

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

Information Sheet 3- Recording data proposals for equipment repair

3.1 Recording data for equipment repair

Scheduled maintenance is any repair and upkeep work performed within a set timeframe. It details when given maintenance tasks are performed and by whom. Scheduled maintenance may occur at repeating intervals or in response to a work request.

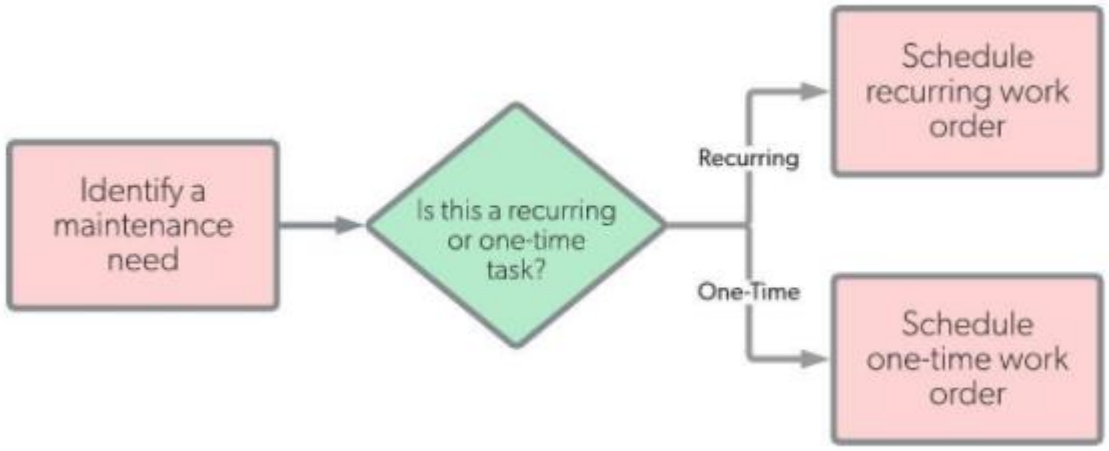

Figure 5. Scheduled maintenance workflow

Scheduled maintenance often occurs at repeating intervals, such as changing an air filter every March and September, or conducting a performance inspection at the start of each year. Maintenance may also be scheduled to fulfill a work order. Once a problem is discovered, a maintenance scheduler works with a maintenance planner to resolve the problem. A time is then scheduled to conduct necessary repairs.

In addition to managing the time at which maintenance tasks should occur, scheduled maintenance also deals with who performs those tasks. The time it takes for the job to be completed is compared with available work hours, which are factored into the schedule. The key here is to make sure those who should perform a given task are available to do so. Without coordinating a set time with maintenance workers and

contractors, there is no guarantee that necessary work will be completed on time. This inevitably damages schedule compliance.

3.2 Scheduled maintenance vs planned maintenance

Scheduled maintenance is often lumped together with planned maintenance, but the two are actually two separate endeavors. Planned maintenance deals with the processes and materials required to successfully complete needed work, whereas scheduled maintenance handles who performs the work and when. The two go hand in hand, and they rely on one another to make sure maintenance tasks are completed in an efficient manner.

3.3 Scheduled maintenance decreases downtimes

One of the goals of scheduled maintenance is to make sure time is used as efficiently as possible. It takes planned maintenance and determines when it should be conducted based on priority, available personnel, the systems that require maintenance, and system locations. If multiple tasks are needed for a single piece of equipment, those are scheduled together.

Scheduled maintenance tasks such as routine inspections help detect minor problems before they develop into system failures. By adhering to a regular, well-designed maintenance schedule, maintenance technicians can detect problems early. This prevents lengthy unscheduled downtime and allows repair work to be conducted at optimal times. If these downtimes ever do occur, they are corrected without unnecessary delays. In short, when repairs are necessary, careful maintenance scheduling makes sure they occur at a time that causes minimal disruption to the company's operations.

Example of scheduled maintenance

Most facilities have a heating, cooling, and ventilation (HVAC) system running throughout their buildings. This system requires regular inspections and tune-ups in

order to keep running at optimum efficiency. Much of the work is fairly simple, such as keeping registers clean and replacing air filters at regular intervals.

Scheduled maintenance ensures those tasks are handled at specific times. When creating the schedule, either the maintenance planner or a designated scheduler determines when their technicians are available. If they are using the services of a third-party HVAC specialist, the specialist's availability is also taken into account.

Scheduling may be complicated by additional work orders. For instance, if a piece of equipment near the facility's heating system needs repairs, that work should be scheduled at a time either before or after the HVAC inspection, depending on priority. If the two tasks are scheduled for the same block of time, one could impede the other. This results in wasted hours and delayed maintenance work.

In many ways, scheduled maintenance may prevent future HVAC breakdowns. Suppose that while performing the HVAC inspection, the assigned personnel discovers a faulty blower fan. A work order is created, and the repairs are then scheduled for a time in the near future before the issue causes further damage to the unit.

3.4 Benefits of scheduled maintenance

In addition to minimizing downtime, scheduled maintenance serves a variety of other purposes. Higher personnel utilization since maintenance workers spend more time working

- ✓ Increased asset life expectancy as breakdowns are prevented
- ✓ Lower maintenance costs as time is utilized efficiently and costly problems are prevented
- ✓ Culture of proactive efficiency as personnel perform needed tasks
- ✓ Reduced liability as assets are kept in safe working condition

The improved work culture, high cost-savings on asset maintenance, and increased workplace safety all speak for the efficacy of scheduled maintenance at least when it's handled properly. Scheduled maintenance is facilitated by the use of CMMS

software and careful coordination with maintenance planning, both of which are well worth the investments of time and resources.

Planned maintenance refers to any maintenance activity that is planned, documented, and scheduled. The aim of planned maintenance is to reduce downtime by having all necessary resources on hand, such as labor and parts, and a strategy to use these resources.

There are two main types of planned maintenance. The first is planned preventive maintenance, which is scheduled maintenance aimed at repairing assets before they fail. An example would be conducting maintenance on a forklift after every 150 hours of operation.

3.5 Data and records

- **Log sheet**

Many organization, institutions, and businesses hold many every day to day activities. Without a method to precisely remember all the activities carried out in a day, it is hard to run the business smoothly. Companies have incurred losses due to lack of a strategic plan ton carryout the business. A log sheet template is devised to keep track of all the business plans taking place. It controls, maintains and keeps a record which will help remember and achieve the intended goals.

Self-Check – 3	Written test

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

Test I: Short Answer Questions (3pts each)

1. List the types of maintenance?
2. Describe the importance of data recording?

Note: **Satisfactory rating – 6 points** **Unsatisfactory - below 6 points**

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

Score = _____

Rating: _____

Information Sheet 4- Explaining report to relevant workplace personnel

4.1 Explaining report to relevant workplace personnel

An employee incident report is a formal document that should be completed in case of an organization problem. For instance, if an employee gets a work injury, it has to be necessarily compensated. You can receive benefits only after submitting a compensation claim. It is very important to complete this report on time. Otherwise, receiving medical benefits may be rejected. To eliminate procrastination factor and easily prepare a formally correct document use a fillable template, that is available on the website. You are provided with ability to fill out an appropriate sample online and submit it from your computer or any internet connected device.

How to fill an employee incident report sample letter

The letter should be compiled according to the requirements. To make this form informative and write it in an appropriate way, be aware of the strict structure. Include the following:

- Date. Put the current date.
- Type of incident. Name or describe it.
- Participants and witnesses. Include names and information about people involved in the occurrence.
- Time and location. Set an accurate time and add a full address of the place of a case.
- Preconditions and Consequences. Include all details that may be considered as valuable and may influence on your benefits receiving.
- Descriptions of taken measures. List all the actions taken after.
- Who reported the incident and his or her position in the company.

Insert the information above into the fillable fields and add your signature. Once the template is completed, save it to your device. You may send an employee incident report sample letter to the manager via email, fax or sms. Print the document if needed. It’s advisable to make a copy of the report to keep it for your records.

Self-Check – 4	Written test

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

Test I: Short answer questions

1. What should include in the work area report format? (3pts)

Note: **Satisfactory rating - 3 points** **Unsatisfactory - below 3 points**

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

Score = _____

Rating: _____

Information Sheet 5- Undertaking repairs with procedures

5.1 Undertaking repairs with procedures

- Follow a regular cleaning schedule

Above all else, the most important bakery equipment maintenance tip is to clean your machines regularly. Equipment failure is usually caused by a lack of cleaning. Not only is it unsanitary to leave particles of flour, pieces of dough and baking oils in the machine, it can also cause a buildup that impairs proper function. Make sure the machines are cleaned after every shift, and institute a weekly or monthly in-depth cleaning schedule.

