Occupational Certificate: Grain Depot Manager

Curriculum Code 132408-000-00--00

KNOWLEDGE MODULE 3: Grain Handling Operations Management

NQF 5, 16 Credits

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INTRODUCTION

Occupational Curriculum: Grain Depot Manager

The Grain Depot Manager achieves operational efficiencies by monitoring, controlling and responding to operational variables, the utilisation of resources and the mechanical integrity of a bulk grain handling and storage unit.

Occupational tasks:

- Conduct grain and oilseed sampling and grading processes (NQF 4)
- Manage and control the achievement of operational targets (NQF 5)
- Lead and manage staff to ensure smooth business operations (NQF 5)
- Manage and control the utilization of operational resources (NQF 5)
- Achieve grain handling and storage efficiency and quality standards by controlling unit operations (NQF 5)

PURPOSE OF THE QUALIFICATION

The core competencies of grain operations have been defined as the basic understanding and practical application of the management of grain quality and grain handling equipment as well as the management of operational technology, facility operations and human resources.

ENTRY REQUIREMENTS

Grade 12

Methodology

Knowledge Modules facilitated in classroom with a knowledge assessment.

Practical Activities in simulated environment with observation sheets

Prescribed workplace activities in a real work environment with logbook

MODULE 1: GENERAL BUSINESS MANAGEMENT CONCEPTS (KM03-KT01)

Learning Outcomes

- Demonstrate understanding of the role of the manager in terms of planning, organizing, directing and controlling resources
- Demonstrate an understanding of decision making and problem solving (including brainstorming, SWOT analysis and PEST analysis)
- Analyze problems and formulate decisions by using a structured approach
- Demonstrate an understanding of planning and scheduling (including the planning cycle, developing time schedules and action plans, plot and sequence schedules)
- Demonstrate an understanding of scheduling and plan a grain handling cycle
- Demonstrate an understanding of the concept continuous improvement (including continuous improvement models, quality management)
- Demonstrate an understanding of delegation principles (including accountability vs responsibility)
- Demonstrate an understanding of client relationship management in relation to business promotion and increasing market share

Role of a manager

Managers manage both processes and people.

Process responsibilities include activities such as:

- Work unit planning
- Budgeting
- Scheduling
- Task/work assignment
- Work implementation and problem solving
- Monitoring work unit progress
- Evaluating results

People responsibilities include activities such as:

- Developing work team and individual employee skills and capabilities
- Motivating employees
- Monitoring and providing feedback on day-to-day performance
- Conducting formal performance reviews
- Carrying out disciplinary activity

Planning, organizing, directing, controlling

Planning

Planning is the function of management that involves setting objectives and determining a course of action for achieving these objectives.

There are many different types of plans and planning.

- Strategic planning

  Strategic planning involves analyzing competitive opportunities and threats, as well as the strengths and weaknesses of the organization, and then determining how to position the organization to compete effectively in their environment. Strategic planning has a long time-frame, often three years or more. Strategic planning generally includes the entire organization and includes formulation of objectives. It is often based on the organization's mission, which is its fundamental reason for existence. An organization's top management most often conducts strategic planning. The manager in a bulk grain handling environment will have to plan strategies to increase market share in a very tough, competitive environment. The manager also needs to ensure that niche markets are identified in line with the consumers' needs. Lastly, he needs to ensure that the bulk

storage facility consistently increases its storage capacity in order to be competitive in the market.

- Tactical planning

Tactical planning is intermediate-range planning that is designed to develop relatively concrete and specific means to implement the strategic plan. Middle-level managers often engage in tactical planning. Tactical planning often has a one- to three-year time horizon.

- Operational planning

Operational planning generally assumes the existence of objectives and specifies ways to achieve them. Operational planning is short-range planning that is designed to develop specific action steps that support the strategic and tactical plans. Operational planning usually has a very short time horizon, from one week to one year.

Planning by a depot manager is crucial when it comes to bin allocation. Planning assists the manager in determining which hopper is allocated to the type/grade of product.

The separate storage of different grain types may seem like a logical storage method, but this may result in being impractical due to the fact that the speed of the depot is restricted when receiving or discharging products.

The distribution of types of product to either side of the silo complex means that two conveyer belts can be used for offloading/dispatch and allows the depot to manage the process more efficiently.

In order to plan these management actions, the manager must at all times know what is going on in his depot and production area with respect to:

- Crops planted (product type, colour, grade and class)
- Harvest estimates
- Potential tons yield per hectare (climatic conditions)
- Types of product to be delivered
- When intake will happen (irrigation planning, early and late planting)
- Dispatching program – when dispatching grain an intake hopper is removed from the receiving system

Organizing

Organizing is the function of management that involves developing an organizational structure and allocating human resources to ensure the accomplishment of objectives. The structure of the organization is the framework within which effort is coordinated. The structure is usually

represented by an organization chart, which provides a graphic representation of the chain of command within an organization. Decisions made about the structure of an organization are generally referred to as "organizational design" decisions.
Organizing also involves the design of individual jobs within the organization. Decisions must be made about the duties and responsibilities of individual jobs as well as the manner in which the duties should be carried out.
Example: Planning to replace personnel who will retire soon, planning temporary staff for busy seasonal times.