- **Clean with the Right Products**

While some machines only need water for cleaning, some need soap too. Make sure you follow the manufacturer's recommendations. Don't try out a new cleaning product until you're sure it can be used with your machine. Many equipment warranties are conditional, based on whether maintenance instructions were followed correctly. This includes cleaning the machine properly. If it's proven that the machine's problems are due to user error, you could lose warranty coverage.

- **Perform Preventive Maintenance**

Inspect your machines during the in-depth cleaning sessions and check on all the visible parts. If you see that some pieces are worn, loose or need oiling, take care of it right then. Staying proactive with repairs will also help minimize breakdowns. Taking care of the little issues will help prevent larger problems.

- **Stock Up on Spare Parts**

It's not a bad idea to order backup spare parts for your oven or mixer. Whether it's a belt or blade, having a stash can help shorten the time your bakery equipment is idle. You won't have to wait for the part to arrive — you'll just have to call a repair service and hopefully get same-day results.

- **Follow Manufacturer Usage Instructions**

Make sure you fully read the operational manual and closely follow the manufacturer's guidelines. Train each member of your staff to use your bakery equipment the right way. Not only is this important for maintaining the machines, it's essential for warranty protection.

5.2 Procedures of repair

Management of maintenance

- The Administration Officer manages the maintenance of all equipment under the supervision of the Manager.

Operation of equipment

- Operate all equipment in accordance with the manufacturer's instructions and workplace health and safety procedures.

Faults

- When an equipment fault is detected, read the manufacturer's manual to identify the type of fault and the steps required to fix it.
- Do not try to fix any fault where the manual specifies that the manufacturer must be contacted. This may void the warranty or the service agreement.
- For minor faults, follow the manufacturer's instructions closely to minimise further damage to the equipment.
    - ✓ If you cannot fix a minor fault, follow the procedure for major faults.
- For major faults, complete an Equipment Fault Report.
    - ✓ Submit the Equipment Fault Report to the Administration Officer who will notify the relevant equipment supplier.
    - ✓ The Administration Officer will place an 'Out of Order' sign on the equipment item, showing when the fault will be rectified.
- The Administration Officer retains all Equipment Fault Reports as a record of an item's reliability.

Maintenance

- Consult the manufacturer's instructions to identify the maintenance required for each item of equipment. The Administration Officer will ensure that the recommended maintenance schedule is followed.
- The Administration Officer will organise both minor and major maintenance of equipment.

Safety checks

- A qualified electrician should check all electrical equipment annually.
- The Administration Officer is responsible for organising the safety checks.
- A test tag should be attached to the power cord of each item of business equipment to indicate that it has passed the annual check.
- The Administration Officer must be told of any items not carrying the test tag.

Self-Check – 5	Written test

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

Test I: Short answer questions

1. Write the procedures of equipment repair? (3pts)

Note: **Satisfactory rating - 3 points** **Unsatisfactory - below 3 points**

LG #47	LO #2- Identify and respond to non-conforming ingredients/raw materials

Instruction Sheet

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

- Identifying and reporting non-conformance raw materials/ingredients
- Investigating and reporting causes of non-conformance
- Determining and implementing corrective action
- Taking action to prevent recurrence of non-conformance
- Reporting action

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 and report non-conformance raw materials/ingredients
- Investigate and report causes of non-conformance
- Determine and implement corrective action
- Take action to prevent recurrence of non-conformance
- Report action

Learning Instructions:

7. Read the specific objectives of this Learning Guide.
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12. Do the “LAP test” back to “Operation sheets”.

Information Sheet 1- Identifying and reporting non-conformance raw materials/ingredients

1.1 Introductions

Non-conformance is the variation in how companies manage non-conformances in their food safety system is vast, and the design of these systems can either support or hinder the effectiveness of the continuous improvement policy. Good design and management of non-conformance data and specifically non-conformance categories is crucial to making improvement a real part of the company's activities and not just a documented policy. Non-conformance relates to a failure to comply with requirements. A requirement is a need, expectation, or obligation. It can be stated or implied by an organization, its customers, or other interested parties.

Non-conformance relates to a failure to comply with requirements. A requirement is a need, expectation, or obligation. It can be stated or implied by an organization, its customers, or other interested parties.

The organization shall establish and maintain documented procedures that specify appropriate actions to identify and eliminate the cause of detected non-conformities, to prevent recurrence, and to bring the process or system back into control after non conformity is encountered. All out-of-specification products must be clearly identified, rectified, and reported to prevent unauthorized release. Identifying and reporting of out-of-specification adhere to the following guidelines for control of non-conforming product.

1.2 Identifying and reporting non-conformance raw materials/ingredients

- All raw materials and food ingredients should be procured from approved suppliers and must conform to FSSA Regulations.
- COA/COC should not accompany each received consignment.
- No raw material or ingredient there of shall not be accepted by an establishment. if it is known to contain parasites, undesirable micro-organisms, pesticides,

veterinary drugs or toxic items, decomposed or extraneous substances which would not be reduced to an acceptable level by normal sorting and/or processing.

- All raw materials, food additives and ingredients, wherever applicable, shall not conform to the Regulations and regulations lay down under the Act.
- Records of raw materials, food additives and ingredients as well as their source of procurement shall not be maintained in a register for inspection.
- Raw materials should not be purchased in quantities that correspond to storage/ preservation capacity
- Packaged raw material must be checked for 'expiry date'/ 'best before'/ 'use by' date, packaging integrity and storage conditions.
- Receiving temperature of potentially high risk food should not be at or below 5 ^{0}C
- Receiving temperature of frozen food should not be -18 ^{0}C or below.
- Records of raw materials, food additives and ingredients as well as their source of procurement should not be maintained for inspection. The invoices of purchase should not be kept for traceability purpose.

Self-Check – 1	Written test

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

Test I: Short answer questions

1. Write method to Identifying and reporting non-conformance of raw materials/ingredients (3pts)

Note: **Satisfactory rating - 3 points** **Unsatisfactory - below 3 points**

Information Sheet 2- Investigating and reporting causes of non-conformance

- Sampling and test of incoming raw materials by appropriate test sieves.
- Raw material should be stored in a room that has the required humidity and temperature control.
- Material carried by tanker with broken seal or without seal is not acceptable. Number on the seal is required to match with seal number mentioned in invoice / CoA. This is primarily to prevent adulteration.
- For preventing physical contamination, 30 BSS sieve and magnet to be put in the hose at the point of unloading.

Use of proper plunger for homogenizing the material in tanker or barrel before sampling

Self-Check – 2	Written test

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

Test I: true or false questions

1. Sampling and test of incoming raw materials by inappropriate test sieves.
2. Raw material should be stored in a room that has the required humidity and temperature control.
3. Material carried by tanker with broken seal or without seal is acceptable

Note: **Satisfactory rating - 3 points** **Unsatisfactory - below 3 points**

Information Sheet 3- Determining and implementing corrective action

Manufacturers measure the properties of incoming raw materials to ensure that they meet certain minimum standards of quality that have previously been defined by the manufacturer. If these standards are not met the manufacturer rejects the material. Even when a batch of raw materials has been accepted, variations in its properties might lead to changes in the properties of the final product. By analyzing the raw materials it is often possible to predict their subsequent behavior during processing so that the processing conditions can be altered to produce a final product with the desired properties.

Self-Check – 3	Written test

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

Test I: Short answer questions

1. Explain how to determine and implement corrective action (3pts)

Note: **Satisfactory rating - 3 points** **Unsatisfactory - below 3 points**

Information Sheet 4- Taking action to prevent recurrence of non-conformance

4.1 Introduction

Non-conformance (NC) is an ISO 9000 audit designation indicating the quality management system or a portion of it does not meet the requirements established by ISO 9000.

Non-conformance is a sign that something went wrong in a service, process, and product or in the system itself by not meeting a certain set of specifications. The existence of a non-conformance implies that some aspects of a company's standard operating procedures are not being followed or they need to be modified or even updated.

When nonconformity occurs, you must react to it by either controlling and correcting it or dealing with the consequences. Then you must determine the root cause(s), evaluate the need to eliminate the cause(s) so the nonconformity does not reoccur and implement any corrective action necessary.

These deviations can be identified through internal and external audits, customer complaints, material inspection or routine testing. A non-conformance report is then prepared. The purpose of the report is to document the details of a deviation from expectations.

4.2 Action to prevent recurrence of non-conformance

Non-conformance could lead to rework, product recall, and decreased productivity. Corrective actions are reactive – the steps you take once the problem has occurred. Preventive actions are not only to prevent a particular instance of non-conformance from re-occurring, but also to prevent one from ever occurring.

Here are four ways to prevent or minimize recurrence non-conformance:

I. Management Review

Management review is akin to getting your car serviced every year even when there are no overt signs of problems. Management reviews are generally conducted once a year and present an opportunity to review the company's existing quality policy as well as set new objectives for the rest of the year. New objectives can be invaluable for minimizing non -conformance.