Directing

Directing involves influencing others toward the attainment of organizational objectives. Effective leading requires the manager to motivate subordinates, communicate effectively, and effectively use power. If managers are effective leaders, their subordinates will be enthusiastic about exerting effort toward the attainment of organizational objectives.
To become effective at leading, managers must first understand their subordinates' personalities, values, attitudes, and emotions.

Controlling

Controlling involves ensuring that performance does not deviate from standards. Controlling consists of three steps, which include establishing performance standards, comparing actual performance against standards, and taking corrective action when necessary. Performance standards are often stated in monetary terms such as revenue, costs, or profits, but may also be stated in other terms, such as units produced, number of defective products, or levels of customer service.
The measurement of performance can be done in several ways, depending on the performance standards, including financial statements, sales reports, production results, customer satisfaction, and formal performance appraisals. Managers at all levels engage in the managerial function of controlling to some degree.

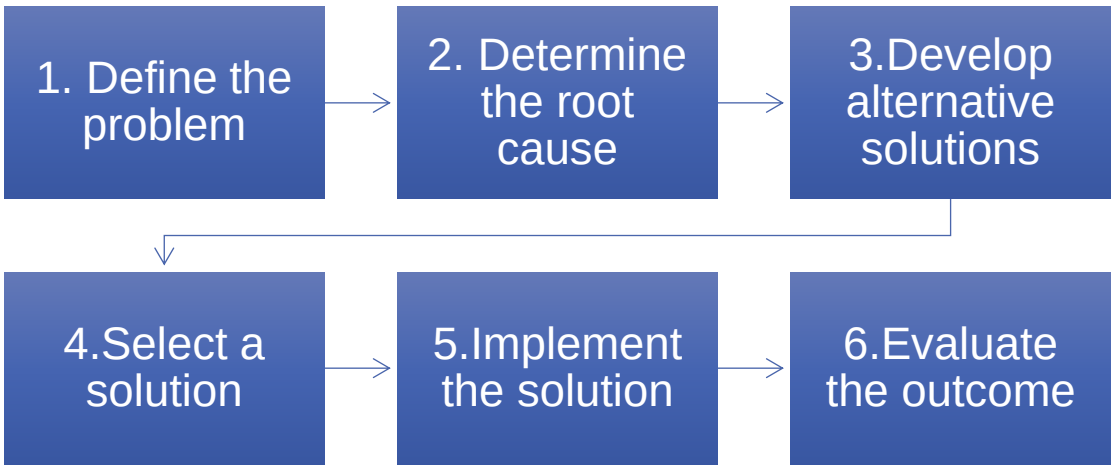
Principles of problem solving

Problems are an inevitable consequence of business and there are various techniques that will assist you to identify and resolve them in a structured way.

Most people take an unstructured approach to problem solving and although this can be successful, the solution they come up with may not always be the best one. A major disadvantage of an unstructured approach is that it is easy to hit a roadblock and convince yourself that the problem cannot be solved or that the solution cannot be implemented for practical reasons.

Problem solving models are used to address the many challenges that arise in the workplace. One such model is the Six-Step Problem Solving Model that ensures a consistent approach when dealing with problems.

Six-Step Problem Solving Model



The process is one of continuous improvement. The goal is not to solve but to evolve, adjusting the solution continually as new challenges emerge through repeating the six step process.

Step 1: Define the problem

Step 1 is about diagnosing the problem – the context, background and symptoms of the issue. At this stage you will use techniques such as:

- Brainstorming
- Interviewing
- Questionnaires

The following questions should be answered in this very important step:

- What do you see happening?
- What are the specific symptoms?
- What proof do you have that the problem exists?
- How long has the problem existed?
- What is the impact of the problem?

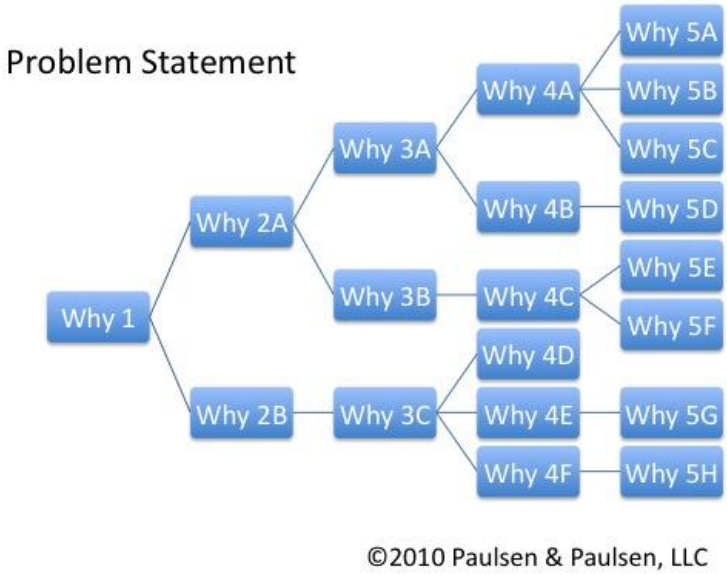
Step 2: Determine the root cause(s) of the problem (RCA)

Once all the symptoms have been identified, the cause of the problem must be identified. Root Cause Analysis is a problem-solving method that builds a sequence of events to gain a deeper analysis to learn why a problem happens.

During this stage, identify as many causal factors as possible. Too often, people identify one or two factors and then stop, but that's not sufficient. With RCA, you don't want to simply treat the most obvious causes – you want to dig deeper.
The following tools can be used to identify causal factors:

5 Whys – Ask "Why?" until you get to the root of the problem.
Ask your team why the problem is occurring. (For example, "Why isn't team A meeting its response time targets?")
Asking "why?" sounds simple, but answering it requires thought and intelligent application. Search for answers that are grounded in fact: they must be accounts of things that have actually happened – not guesses at what might have happened.
This prevents 5 Whys from becoming just a process of deductive reasoning, which can generate a large number of possible causes and, sometimes, create more confusion as you chase down hypothetical problems.
Your team members may come up with one obvious reason why, or several plausible ones. Record their answers under (or to the right of) your problem statement as succinct phrases, rather than single words or lengthy statements. For example, saying "volume of calls is too high" is better than a vague "overloaded."

5 Why Analysis



Drill Down – Break down a problem into small, detailed parts to better understand the big picture.

To use the technique, start by writing the problem down on the left-hand side of a large sheet of paper. Next, write down the points that make up the next level of detail on the problem a little to the right of this. These may be factors contributing to the problem, information relating to it, or questions raised by it. This process of breaking the problem down into its component part is called 'drilling down'.

For each of these points, repeat the process. Keep on drilling down into points until you fully understand the factors contributing to the problem. If you cannot break them down using the knowledge you have, then carry out whatever research is necessary to understand the point.

Cause and Effect Diagrams – Create a chart of all of the possible causal factors, to see where the trouble may have begun.

Professor Kaoru Ishikawa created Cause and Effect Analysis in the 1960s. The technique uses a diagram-based approach for thinking through all of the possible causes of a problem. This helps you to carry out a thorough analysis of the situation.

There are four steps to using the tool.

1. Identify the problem.
2. Work out the major factors involved.

3. Identify possible causes.
4. Analyze your diagram.

You'll find this method is particularly useful when you're trying to solve complicated problems.

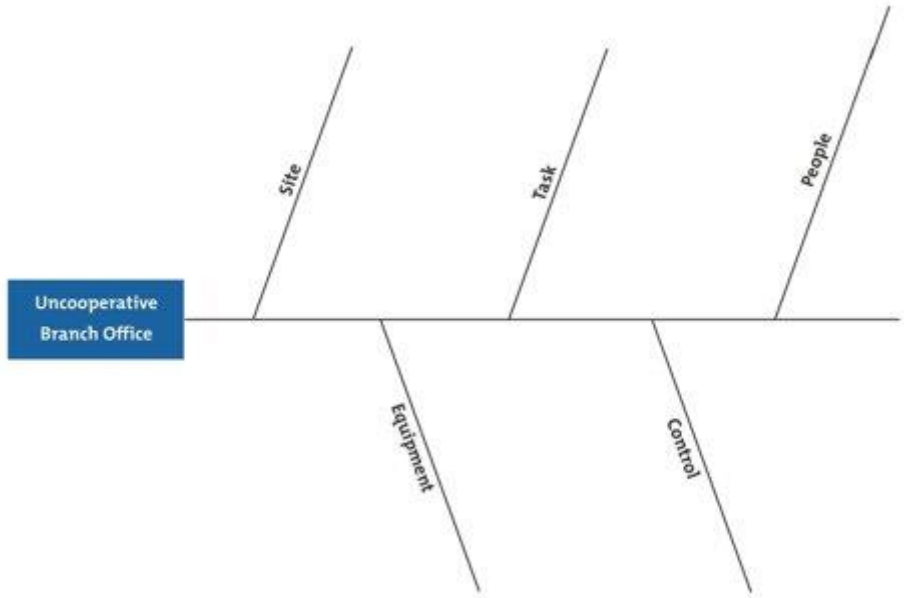
Step 1: Identify the Problem
First, write down the exact problem you face. Where appropriate, identify who is involved, what the problem is, and when and where it occurs.
Then, write the problem in a box on the left-hand side of a large sheet of paper, and draw a line across the paper horizontally from the box. This arrangement, looking like the head and spine of a fish, gives you space to develop ideas.