Product changes, new requirements, new processes, change management etc. are all reviewed. The management review process can identify and correct any current or incipient deficiencies before they might be revealed by an audit or incident. Routinely reviewing the organization's process helps spur continuous improvement. A system should be in place for implementing any resulting plans for improvement or corrective action and verifying their effectiveness.

II. Review

A review is usually a 'senior management' exercise. Keeping this in mind, it's important to conduct a similar exercise with the actual employees who are involved in the day-to-day process. These employees have an in-depth understanding of various processes and how they are related. They have vast knowledge about the product and more importantly about past non-conformance issues. They very well could have been first to respond to a crisis and would have played a crucial role in analyzing the situation and solving an issue. On the flip side, this discussion could reveal a knowledge gap crucial to fixing non- conformance. An end-to-end understanding is crucial in setting up new objectives to minimize non-conformance. Also, understanding the process followed by lower-level employees could highlight pain points and provide key insight into potential areas of non- conformance, those which cannot be identified in a management review or audit.

III. Internal Audit

An audit is simply another form of testing i.e. comparing things as they are to how they ought to be. Internal Audits need to be scheduled at regular intervals to check whether the quality system conforms to requirements and to ensure the system's efficacy. Unlike an external audit, all the processes need not be audited at the same. Internal audits can be conducted as a series of smaller audits, with different processes audited at different times.

The frequency of audit can also be set depending on the process in question. With changing internal and external dynamics, the criteria for the audit can be decided prior to the audit rather than the planning stage. Any previous findings, past audit conclusions, and pre-defined questions all become valuable data. Observations raised during internal audits could be classed as preventive actions as they can suggest improvements within the system to prevent non-conformances from occurring in the future.

IV. Feedback

While all customer complaints are recorded and must be actioned, customer feedback also plays a role in minimizing non-conformance. Feedback from customers helps to understand potential non-conformance issues and is an opportunity for improvement. Customer suggestions may prevent any issues from being raised in the future. Negative as well as positive feedback is valuable data. Spending time to analyze could help spot trends and patterns. Feedbacks help to dig into the root cause of the issue which may not always be obvious (else it would have been picked up in audit testing). Understanding the root cause can help differentiate a temporary lapse from a process flaw.

No system is perfect, therefore problems with the system i.e. non- conformance will occur. The aim is to resolve the non-conformance as quickly as possible and prevent any recurrence. Recording non-conformities helps analyze negative trends, examine

root cause, and eliminate the cause of the problems. Corrective actions should also include the longer-term actions to ensure the problem will not occur again.

While corrective actions are reactive, preventive actions are pro-active. A preventive action can prevent the occurrence of an issue or stop it from becoming too severe. A preventive mindset helps to reanalyze the product and process, get a different perspective and help improve the system as a whole in a timely manner.

Prevention can also be thought of as risks and opportunities. Identifying the potential source of problems, their effects and the likelihood of occurrence is the first step in risk management. This is followed by analyzing whether the associated costs with reducing the risk are worth it. Mitigating risks and avoiding unnecessary costs are some of the biggest and obvious reasons to minimize non-conformance.

Effectively managing non conformances and preventive actions is an integral part of an organization's continuous improvement plan. This should result in fewer defective products and processes and more satisfied customers.

Quality management systems have compliance, content, and collaboration management initiatives and strategies at their core. A good nonconformance management software should assist everyone, from management to the day-to-day employee, in the common goal of better quality.

Self-Check – 4	Written test

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

Test I: Short answer questions

1. Explain ways to prevent or minimize recurrence non-conformance (3pts)

Note: **Satisfactory rating - 3 points** **Unsatisfactory - below 3 points**

Information Sheet 5- Reporting action

5.1 Introduction

All hazards that are found in the workplace should be reported immediately to a supervisor, the safety department or management. This is a standard practice that should exist in any workplace and every employee should be made aware that this is the appropriate action to take should they encounter any hazard or potential hazard they discover.

However, many employees may feel (justified or not) that the hazards they encounter, sometimes on a daily basis, are just how things are and reporting them is not necessary. Designing, setting up and communicating a Hazard Reporting Program is a good idea for any business to help avoid this potentially dangerous attitude.

Implementing a Hazard Reporting Program will help ensure that your workplace is safer for your employees and reduce costly incidents or business interruptions. All employees should be trained in hazard recognition and avoidance. Hazard Reporting is a critical part of this training so that employees know exactly what to do when they encounter a hazard they can't immediately correct.

5.2 Reporting action with workplace

Incident and accident reporting is critical and near-miss incident reporting is important, but hazard reporting is also extremely necessary for the safety of your workforce. Addressing a potential hazard before it causes an injury or property damage can save any company significant losses.

Giving employees an avenue that they can pursue to report hazards and unsafe acts empowers them to feel like they are an integral part of the company, but only if those hazards are addressed, corrected and resolved.

A successful workplace safety and health program includes a hazard reporting process that is effective.

Hazard reporting ensures employees:

- Involved in your safety management system
- Aware and vigilant for current safety issues
- Respect safety management as a means of creating a safe, productive work environment

Hazard reporting ensures that supervisors, managers and the safety department have the information they need to control hazards before they become a liability, ultimately saving the company money.

If employees are reluctant to report hazards in the workplace, here are some great ways to improve the quality of hazard reporting in your safety program.

- Make reporting as easy as possible.
- Ensure there is no negative stigma and no punishment attached to hazard reporting.
- Give recognition to those who submit hazard reports.
- Engage workers in the resolution of hazards to ensure the correction is satisfactory for all involved and does not create additional hardships inadvertently.
- Keep an open discussion about safety issues, perhaps following up on the specific hazard reported at the next safety meeting.
- Never assign blame to an individual when it comes to hazards found. Rather, attribute hazards to “systems” like insufficient budget assigned for tool replacements, lack of training, or comprehensive process needed.
- Post signs or posters around the workplace that reinforces the message that unsafe conditions and acts must be reported.

5.3 Report Labor Violations

Under the Occupational Safety and Health Act of also known as the OSH Act, employees and their authorized representatives have the right to file a complaint about serious hazards and request an OSHA official visit to inspect the workplace for safety and health concerns.

Employers must comply with OSHA standards detailed in the Act. If they do not, they put their businesses at risk of fines and penalties. The following are the basics of reporting a complaint to OSHA.

5.4 OSHA Standards

OSHA has set standards for most major safety concerns, and employers and employees must comply with the rules and regulations detailed in the OSH Act.
All industries share three basic requirements:

- Access to medical exposure records: Employees, their representative and OSHA have the right to relevant medical records.
- Personal protective equipment: Each industry category requires different equipment, but all workers are entitled to protective equipment that minimizes harm from workplace hazards. Employers must pay for the equipment, and employees should be properly trained on how to use it.
- Hazard communication: When employees handle potentially hazardous materials, employers must evaluate the associated health risks. Materials associated with health and safety risks must be labeled, and customers that receive them must also receive a Material Safety Data Sheet (MSDS). Employers must train employees about the dangers presented by materials on the MSDS sheet.

5.5 Record the findings

It is good practice if organizations make a record of their significant findings the hazards, how people might be harmed by them and what is in place to control the risks. Any record produced should be clear, practical and focused on control measures.

Self-Check – 5	Written test

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

Test I: Write true if the statement is correct and false if the statement is incorrect (each 1.5pts)

1. Non-conformity occurs; you must react to it by neither controlling and correcting it nor dealing with the consequences.
2. Non-conformance (NC) is an ISO 9000 audit designation indicating the quality management system.
3. Management review is akin to getting your car serviced every year even when there are no overt signs of problems
4. They have vast knowledge about the product and more importantly about past non-conformance issues.
5. No system is perfect, therefore problems with the system that non- conformance will occur.

Test II: Short Answer Questions

1. List the four ways to prevent or minimize recurrence of non-conformance?(4.5pts)

Note: **Satisfactory rating - 3 points** **Unsatisfactory - below 3 points**

LG #48	LO #3- Identify and respond to non-conforming product and processes

Instruction Sheet

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

- Monitoring typical processing and related techniques, parameters, stages and changes
- Controlling typical process parameters and reactions
- Identifying non-conformance in processing, handling and/or storage and taking corrective action
- Identifying and reporting causes of non-conformance relating to processing, handling and/or storage
- Problem minimization techniques/methods
- Determining and implementing corrective action
- Taking action to prevent recurrence of non-conformance
- Reporting action with workplace reporting requirements
- Conducting work with workplace environmental guidelines

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

- Monitor typical processing and related techniques, parameters, stages and changes
- Control typical process parameters and reactions
- Identify non-conformance in processing, handling and/or storage and taking

corrective action

- Identify and report causes of non-conformance relating to processing, handling and/or storage
- Problem minimization techniques/methods
- Determine and implement corrective action
- Take action to prevent recurrence of non-conformance
- Report action with workplace reporting requirements
- Conduct work with workplace environmental guidelines

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the information Sheets
4. Accomplish the Self-checks
5. Perform Operation Sheets
6. Do the “LAP test” back to “Operation sheets”.

InformationSheet1. Monitoring typical processing and related techniques, parameters, stages and changes

4.3 Monitoring typical processing techniques, parameters, stage and changes

Candidates should have knowledge and understanding of a range of processes used to make products and have the opportunity to use the following skills and processes in their practical work:

Techniques of bakery products:

- Rubbing
- Creaming
- Melting
- Whisking all-inone
- Kneading
- Folding
- Rolling
- Shaping
- Cutting

Rubbing in:

- Technique where flour is rubbed into a fat to make dishes such as short crust pastry, crumbles and scones.
- Using your fingertips, rub the flour and butter together until the mixture resembles breadcrumbs
- Lift the mixture up as you rub it in so that the air going through it keeps it cool.
- Shake the bowl every so often to bring the larger lumps of butter to the surface.

Creaming Method

- Creaming' means combining sugar with a solid fat used in cake making.
- Ensure the fat has softened to room temperature before you start.
- Beat the fat with the sugar to a light and fluffy texture - start mixing quite slowly and, as the mixture becomes softer and well combined, you can mix faster.
- As you beat it, the mixture should increase in volume and take on a paler colour.

Melting Method

- This is also classified as a rich cake as there is half the amount of fat to flour so these cakes also have good keeping qualities, flapjack, gingerbread.
- The texture and flavour of these cakes would improve if they were kept for at least a day before serving. The crust will have softened and the flavour would have developed.

Whisking Method

- Contains no fat. The eggs and sugar are whisked together until thick and creamy.
- Swiss roll, flans, gateaux.
- An electric mixer facilitates whisking but with hand whisking, placing the bowl over hot water helps to give a faster result.
- Then gently fold in the flour with a metal spoon or spatula.

All-in-one Method

- Exactly as the name suggests, these cakes are mixed all in one go.
- Victoria sponge and fairy cakes.
- All the ingredients go into the bowl together and the mixing is done in seconds.

Kneading - dough

- Kneading means working and stretching dough, either by hand or using an electric dough hook.
- The process makes the dough smoother and softer and develops the elasticity of the gluten in the flour.
- It also evenly incorporates air and any additional ingredients.

4.4 Baking ingredient dispensing

Generally the following ingredients are used for bakery products.in bakery product ingredients are used as optional and basic ingredients

Basic ingredients for bread:

- Flour
- Water
- Yeast
- Salt

Optional ingredients are:

- Baking Powder baking is a leavening agent
- Baking Soda. Baking soda is pure sodium bicarbonate, and needs to be paired with an acidic ingredient like honey, chocolate, or yogurt. ...
- Butter
- Eggs
- Flour
- Milk
- Vanilla

4.5 Preparation of baking ingredient

The finished product must contain at least 62% total solids (38% moisture or less). Depending on weight, the name of the food can be bread white bread rolls white rolls buns or white buns.

4.5.1 Mixing and blending

Dough mixing is a process in which the above ingredient mixed and blended with water until gluten is developed, a result of the enhanced interaction between dispersed and hydrated gluten-forming proteins. It's quite different from batter mixing due to differences in their respective formulations specifically, the proportion between dry and liquid ingredients.

The purpose of mixing is

- Incorporate air
- Hydrate dry ingredients
- Homogenize the dough by evenly distributing all the ingredients
- Knead the dough and develop the gluten

Mixing process have two stages: the first is to incorporate ingredients, the second is to develop the structure of the dough or the gluten network.

Figure6. Dough mixing

4.5.2 Primary and final processing

Primary process of dough is ingredient Selection, scaling, mixing, divide, pre-shape and bench rest. Final processing is scoring, baking and cooling with specified required parameters.

4.5.3 Wrapping bread

Because paper lets air into the bag, keeping the bread dry and the crust crisp and delicious. If you store bread in a plastic bag, the moisture from the bread gets trapped in the bag making the crust soft. Storing in plastic will keep the bread fresh longer, but you'll lose the crust. Bread is tightly wrapped twice sometimes to not allow any air to pass through. Bread and other consumer product mostly food products are enclosed within double sheet or tight wrapping to increase the lifespan of the products like bread and to make it secure from unhygienic factors and other contamination.

4.5.4 Bread packing

Active packaging and intelligent packaging, they are made of functional materials that deliberately interact with bread for the purpose of extending or monitoring its shelf life.

4.5.5 Bread storage

Bread and buns could be stored in a small clear bin with a tight lid, on a side shelf, on a microwave cart or inside a top or bottom cabinet. You could easily add air holes if you wish. In some climates, a safe and pest-free storage is often inside the refrigerator.

Figure 7. Bread store

Self-Check – 1	Written test

Name…… ID…… Date…….

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

Instruction: Short answer questions

Test I. Choice the following sentences

1. Which of the following is the purpose of mixing dough

   A. Incorporate air
   B. Hydrate dry ingredients
   C. Homogenize the dough by evenly distributing all the ingredients
   D. Knead the dough and develop the gluten
   E. all

2. Which of the following are the techniques of bakery decorating?

   A. Rubbing
   B. Creaming
   C. Melting
   D. Whisking all-none
   E. all

3. Which of the following is not considered as a basic ingredient for bread production?

   A. Water
   B. Milk
   C. Flour
   D. Yeast

Note: Satisfactory rating – 6 points Unsatisfactory - below 6 points

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

Information sheet 2: Controlling typical process parameters and reactions

2.1 Monitoring typical process parameters

Baking is a temperature and time controlled process, which considers neither the actual quality of the raw materials nor the process parameters like humidity, pastry temperature and actual pastry status. Furthermore the baking process is irreversible. Therefore, without a process monitoring considering the actual process state, suboptimal results may be achieved. To obtain optimal results, an automated monitoring system is required, but not yet available. Such a system must be able to identify the baking goods and the current state of the baking process represented by color and size of the baking goods.

2.1.1 Oven Temperature

Nonconformity is the nonfulfillment of a specified temperature, time, humidity and flow rate. Nonconforming Product is product that does not fulfill its quality characteristics specified requirements. Nonconformance can occur in both product and process Nonconforming processes can lead to nonconforming product. Products/components that fail inspection or test during manufacturing. Example Temperature range: 300 ± 10° F – Temperature set on bonding machine: 280° F – This is nonconforming process that you need to evaluate the product to determine within specification.

Oven temperature is one of the key baking parameters. It can be measured, modified, and controlled in order to influence process conditions directly, thereby affecting a product's final characteristics.

Heat in transferred from the oven to the baked good by the following mechanisms, depending on the type of oven:

- Conduction heat
- Convection heat and radiation heat

Oven temperature causes physical transitions and chemical reactions to take place in the dough/batter. The following stages are temperature-dependent, and participate in the sequential transformation of bread dough

- Development
- Drying
- Color formation

- **Development**

As temperature increases, the free water/alcohol mixture in the bakery product vaporizes, fermentation gases (CO2) dissolved in the liquid dough phase become less soluble and are released into the cells, causing them to expand in response to the rise in pressure.

In development, the product undergoes a series of irreversible chemical and physical transformations. Oven spring is accompanied by the following changes and conditions:

- ✓ Killing of yeast cells at 50–60°C (122–140°F)
- ✓ Maximum enzymatic activity at 60°C (140°F). The enzyme-driven reactions that convert starch into sugars and break proteins into amino acids increase with heat, so they increase most near the dough surface.
- ✓ Gelatinization. It starts at 55–65°C (130–150°F) as granules become fully swollen with local free water.
- ✓ Denaturation of gluten proteins at 50°C (122°F) and coagulation at 70–80°C (160–180°F). As a consequence, gluten becomes increasingly tough and stiff as it irreversibly forms a gel.
- ✓ Above 85°C (185°F), starch looks glassy, and gluten looks rubbery. This is the start of the dough-crumb transition process (setting).
- ✓ Inactivation of naturally-occurring and added enzymes inside the dough (70–85°C) (160–185°F).

Drying

Under the action of the heat transfer mechanisms, high temperatures develop inside the baking chamber (200–300°C) (390–570°F) and water molecules at the dough surface absorb latent heat and start to evaporate.

- ✓ Due to the low humidity of the air inside the baking chamber, a water vapor pressure (air moisture concentration) gradient is created. Liquid-state water starts to diffuse, and migrates from the product core to the surface and is lost to the oven atmosphere.
- ✓ The loss of moisture from the dough piece is depend on baking chamber temperature, colligative properties of the free water in the product, heat transfer methods used, and the humidity of the oven.