Example:
In this simple example, a manager is having problems with an uncooperative branch office.
Figure 1 – Cause and Effect Analysis Example Step 1

Step 2: Work Out the Major Factors Involved
Next, identify the factors that may be part of the problem. These may be systems, equipment, materials, external forces, people involved with the problem, and so on.
Try to draw out as many of these as possible.
Brainstorm any other factors that may affect the situation.
Then draw a line off the "spine" of the diagram for each factor and label each line.
Example:
The manager identifies the following factors, and adds these to his diagram:

- Site.
- Task.
- People.
- Equipment.
- Control.

Figure 2 – Cause and Effect Analysis Example Step 2



Step 3: Identify Possible Causes

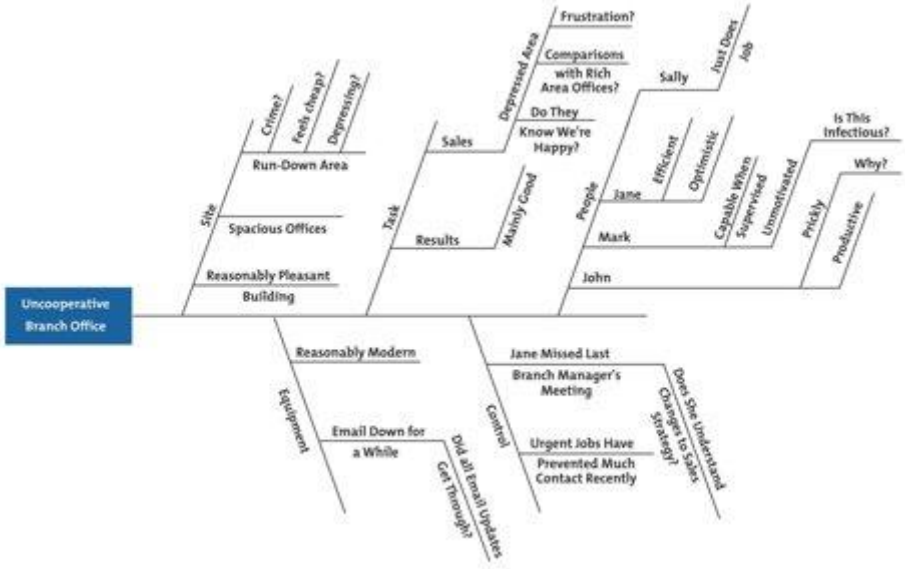
Now, for each of the factors you considered in step 2, brainstorm possible causes of the problem that may be related to the factor.

Show these possible causes as shorter lines coming off the "bones" of the diagram. Where a cause is large or complex, then it may be best to break it down into sub-causes. Show these as lines coming off each cause line.

Example:

For each of the factors he identified in step 2, the manager brainstorms possible causes of the problem, and adds these to his diagram, as shown in figure 3.

Figure 3 – Cause and Effect Analysis Example Step 3



Step 4: Analyze Your Diagram

By this stage you should have a diagram showing all of the possible causes of the problem that you can think of.

Depending on the complexity and importance of the problem, you can now investigate the most likely causes further. This may involve setting up investigations, carrying out surveys, and so on. These will be designed to test which of these possible causes is actually contributing to the problem.

Example:

The manager has now finished his analysis. If he hadn't looked at the problem this way, he might have dealt with it by assuming that people in the branch office were "being difficult." Instead he thinks that the best approach is to arrange a meeting with the Branch Manager. This would allow him to brief the manager fully on the new strategy and talk through any problems that she may be experiencing.

Tip:

A useful way to use this technique with a team is to write all of the possible causes of the problem down on sticky notes. You can then group similar ones together on the diagram.

Step 3: Develop alternative solutions

Analytical, creative problem solving is about creating a variety of solutions, not just one. Often the most obvious answer is not the most effective solution to the problem. This step focuses on:

- Finding as many solutions to the problem, no matter how outlandish they may seem
- Looking at how each solution relates to the root cause and symptoms of the problem
- Deciding if different solutions can be merged to give a better answer to the problem

At this stage it is not about finding one solution but eliminating the options that will prove less effective at dealing with both the symptoms and the root cause. Techniques include:

- SWOT Analysis
- Brainstorming

SWOT Analysis

You can use SWOT discussions as the basis for a brainstorming session about where to take your company next. If you have a particular problem you're concerned with, focus SWOT

analysis directly on the issue. Whether the problem is a corporate weakness, the threat from a new competitor or an opportunity you don't know how to exploit, SWOT analysis places the problem in the context of your overall strengths and vulnerabilities.
One way to apply SWOT to a problem is to draw up a four-square grid: Two squares list strengths along with opportunities and threats and the other two list weaknesses with threats and opportunities. If the problem you're analyzing is a threat, such as a new competitor, the grid shows which of your weaknesses -- slow growth, or an inexperienced sales force -- make you vulnerable to the threat. The grid also helps you see which of your strengths is best suited to fend off the threat.