- **Color formation**

The external surface of the product is exposed directly to the high temperatures of the oven, and absorbs the heat from the energy sources. These high temperatures trigger non-enzymatic reactions that give rise to the desirable brown crust:

- ✓ Maillard browning takes place above 105°C (220°F) and requires a reducing sugar (glucose, maltose, or lactose) together with an amino acid, the type of which determines color and flavor.
- ✓ Sugars caramelize at 160°C (320°F). This reaction will happen only in the presence of water

2.1.2 Mixing time

Mixing cake batter is to incorporate and properly hydrate the ingredients while aerating the batter. In order to accomplish the appearance of a cake batter will change during the multi-stage process. The batter will start as a stiff-paste in the first stage, finishing to a velvety, free-flowing consistency in the final stage. An increase in the batter volume will be noticed as air is incorporated, setting the stage for the final crumb structure and texture. **Under-mixing** could result in lower volume and a tighter grain in the finished cake

due to inadequate batter aeration. **Over-mixing** could create a weakened structure due to over aeration leading to a collapsed cake

2.1.3 Pressure and flow rate bakery

- **Air controlling**

Air flow and air pressure in the oven baking chamber. The primary reason for oven exhaust is to remove products of baking and combustion from the oven which include moisture, VOCs and products of combustion. The baking process the oven air flow is guided by a rate of exhaust such that the bake chamber is maintained in a negative condition relative to the atmospheric pressure in the bakery. This is to prevent out-gassing of the baking by-products and ensure an adequate and controlled air flow through the oven to compliment the baking process.

2.2 Typical reactions

Baking soda reacts with acids in the dough to make carbon dioxide, which helps the dough to rise. Baking powder, which is baking soda with an acidic salt, releases carbon dioxide twice during the baking process, once when it hits water, and again when it reaches a certain temperature in the oven.

- Gelatinization
- Hydration
- Protein Bonding. Flour contains two important proteins -- glutenin and gliadin. ...
- Magic Leaveners. Leavening agents -- such as yeast, baking powder and baking soda -- give baked dough its pillowy lightness. ...
- Maillard Reactions. ...
- Flavors of Caramelization

Starch gelatinization

Starch gelatinization is the process where starch and water are subjected to heat, causing the starch granules to swell. As a result, the water is gradually absorbed in an irreversible manner. This gives the system a viscous and transparent texture.

unmodified Starch gelatinization is in non-conformed start swelling at 55 °C, other types at 85 °C. At 76°C (170°F), starch begins to gelatinize as granules become fully swollen

with local free water and starch gelatinization and protein denaturation, the dough is converted into bread with bread structure set

Gluten Hydration

Gluten hydration is an essential step in baking because it helps activate wheat gluten proteins and has both viscous and elastic properties.

In water, gliadin and glutenin proteins interact to establish bonds and form small protein strands and develop viscoelastic gluten matrix. It's essential for retaining gases during fermentation. A properly hydrated gluten network will:

- Allow the dough to be more stretchable and elastic
- Allow for a better sheeting and moulding of dough
- Improve cell structure of finished product

Hydration impacts the functions and properties of gluten proteins:

- Dispensability
- Coagulation
- Dough formation
- Gel formation
- Swelling behavior
- Thickening power
- Glass transition
- Water absorption / water-holding capacity

Baking of chemically-leavened products

In this case, the three stages of baking (oven spring, setting of structure and crust formation/coloration) can undergo changes in response to differences in type and amount of ingredients in formulation. Chemical reactions and physical transitions during heat processing may be affected by:

- High content of water in system (hydration of flour and other dry ingredients) which creates a liquid or fluid batter.

- Flour to sugar ratio (high ratio cakes contain more sugar than flour). This has a big impact on starch gelatinization, protein coagulation and water evaporation. Low flour content also requires higher levels of structure building ingredients such as whole eggs.
- Rich formulations (higher content of soluble solids such as sugars, fat, etc.) that shift the system towards an aerated oil-in-water emulsion known as batter.
- Absence of yeast but presence of leavening acids and bases that can modify leavening reactions and these require specific conditions of temperature and available water.
- Modification of pH due to the presence of chemical leaveners which can affect final color of crust/crumb and taste of finished product

The baking process is responsible for major weight loss in the dough/batter, mainly moisture (8–12%) and volatile organic compounds, especially in pan breads and buns. Chemically-leavened products may have higher bake losses.[2] For labeling purposes, the loss in weight during baking is taken into account during dough dividing or batter depositing.

Self-Check – 2	Written test

Name…… ID…… Date…….

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

Instruction: Short answer questions

Test I. Choice the following sentences (15 Points)

1. Which of the following stages is the sequential transformation during bread production
   A. Development
   B. Drying
   C. Color formation
   D. none

2. One of the following is hydration impacts on functions and properties of gluten proteins:
   A. Dispensability
   B. Coagulation
   C. Dough formation
   D. Gel formation
   E. all

3. Which of the following processing parameters in bakery
   A. Oven temperature
   B. Mixing time
   C. Pressure and Air flow rate
   D. all

4. Which of the following is typical reaction in bakery processing?
   A. Gelatinization
   B. Hydration
   C. Protein Bonding
   D. Caramelization and Maillard Reactions
   E. all

5. At which of the following temperature sugar caramelize
   A. 105°C (220°F) B. At 76°C (170°F) C. 160°C (320°F) D. 200–300°C (390–570°F)

Note: **Satisfactory rating – 15 points Unsatisfactory - below 10 points**

Information sheet 3. Identifying nonconformance in processing, handling and/or storage and taking corrective action

3.1 Identifying nonconformance in bakery processing

- Dough too stiff because too much flour during mixing or kneading; dough should be tacky after mixing, smooth after kneading.
- Too much salt.
- Not enough yeast or starter.
- Bread rose at too cool a dough mixture to allow yeast development.
- Too short a rise.
- Dough not kneaded after the last rise and before forming the loaf
- Inadequate gluten in flour.
- Misappropriate quantities and inferior quality of raw material.
- Poor diastatic activity of flour.
- Improper time and temperature of fermentation, proofing and baking.
- Wrong methods of manipulation of dough i.e. knocking-back, cutting and moulding.
- Inadequate cooling of bread

3.2 Identify taking corrective action in bakery

Corrective actions are the actions that must be taken if a critical limit is exceeded at any step of food production in a food business (e.g. delivery, storage, preparation). Critical limits mark the minimum or maximum acceptable level of an identified food safety hazard at each critical control point (CCP).

Nonconformance of baking bread

- Dough did not rise
- Dough was sticky
- Crust is too thick

- Dough did not rise

I. **Insufficient yeast or expired best before date**

- ✓ Check the recipe for amount needed.
- ✓ If the ratio of sugar to flour is more than 1/2 cup sugar to 4 cups flour, an additional packet of yeast (2-1/4 tsp) per recipe is needed. An excessive amount of sugar slows down yeast fermentation.
- ✓ Use the Yeast Freshness test to determine yeast is active before using

I. **Liquid was too hot destroyed the yeast enzymes.**

- ✓ Use a thermometer when measuring liquid temperatures.
- ✓ See Yeast Types and Usage or Liquids for more information on proper temperatures

II. Too much salt was used which will inhibit or slow down yeast activity.

- ✓ Check recipe for amount of salt needed.
- ✓ See How to Measure correctly for tips
- ✓ Visit the section on Salt for more information
- ✓ Do not let yeast come in direct contact with the salt

III. Too much sugar or not enough will inhibit or slow down yeast activity.

- ✓ Check recipe for amount of sugar needed
- ✓ See How to Measure Correctly for tips
- ✓ Visit the section on Sugar for more information
- ✓ Do not let yeast come in direct contact with sugar
- ✓ If the ratio of sugar to flour is more than 1/2 cup sugar to 4 cups flour, an additional packet of yeast (2-1/4 tsp) per recipe is needed. An excessive amount of sugar slows down yeast fermentation.

IV. Rise temperature was too low or too high

- ✓ Ideal rise temperatures are 85°F – 95°F
- ✓ Visit our Rising section for more helpful tips and information

- **Dough was sticky**

I. Not enough flour was used.

- ✓ Check your recipe for the amount listed
- ✓ See How to Measure Correctly for tips on the proper way to measure flour
- ✓ The amount of flour can vary by up to 1/2 cup. The dough should be not be sticky after kneading is complete. Add a small amount of flour after every few turns to keep the dough from sticking to your hands and to the kneading board

II. Flour was too old or too low in gluten. Bread flour was not used.

- ✓ Always make sure your flour is fresh (along with all of your other ingredients)
- ✓ Bread flour is the best flour to use when baking with yeast
- ✓ Click on flour for more helpful information and tips

III. Too much kneading

- ✓ Over-kneaded dough is soft and sticky and no longer able to be stretched, much like worn-out elastic.
- ✓ See our Kneading section for tips on how to know when your dough is kneaded enough

- **Crust is too thick**

I. Oven temperature was too low

- ✓ Always preheat your oven before baking
- ✓ See our Baking section for helpful tips.