Brainstorming

The purpose of brainstorming is to generate as many ideas as possible and then carefully select the one or two that will enhance your organization.

One of the first things to understand about brainstorming is the fact that it is meant to be one of the most open and free tools of creativity that you can use. At first, there are going to be very few limitations placed on what can come from your brainstorming sessions – the whole point of the process is to think of as many new, innovative ideas as possible.

The time for practicality and rational thinking will come later down the line. Even though brainstorming is about freedom and creativity, you still need to have some basic structure in place for your brainstorming sessions.

The first step is to clearly define the problem that you are trying to solve. The key is to have asked the right question or to have posed the problem in a way that at least some of the results of the brainstorming session are usable.

Step 1: Prepare the Group
First, set up a comfortable meeting environment for the session. Make sure that the room is well-lit and that you have the tools, resources, and refreshments that you need.
How much information or preparation does your team need in order to brainstorm solutions to your problem?
Consider who will attend the meeting. A room full of like-minded people won't generate as many creative ideas as a diverse group, so try to include people from a wide range of disciplines and include people who have a variety of different thinking styles.
When everyone is gathered, appoint one person to record the ideas that come from the session. This person shouldn't necessarily be the team manager – it's hard to record and contribute at the same time. Post notes where everyone can see them, such as on flip charts or whiteboards; or use a computer with a data projector.

If people aren't used to working together, consider using an appropriate warm-up exercise, or an icebreaker .

Step 2: Present the Problem

Clearly define the problem that you want to solve and lay out any criteria that you must meet.
Make it clear that that the meeting's objective is to generate as many ideas as possible.
Give people plenty of quiet time at the start of the session to write down as many of their own ideas as they can. Then, ask them to share their ideas, while giving everyone a fair opportunity to contribute.

Step 3: Guide the Discussion

Once everyone has shared their ideas, start a group discussion to develop other people's ideas, and use them to create new ideas. Building on others' ideas is one of the most valuable aspects of group brainstorming.
Encourage everyone to contribute and to develop ideas, including the quietest people, and discourage anyone from criticizing ideas.
As the group facilitator, you should share ideas if you have them, but spend your time and energy supporting your team and guiding the discussion. Stick to one conversation at a time, and refocus the group if people become sidetracked.
Although you're guiding the discussion, remember to let everyone have fun while brainstorming. Welcome creativity and encourage your team to come up with as many ideas as possible, regardless of whether they're practical or impractical.
Don't follow one train of thought for too long. Make sure that you generate a good number of different ideas and explore individual ideas in detail. If a team member needs to "tune out" to explore an idea alone, allow them the freedom to do this.
Also, if the brainstorming session is lengthy, take plenty of breaks so that people can continue to concentrate.

Step 4: Select a solution

In this step all the potential solutions are evaluated to narrow it down to one. This step applies two key questions:

- Which solution is most feasible?
- Which solution is favoured by those who will implement and use it?

Feasibility is ascertained by deciding if a solution:

- Can be implemented within an acceptable timeframe?
- Is cost effective, reliable and realistic?
- Can adapt to conditions as they evolve and change?
- Its risks are manageable?

- Will benefit the organization?

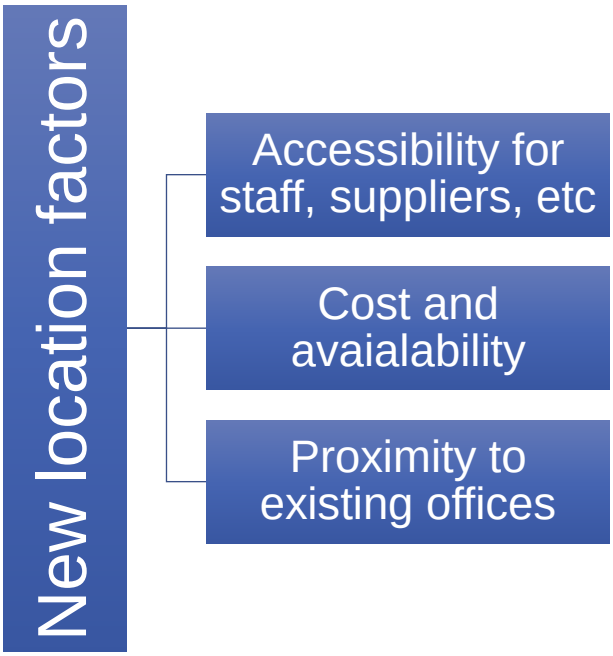
A tool that is commonly used to make important decision in business, is called the **Decision Matrix Analysis mode**l. Rather than using a pre-designed matrix – which may or may not be appropriate for your needs – you are going to create your own matrix when using this model.

The first thing you need to do in order to assemble your matrix is to collect a list of the various options that you have for the decision. For instance, if you are trying to:

Decide on a location for a new office that you are building, you could list all of the potential locations as rows on the left side of your matrix.

You aren't trying to eliminate anything at this point in the process. Obviously, you are going to need some columns to intersect with your rows if you are going to create a proper matrix. The columns, in this case, are going to be the various factors that you are going to use to influence your decision. You can have as many factors as you would like, but you should try to develop at least three or four if you are going to have a matrix that will tell you something about making the right decision.

Continuing with the example of a location for your new office, there are plenty of potential factors that may influence the decision. For instance, you could rate each location on its distance from the freeway, as proximity to main roads will make the location easier to access for employees, suppliers, etc.



Compile a complete list of all the factors that you want to weigh and use those as the columns across the top of your matrix to complete the model.

Now that the rows and columns are assembled properly, you are going to place a score in each box as a way of coming up with an overall rating for each location.

You can use a scale that makes sense for your purposes, such as 1-5 or 1-10.

So, for example, a cost score of 5 on the 1-5 scale would mean that the location offers great value.

Go through and fill out the entire matrix, carefully giving a score to each location for each of the factors that you have weighed. Once finished, you can then decide how you would like to weight each column based on its importance.

So, if the cost of the project is the highest priority, you may decide to multiply the cost column by three in order to weight it appropriately. On the other hand, if the length of the lease is not something you are particularly concerned with, you may decide to skip using a multiplier in that column.

To finish off your use of this model, you are simply going to add up the scores that you are left with. The highest scoring option is the best solution to the identified problem unless past experience or new information challenges this decision.

Step 5: Implement the solution

Once the solution has been chosen, initial project planning begins and establishes:

- The project manager
- Who else needs to be involved to implement the solution?
- The key milestones
- What actions need to be taken before implementing the solution
- What actions need to be taken during implementing the solution
- Why are these actions necessary?

Step 6: Evaluate the Outcome

The final stage requires an evaluation of the outcomes and results of the solution process. The implementation of the solution will be monitored to ensure that:

- Milestones are met
- Costs are contained
- Necessary work is completed

Evaluation helps to decide whether there is a need to return to a previous step or continue with the implementation. Ask questions such as:

- Did the option answer the questions we were working on?
- Did the process address the findings that came out of the assumptions?

Delegation

There is no other skill that will increase your productivity as a manager to the same degree as being able to delegate successfully. When undertaken properly, delegation increases the level of motivation of team members as it allows for new and innovative ideas, which in turn leads to the development of team member's creative and decision-making skills.

A key aspect of delegating efficiently is to ensure that whilst your time is organized more effectively, tasks must be allocated to suitable people to minimize risks and to ensure the optimum outcome. It also provides you with the opportunity to develop your team members by increasing their morale and motivation.

It is also key to remember that when delegating a task to other team members, you will retain responsibility for it; all you are doing is assigning another person to perform the task on your behalf. It is often the fear that the delegated person will fail to perform the task properly (for which you will ultimately be responsible) that prevents managers from delegating.

Whilst delegation does contain an element of performance risk, the extent of the risk is dependent on the nature of the task and its importance to achieving organizational goals. To be an effective manager, you therefore need to control that risk of poor performance when you delegate a task.

As a manager, you need to keep the bigger picture in mind of what your organization wants to achieve. When considering which tasks to delegate, there are some fundamental high-level factors you need to address. You can do this by asking yourself:" If I delegate this task":

- Will it give me more time to focus on tasks that are of higher value to the organization?
- Will it allow me to develop the skills of one of my team members by expanding their experience in this area?
- Will it offer someone with a fresh view of the task and the chance to provide a more innovative solution than I would have done?

If the answer is "yes" to any of these questions, then you should consider delegating the task.

As an initial step it is best to delegate:

- Routine tasks
- Planned tasks

- Tasks that a team member has expressed an interest in performing

For all of these, you should ensure that you have sufficient time within your workload to brief and explain exactly what is required. You must be mindful not to always delegate unpleasant tasks as this will not develop or motivate your staff.

Principles of delegation

- **Principle of delegation by results expected**
  The degree of authority delegated to an individual manager should be adequate to assure their ability to accomplish the results expected of them. Without this level of authority, they will be unable to complete the task, as others they need to interact with will hinder their progress die to lack of "real" authority. It is essential that as part of the delegation process, you communicate this devolved authority to all necessary parties.
- **Principle of absoluteness of responsibility**
  It is vital that delegation is not used as a way of avoiding or abdicating ultimate responsibility of ownership of tasks. Responsibility for the activities of subordinates, who have been assigned duties, remains at all times with whoever originally delegated the task.
- **Principle of parity of authority and responsibility**
  The degree of authority that is delegated in conjunction with the task has to be consistent with the level of responsibility and role of the subordinate.