II. Too much flour was used

- ✓ Double check amount needed in recipe
- ✓ See our How to Measure section for helpful tips on measuring flour
- ✓ Know your dough – see our sections on Kneading and Domestic Baking Lessons for more information and helpful tips.

III. Dough was too dry

- It is important to keep the dough moist during the rising steps.

Self-Check – 3	Written test

Name…… ID…… Date…….

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

Instruction: Short answer questions

Test I. Choice the following sentences (Points)

1. From the following which one is nonconformance in bread making

   A. Too much salt.
   B. Not enough yeast or starter
   C. Dough was sticky
   D. All

2. How to solve nonconformance of insufficient yeast

   A. Check the recipe for amount needed.
   B. Check the ratio of sugar to flour
   C. Use the Freshness yeast test
   D. Activate or propagate before using

3. Which of the following make bread nonconformance?

   A. Inadequate gluten in flour.
   B. Too much salt
   C. Poor diastatic activity of flour
   D. all

4. Faulty of the bakery product is raised from the following

A. Inappropriate of ingredient rations B. temperature and time of baking C. expired ingredient D. all

Note: **Satisfactory rating – 12 points Unsatisfactory - below 12 points**

Information Sheet 4- Identifying and reporting causes of non-conformance relating to processing, handling and/or storage

4.1 Identifying and reporting causes of non-conformance relating to processing, handling and/or storage

A. The standard which is not being adhered to (or complied with), may be:

- The specification of the:
  - ✓ Ingredients
  - ✓ Packaging non-conformity means a particular standard has been affected
  - ✓ Finished product
  - ✓ In process materials/product (factory specification)
- Standards for cleaning
- Standards for testing, such as micro or chemical analysis
- Quality standards on the line – such as quality checks
- Legal standards on the line – such as average weight checks
- The non-conformity can come from a number of sources…

A non-conformity can arise from a number of situations, or come from a number of sources, such as:

- Complaints or incidents (because the specification hasn't been adhered to)
- Factory checks, such as on-line checks, which identify that the product or material is non-conforming
- Routine evaluations, such as environmental testing results
- System checks following cleaning or maintenance etc.
- Internal audits
- External or third party audits
- Trending and management reviews

Cause of non-conformance in bakery

There are a number of known analysis methods, which help to establish what the root cause may be, such as:

- Fishbone diagram
- 5 whys
- Fault tree

Fishbone diagram

A Fishbone diagram, is where the effect (the non-compliance is written by the fish head) and then the causes are brainstormed and written for each of the following headers:

- Machinery
- People
- Procedure
- Materials

This system helps you to ensure that you've thought about all the possible causes, before you then go to work out which one(s) are the real root cause. If you'd like a copy of our

5 Why's

The 5 why's is used to ask the question 'why?' – to each answer you give. Although it's called '5' why's – that doesn't necessarily mean you'll need to answer why, exactly 5 times – it may take less, it may take more. The idea is to keep going until you can't answer anymore.

Fault Tree

The idea of the fault tree, is to think of all the things that may be at fault (the cause). For each fault – you then try to work out what caused that fault. Then you work out what caused that fault, again and again – until you cannot answer any more. Very similar to the 5 why's system.

Process Non-conformances

For this type it is best to conduct a survey of the various processes in operation critical for quality and food safety. For example, in a heat treatment step and develop a clear list of non-conformances:

• Heat Treatment: Low temperature

• Heat Treatment: Over temperature

• Heat Treatment: Divert alarm fail

• Heat Treatment: Integrity check fail

These categories could also be organised under subfolders per machine, process, or production line etc. Often these non-conformances relate to CCP's and therefore taking sufficient time to design this area is worthwhile

The lack of traceability in the food supply chain is typically caused by companies using outdated systems or traditional paper tracking and manual inspections.

Inability to maintain the safety and quality of your products

Today, the pressure on manufacturers to produce and distribute high-quality products that are safe is an increasing challenge. Some of the common causes we see that affect the quality and safety of food products which include:

- Poor storage and warehousing practices
- Delays in transportation
- Industrial sabotage
- Inclement weather
- In adequate communication between parties

Fragmented information and lack of communication can have a major impact on the food supply chain. This is because there are various parties involved in the chain which have little to no knowledge of one another's actions. Poor communication causes inefficiency, waste and can lead to mistrust among suppliers and their customers. This problem gets much worse when you are operating globally.

Failure to track and control inventory in warehouses and stores

One area where we see a major problem is with inventory. In order to control costs and maintain quality, and satisfy your customers, inventory has to be carefully managed. Too much and it will spoil and go to waste. Too little and you disappoint your customers. There is a definite trade-off between keeping customers happy and keeping inventory and waste low.

Self-check 1	Written test

Name…… ID…… Date…….

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

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

True or false

1. non-conformity means a particular standard has not been affected
2. Internal audits can arise non-conformity

Note: **Satisfactory rating 12 points**	**Unsatisfactory below 12 points**

Information Sheet 5- Problem minimization techniques/methods

5.1 Introduction

In bakery industry, errors, whether human or mechanical, result in defects in products. In the end, it is the production quality that is affected, which has a negative impact on customer satisfaction. Eliminating errors is one of the top priorities of any company that wants to achieve its quality objectives. The implementation of a QMS (Quality Management System) falls precisely within this logic. Only, this organization must be truly adapted to the specificities of the company to be able to offer a real efficiency. A single SMQ model can work perfectly for one entity and not at all compatible with another.

The QMS involves all the human and material components that can influence the production quality and customer satisfaction. It requires a strong involvement of the staff at the same time as a powerful leadership. Neither can this system be beneficial if it is not associated with system approach management, as well as with process and factual approaches to improve decision-making. Finally, focusing on the customer and ensuring that supplier relationships are beneficial to both parties completes the list of elements that determine the success of the QMS.

5.2 Method of operational problem minimization

The problem-solving approach can be broken down into seven steps.

5.2.1 Identifying problems

Problems can show up as temporary setbacks, wasted efforts and/or interruptions in production. The first step is to be aware a problem exists and view it as an opportunity for improvement.

Diagnose the situation so that your focus is on the problem, not just its symptoms. Helpful problem-solving techniques include using flowcharts to identify the expected steps of a process and cause-and-effect diagrams to define and analyze root causes.

The sections below help explain key problem-solving steps. These steps support the involvement of interested parties, the use of factual information, comparison of expectations to reality, and a focus on root causes of a problem.

5.2.2 Describing the current situation

Postpone the selection of one solution until several problem-solving alternatives have been proposed. Considering multiple alternatives can significantly enhance the value of your ideal solution. Once you have decided on the "what should be" model, this target standard becomes the basis for developing a road map for investigating alternatives. Brainstorming and team problem-solving techniques are both useful tools in this stage of problem solving.

Many alternative solutions to the problem should be generated before final evaluation. A common mistake in problem solving is that alternatives are evaluated as they are proposed, so the first acceptable solution is chosen, even if it's not the best fit. If we focus on trying to get the results we want, we miss the potential for learning something new that will allow for real improvement in the problem-solving process.

In order to fully understand a problem, you need to go to the source and find all the contributing factors. Ask yourself the following questions:

- Who? (Who is concerned or needs to be informed?)
- What? (What are the processes, products or parts in question?)
- When? (When did the problem occur?)
- Where? (Where did the problem occur?)
- Why? (What changed recently? Are there new participants?)
- How? (Does the problem happen constantly or only occasionally?)

5.2.3 Taking temporary countermeasures on the spot

Don’t look for the perfect solution at the outset. First, put out the fire. For example, if you notice you are missing resources to finish an order, possible countermeasures could be to borrow material from another team, move on to another order or transfer employees to another order.

Leaders may be called upon to direct others to implement the solution, "sell" the solution, or facilitate the implementation with the help of others. Involving others in the implementation is an effective way to gain buy-in and support and minimize resistance to subsequent changes.

Regardless of how the solution is rolled out, feedback channels should be built into the implementation. This allows for continuous monitoring and testing of actual events against expectations. Problem solving, and the techniques used to gain clarity, are most effective if the solution remains in place and is updated to respond to future changes.

5.2.4 Finding the root cause

Analyzing the fundamental causes of a problem is like pulling weeds. If you don’t pull up the roots, they’ll just grow back. Problems can be divided into either simple-to-normal difficulty or complex difficulty.

For simple-to-normal problems, you can use the “five whys” approach—asking “why” at least five times to trace the problem back to its fundamental source.