Stages for successful delegation

There are six practical stages you should follow so that your delegated activities are successfully completed.

Step 1: Select the right person for the job

As a manager, it is essential that you have an accurate picture of your team members' individual KSA's (Knowledge, Skills, Attitude). You will be able to assess these by watching and evaluating the competencies and behaviours an individual display in different situations. The right person for you to delegate to will already exhibit many of the behaviours that are required to perform the task you want to delegate. This can be seen in the way they deal with unexpected circumstances or handle other members of your team to defuse potentially damaging situations.

Step 2: Provide a clear goal

It is your responsibility to provide the team member with all the information they will need to understand exactly what is expected of them and to perform the task successfully. It is important that the brief you give provides a clear understanding of the importance of the task.

An essential part of your brief is that you must clearly define what you expect from the job you are delegating and that it meets the SMART goal-setting criteria. This includes how their and your, success will be measured. With this knowledge, the team member can clearly understand what the goal is, as well as what you expect from them.

Step 3: Delegate the whole job to a single team member

One of the most serious mistakes that you can make when delegating work is to split the task up and give it to more than one team member. The effect of this is to add considerable confusion to the whole situation. Therefore, it is crucial to ensure that the individual understands that the task is their sole responsibility to deliver in the most appropriate way to guarantee success.

Step 4: Set realistic deadlines if appropriate

When briefing the team member to whom you have delegated, you must clearly state what the deadline is and the reason for that timeframe. Setting extremely challenging deadlines usually has the opposite effect from the one intended. If a team member starts to doubt their ability to finish on time, they may lose motivation to even try. Similarly, setting a strict deadline where there are too many unknown factors may have the same result of impairing motivation.

Step 5: Perform periodic reviews

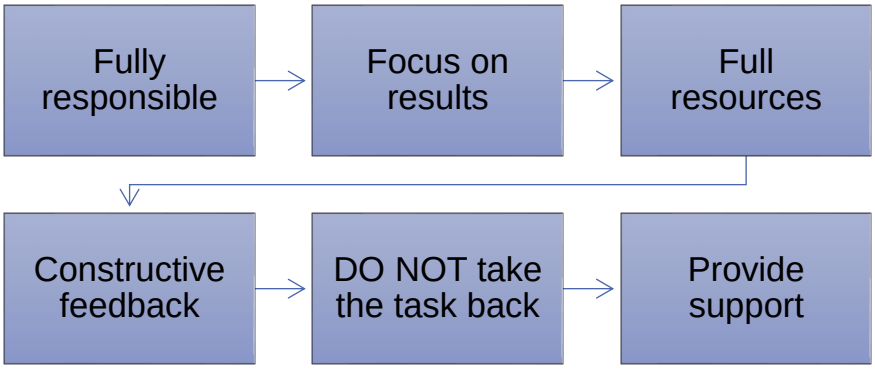
To ensure successful delegation of your task, you must clearly identify as part of the brief the key points of the task or the dates when you want feedback about progress. This allows you to become aware of potential issues or problems the person you have delegated the task to may have and to help resolve them, before they become damaging to the task's success.

Step 6: Give proper credit and recognition

Decide in advance how you will thank and reward the team member for their successful completion of the task. When a job is completed, it is important that you give full credit to the person who completed it. This provides them with the personal recognition of their achievement at both a team and corporate level.

If the project is not a success, you must assume full responsibility and as part of your task debrief evaluate what happened, how things developed, and the reasons as to why the team member was not capable of completing the task. Always try to learn from these experiences, so that next time you delegate more efficiently.

How to make your delegation succeed?



Production Planning and Scheduling

To maximize productivity, every company needs a sound production plan. However, effective planning is a complex process that covers a wide variety of activities to ensure that materials, equipment and human resources are available when and where they are needed. Production planning is like a roadmap: It helps you know where you are going and how long it will take you to get there.

There are several key factors that contribute to the success of production planning for a product or a service.

In general, your production planning must align with your overall operations strategy, which in turn must align with your overall corporate strategic objectives. Consider your internal and external environments as well as your company's vision, mission and values.

Your production planning and production processes must be able to deliver key performance objectives, which vary from business to business. But the levels of performance must be defined by your customer. Here are some examples.

- Quality–Minimize mistakes and provide your customer with the level of product and service quality they require. Quality reduces cost in the long run and increases dependability.
- Speed–React quickly to customer requirements. Increase the availability of your product to meet your customer's requirements. Speed decreases both inventories and risk.
- Dependability–Deliver your product or service with the quality required, when and where the customer requires it. Dependability saves your customer time and money and is critical in developing trust with your customers.