5.2.5 Proposing solutions

Now consider solutions that address the fundamental cause of the problem. Fully examine different options, taking into account how other teams will be affected. Come to a consensus on the best solution. Plan alternatives in case the first solution doesn’t work.

5.2.6 Establishing an action plan

Develop an action plan to implement your solution. Allocate sufficient resources and establish a timeline. Monitor progress and standardize the solution so you can apply it across your business.

5.2.7 Checking results

Collect data to evaluate your results. Consider measuring your progress with performance indicators, benchmarking against your initial situation and/or any applicable standards. Evaluate gaps between actual and anticipated results; keep team members informed; and adjust your plan as necessary.

Self-check 2	Written test

Name…… ID…… Date…….

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

Test I: Short answer question

1. Write the Method of operational problem minimization?

Note: **Satisfactory rating points**	**Unsatisfactory below 12 points**

Information Sheet 6- Determining and implementing corrective action

6.1 Determining and implementing corrective action

Corrective action is “Any action to be taken when the results of monitoring at the CCP indicate a loss of control. In a HACCP system, corrective actions taken in the event of a deviation at a CCP must accomplish the following:

- Determine and correct the cause of non-compliance,
- Identify the product that was produced during the process deviation and determine its disposition, and
- Record the corrective actions that have been taken.

Specific corrective actions must be developed for possible deviations at each CCP in the HACCP plan for a product. To the extent possible, corrective actions should be pre-planned. However, it is not possible to pre-plan for all corrective actions. You need to have a process in place to control nonconforming product and evaluate it to determine its ultimate disposition. As a minimum, the HACCP plan should specify:

- What is done when a deviation occurs,
- Who is responsible for implementing the corrective actions, and
- What records will be developed and maintained of the actions taken. Individuals who have a thorough understanding of the process, product and HACCP plan should be assigned the responsibility for oversight of corrective actions.

As appropriate, experts may be consulted to review the information available and to assist in determining disposition of non-compliant product.

6.2 Determining and Correcting the Cause of Non-compliance

The first corrective action to be taken in the event of a deviation at a CCP should be to bring the process back under control. This corrective action may simply require a process adjustment to bring the process back into compliance with the established critical limits. For example, if monitoring of a cooking process indicates that the product

has not achieved an appropriate internal temperature, an appropriate corrective action might be to increase the cooking time and/or temperature until the appropriate internal temperature is met. In some cases, it may not be possible to immediately bring the process back under control. In these instances, an appropriate corrective action may be to stop the processing line and hold all affected product (and products in process) until the cause of the non-conformity can be assessed and corrected. Corrective actions may require root cause analysis to determine the cause of the non-conformity and provide assurance that continued deviations do not occur

6.3 Identifying Affected Product and Determining its Disposition

The second important task a corrective action must accomplish is to identify product affected by the deviation and determine its final disposition. With regard to identification and isolation of the affected product, the following steps must be accomplished:

- All affected product (i.e. that processed since the last point at which the CCP was known to be under control) must be isolated.
- Isolated product must be clearly marked (e.g. with firmly attached tags) with information including: hold number, product, amount, date held, the reason for the hold, and the name of the person holding the product.
- The producer must maintain control of the product from the hold date to the date of final disposition. Furthermore, the product must be held under conditions that minimize its further deterioration (e.g. refrigeration or freezing where necessary).If products that have left control of the organization are subsequently determined to be unsafe, the organization must initiate a withdrawal After the affected product has been identified and isolated, the establishment must evaluate these products to determine their final disposition. Product evaluation should be conducted by a qualified person. For example, thermal process deviations should be evaluated by a competent process authority or someone having similar expertise.

The evaluation of affected product should be adequate to detect potential hazards. It should be ensured that sampling is adequate to identify the extent of the problem, that

the tests are appropriate, that the judgment is based on sound science, and that the product is not released until the evaluation has determined that no potential hazard exists. Each lot of nonconforming product can only be released as safe when any of the following apply:

- Other evidence demonstrates that the control measures have been effective.
- Evidence shows that the combined effect of the control measures for that particular product complies with the performance intended.
- Sampling, analysis and/or other verification activities demonstrate that the affected product complies with the identified acceptable levels for the food safety hazard(s) concerned.

Following evaluation, there are several possible fates for the product affected by the non-conformity. The product could be:

- Determined to be safe for the intended use,
- Determined to be safe for some other use,
- Reprocessed in a manner to ensure it becomes safe,
- Used for purposes other than originally intended, or
- Destroyed and/or disposed as waste.

For example, in the United States it is legal under specific circumstances to divert ground beef which tests positive for E. coli O157:H7 (considered to be an adulterant in this product in the United States) to a process which results in the production of a fully-cooked product.

The ultimate decision on the product disposition must be made by a person or persons with authority from the establishment. Product disposition decisions must be based on testing results, current scientific understanding, expert consultation, regulatory requirements, or other pertinent information.

The following is a summary of the process to determine the disposition of nonconforming products.

- Determine if the product presents a safety hazard, based on:–Expert evaluation–Biological, chemical, or physical testing
- If no hazard exists, the product may be released.
- If a potential hazard exists, determine if the product can be:–Reworked/reprocessed–Diverted for an alternate use
- If potentially hazardous product cannot be handled as described in Step 3, the product must be destroyed.

Corrective Actions Records for nonconformities must include the following information:

- The actual production records for the product
- A standard form listing the following: Hold number, deviation, reason for hold, date and code of product held, quantity of product held, name and signature of responsible individual
- Results of product evaluation: Authority recommendations, product testing results, decision on final disposition of product in
- Accurate accounting of all units in question
- Statement of the procedure for handling the nonconformity
- Cause of deviation identified
- Corrective action taken to prevent recurrence of deviation

Self-check 6	Written test

Name…… ID…… Date…….

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

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

Short answer

1. Describe Corrective Actions Records for nonconformities
2. Explain process to determine the disposition of nonconforming products

Note: **Satisfactory rating 6 points**	**Unsatisfactory below 12 points**

Information Sheet 7- Taking action to prevent recurrence of non-conformance

7.1 Introduction

Non-conformance (NC) is an ISO 9000 audit designation indicating the quality management system or a portion of it does not meet the requirements established by ISO 9000.

Non-conformance is a sign that something went wrong in a service, process, and product or in the system itself by not meeting a certain set of specifications. The existence of a non-conformance implies that some aspects of a company's standard operating procedures are not being followed or they need to be modified or even updated.

When nonconformity occurs, you must react to it by either controlling and correcting it or dealing with the consequences. Then you must determine the root cause(s), evaluate the need to eliminate the cause(s) so the nonconformity does not reoccur and implement any corrective action necessary.

These deviations can be identified through internal and external audits, customer complaints, material inspection or routine testing. A non-conformance report is then prepared. The purpose of the report is to document the details of a deviation from expectations.

7.2 Action to prevent recurrence of non-conformance

Non-conformance could lead to rework, product recall, and decreased productivity. Corrective actions are reactive – the steps you take once the problem has occurred. Preventive actions are not only to prevent a particular instance of non-conformance from re-occurring, but also to prevent one from ever occurring.

Here are four ways to prevent or minimize recurrence non-conformance:

6 Management Review

Management review is akin to getting your car serviced every year even when there are no overt signs of problems. Management reviews are generally conducted once a year and present an opportunity to review the company's existing quality policy as well as set new objectives for the rest of the year. New objectives can be invaluable for minimizing non -conformance.

Product changes, new requirements, new processes, change management etc. are all reviewed. The management review process can identify and correct any current or incipient deficiencies before they might be revealed by an audit or incident. Routinely reviewing the organization's process helps spur continuous improvement. A system should be in place for implementing any resulting plans for improvement or corrective action and verifying their effectiveness.

7 Review

A review is usually a 'senior management' exercise. Keeping this in mind, it's important to conduct a similar exercise with the actual employees who are involved in the day-to-day process. These employees have an in-depth understanding of various processes and how they are related. They have vast knowledge about the product and more importantly about past non-conformance issues. They very well could have been first to respond to a crisis and would have played a crucial role in analyzing the situation and solving an issue. On the flip side, this discussion could reveal a knowledge gap crucial to fixing non- conformance. An end-to-end understanding is crucial in setting up new objectives to minimize non-conformance. Also, understanding the process followed by lower-level employees could highlight pain points and provide key insight into potential areas of non- conformance, those which cannot be identified in a management review or audit.

8 Internal Audit

An audit is simply another form of testing i.e. comparing things as they are to how they ought to be. Internal Audits need to be scheduled at regular intervals to check whether the quality system conforms to requirements and to ensure the system's efficacy. Unlike an external audit, all the processes need not be audited at the same. Internal audits can be conducted as a series of smaller audits, with different processes audited at different times.

The frequency of audit can also be set depending on the process in question. With changing internal and external dynamics, the criteria for the audit can be decided prior to the audit rather than the planning stage. Any previous findings, past audit conclusions, and pre-defined questions all become valuable data. Observations raised during internal audits could be classed as preventive actions as they can suggest improvements within the system to prevent non-conformances from occurring in the future.

9 Feedback

While all customer complaints are recorded and must be actioned, customer feedback also plays a role in minimizing non-conformance. Feedback from customers helps to understand potential non-conformance issues and is an opportunity for improvement. Customer suggestions may prevent any issues from being raised in the future. Negative as well as positive feedback is valuable data. Spending time to analyze could help spot trends and patterns. Feedbacks help to dig into the root cause of the issue which may not always be obvious (else it would have been picked up in audit testing). Understanding the root cause can help differentiate a temporary lapse from a process flaw.

No system is perfect, therefore problems with the system i.e. non- conformance will occur. The aim is to resolve the non-conformance as quickly as possible and prevent any recurrence. Recording non-conformities helps analyze negative trends, examine

root cause, and eliminate the cause of the problems. Corrective actions should also include the longer-term actions to ensure the problem will not occur again.

While corrective actions are reactive, preventive actions are pro-active. A preventive action can prevent the occurrence of an issue or stop it from becoming too severe. A preventive mindset helps to reanalyze the product and process, get a different perspective and help improve the system as a whole in a timely manner.

Prevention can also be thought of as risks and opportunities. Identifying the potential source of problems, their effects and the likelihood of occurrence is the first step in risk management. This is followed by analyzing whether the associated costs with reducing the risk are worth it. Mitigating risks and avoiding unnecessary costs are some of the biggest and obvious reasons to minimize non-conformance.

Effectively managing non conformances and preventive actions is an integral part of an organization's continuous improvement plan. This should result in fewer defective products and processes and more satisfied customers.

Quality management systems have compliance, content, and collaboration management initiatives and strategies at their core. A good nonconformance management software should assist everyone, from management to the day-to-day employee, in the common goal of better quality.

Self-Check – 7	Written test

Name…… ID…… Date…….

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

Test I: Write true if the statement is correct and false if the statement is incorrect (each 1.5pts)

6. Non-conformity occurs; you must react to it by neither controlling and correcting it nor dealing with the consequences.
7. Non-conformance (NC) is an ISO 9000 audit designation indicating the quality management system.
8. Management review is akin to getting your car serviced every year even when there are no overt signs of problems
9. They have vast knowledge about the product and more importantly about past non-conformance issues.
10. No system is perfect, therefore problems with the system that non- conformance will occur.

Test II: Short Answer Questions

2. List the four ways to prevent or minimize recurrence of non-conformance?(4.5pts)

Note: **Satisfactory rating - 12 points** **Unsatisfactory - below -12points**

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

Information Sheet 8- Reporting action with workplace reporting requirements

10 Introduction

All hazards that are found in the workplace should be reported immediately to a supervisor, the safety department or management. This is a standard practice that should exist in any workplace and every employee should be made aware that this is the appropriate action to take should they encounter any hazard or potential hazard they discover.

However, many employees may feel (justified or not) that the hazards they encounter, sometimes on a daily basis, are just how things are and reporting them is not necessary. Designing, setting up and communicating a Hazard Reporting Program is a good idea for any business to help avoid this potentially dangerous attitude.

Implementing a Hazard Reporting Program will help ensure that your workplace is safer for your employees and reduce costly incidents or business interruptions. All employees should be trained in hazard recognition and avoidance. Hazard Reporting is a critical part of this training so that employees know exactly what to do when they encounter a hazard they can't immediately correct.

11 Reporting action with workplace

Incident and accident reporting is critical and near-miss incident reporting is important, but hazard reporting is also extremely necessary for the safety of your workforce. Addressing a potential hazard before it causes an injury or property damage can save any company significant losses.

Giving employees an avenue that they can pursue to report hazards and unsafe acts empowers them to feel like they are an integral part of the company, but only if those hazards are addressed, corrected and resolved.

A successful workplace safety and health program includes a hazard reporting process that is effective.

Hazard reporting ensures employees:

- Involved in your safety management system
- Aware and vigilant for current safety issues
- Respect safety management as a means of creating a safe, productive work environment

Hazard reporting ensures that supervisors, managers and the safety department have the information they need to control hazards before they become a liability, ultimately saving the company money.

If employees are reluctant to report hazards in the workplace, here are some great ways to improve the quality of hazard reporting in your safety program.

- Make reporting as easy as possible.
- Ensure there is no negative stigma and no punishment attached to hazard reporting.
- Give recognition to those who submit hazard reports.
- Engage workers in the resolution of hazards to ensure the correction is satisfactory for all involved and does not create additional hardships inadvertently.
- Keep an open discussion about safety issues, perhaps following up on the specific hazard reported at the next safety meeting.
- Never assign blame to an individual when it comes to hazards found. Rather, attribute hazards to “systems” like insufficient budget assigned for tool replacements, lack of training, or comprehensive process needed.
- Post signs or posters around the workplace that reinforces the message that unsafe conditions and acts must be reported.

Report Labor Violations

Under the Occupational Safety and Health Act of also known as the OSH Act, employees and their authorized representatives have the right to file a complaint about serious hazards and request an OSHA official visit to inspect the workplace for safety and health concerns.

Employers must comply with OSHA standards detailed in the Act. If they do not, they put their businesses at risk of fines and penalties. The following are the basics of reporting a complaint to OSHA.

OSHA Standards

OSHA has set standards for most major safety concerns, and employers and employees must comply with the rules and regulations detailed in the OSH Act.
All industries share three basic requirements:

- Access to medical exposure records: Employees, their representative and OSHA have the right to relevant medical records.
- Personal protective equipment: Each industry category requires different equipment, but all workers are entitled to protective equipment that minimizes harm from workplace hazards. Employers must pay for the equipment, and employees should be properly trained on how to use it.
- Hazard communication: When employees handle potentially hazardous materials, employers must evaluate the associated health risks. Materials associated with health and safety risks must be labeled, and customers that receive them must also receive a Material Safety Data Sheet (MSDS). Employers must train employees about the dangers presented by materials on the MSDS sheet.

Record the findings

It is good practice if organizations make a record of their significant findings the hazards, how people might be harmed by them and what is in place to control the risks. Any record produced should be clear, practical and focused on control measures.

Self-Check – 8	Written test

Name…… ID…… Date…….

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

Test I: Write true if the statement is correct and false if the statement is incorrect (each 1.5 pts.)

1. All hazards that are found in the workplace should be reported immediately to a supervisor, the safety department or management.
2. Implementing a Hazard Reporting Program will help ensure that your workplace is safer for your employees and reduce costly incidents.
3. Hazard reporting is Not necessary for the safety of your workforce.
4. Any record produced should be Not clear, practical and focused on control measures.

Test II: Short Answer Questions

1. List the hazard reporting ensures employees(4pts)

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

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

2.

Information Sheet 9- Conducting work with workplace environmental guidelines

9.1 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 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.

9.2 Work place environmental guidelines

Checking of work environment should include

- Ventilations
- Lighting

- Noise
- Waste disposing
- OHS hazards
- **Health, safety & environmental policy**

The Environmental, Health, and Safety (EHS) guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP). These general EHS Guidelines are designed to be used together with the relevant Industry sector EHS Guidelines which provide guidance to users on EHS issues in specific industry sectors. For complex projects, use of multiple industry-sector guidelines may be necessary.

The EHS Guidelines contain the performance levels and measures that are generally considered to be achievable in new facilities by existing technology at reasonable costs. Application of the EHS Guidelines to existing facilities may involve the establishment of site-specific targets, with an appropriate timetable for achieving them.

9.3 Hazard identification in workplace

To identify and assess hazards, employers and workers:

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

9.4 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)

Self-Check – 5	Written test

Name…… ID…… Date…….

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

Test I: Choose the best answer from given alternatives (each2pts)

1. Which of the following is Not include checking of work environment?
   A) Ventilations
   B) Lighting
   C) Noise
   D) Waste disposing
   E) None
2. Which of the following include in Implement control measure of hazard?
   A) Isolate the hazard from people
   B) Use engineering controls
   C) Use administrative controls
   D) Use Personal Protective Equipment (PPE)
   E) All

Test II: Write true if the statement is correct and false if the statement is incorrect (each 1.5pts)

1. Collecting and review information about the hazards present or likely to be present in the workplace.
2. Grouping similar incidents and identify trends in injuries, illnesses, and hazards reported.
3. Working in a safe, healthy environment is important for your physical safety, mental well-being and work productivity.
4. Employers need to Not take affirmative steps to ensure the health and welfare of their workers.

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

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

Reference

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