- Flexibility–Adapt to constantly changing customer demands. Make sure your planning and production processes provide flexibility given changing types of product or services and changes to product mix, volume and delivery.
- Cost–Every customer care about cost relative to value. You need to develop an efficient and waste-free supply chain to minimize costs. The other performance objectives will affect costs.

Here are some advantages of an effective production plan and scheduling.

- Reduced labour costs by eliminating wasted time and improving process flow.
- Reduced inventory costs by decreasing the need for safety stocks and excessive work-in-process inventories.
- Optimized equipment usage and increased capacity.
- Improved on-time deliveries of products and services.

Key factors of a production plan

Effective planning hinges on a sound understanding of key activities that business managers should apply to the planning process. Here are some examples:

- Forecast market expectations

To plan effectively, you will need to estimate potential sales with some reliability. Most businesses don't have firm numbers on future sales. However, you can forecast sales based on historical information, market trends and/or established orders.

- Inventory control

Reliable inventory levels feeding the pipeline have to be established and a sound inventory system should be in place.

- Availability of equipment and human resources

Also known as open time, this is the period of time allowed between processes so that all orders flow within your production line or service. Production planning helps you manage open time, ensuring it is well-utilized, while being careful not to create delays. Planning should maximize your operational capacity but not exceed it. It's also wise not to plan for full capacity and leave room for the unexpected priorities and changes that may arise.

- Standardized steps and time

Typically, the most efficient means to determine your production steps is to map processes in the order that they happen and then incorporate the average time it took to complete the work. Remember that all steps don't happen in sequence and that many may occur at the same time.

After completing a process map, you will understand how long it will take to complete the entire process. Where work is repeated or similar, it is best to standardize the work and time involved. Document similar activities for future use and use them as a base-line to establish future routings and times. This will speed up your planning process significantly.

During the process map stage, you may identify waste. You can use operational efficiency/lean manufacturing principles to eliminate waste, shorten the process and improve deliveries and costs.

- Risk factors

Evaluate these by collecting historical information on similar work experiences, detailing the actual time, materials and failures encountered. Where risks are significant, you should conduct a failure mode effect analysis method (FMEA) and ensure that controls are put in place to eliminate or minimize them. This method allows you to study and determine ways to diminish potential problems within your business operations. This type of analysis is more common in manufacturing and assembly businesses.

- How to plan work

All other activities are initiated from the production plan and each area is dependent on the interaction of the activities. Typically, a plan addresses materials, equipment, human resources, training, capacity and the routing or methods to complete the work in a standard time. In order to do a good sales forecast, you should base it on a history of firm orders.

The production plan initially needs to address specific key elements well in advance of production in order to ensure an uninterrupted flow of work as it unfolds.

- Material ordering—Materials and services that require a long lead time or are at an extended shipping distance, also known as blanket orders, should be ordered in advance of production requirements. Suppliers should send you materials periodically to ensure an uninterrupted pipeline.
- Equipment procurement—Procuring specialized tools and equipment to initiate the production process may require a longer lead time. Keep in mind that the equipment may have to be custom made or simply difficult to set up. This type of equipment may also require special training.
- Bottlenecks—These are constraints or restrictions in the process flow and should be assessed in advance so you can plan around them or eliminate them before you begin production. When you assess possible bottlenecks, be aware that they may shift to another area of the process. Dealing with bottlenecks is a continual challenge for any business.
- Human resources acquisitions and training—Key or specialized positions may demand extensive training on specialized equipment, technical processes or regulatory requirements. These employees should be interviewed thoroughly about their skills. When hiring them, allow sufficient time for training and be sure that they are competent in their work before the job begins. This will ensure that your process or service flows smoothly.

The production plan provides a foundation to schedule the actual work and plan the details of day-to-day activities. As sales orders come in, you will need to address them individually

based on their priority. The importance of the sales order will determine the work flow and when it should be scheduled. After this, you should evaluate whether or not you are ready for production or to offer the service.

You will need to determine:

- If the inventory is available at the point where work is to start? If not, then the work needs to be rescheduled when supplies become available. There is no point in scheduling work that you will not be able to complete.
- Are your resources available? Do you have the necessary staff to complete the task? Are the machines being used?
- Does the standard time fit within the open time allowed? If not, then the work should be rescheduled.

After you have determined that you have met the criteria to start production, you will need to communicate the plan to the employees who will implement it. You can plan the production on spreadsheets, databases or software, which usually speeds the process up. However, a visual representation is preferred as a means to communicate operation schedules to floor employees. Some businesses post work orders on boards or use computer monitors to display the floor schedule. The schedule also needs to be available to employees ahead of time and kept up to date.

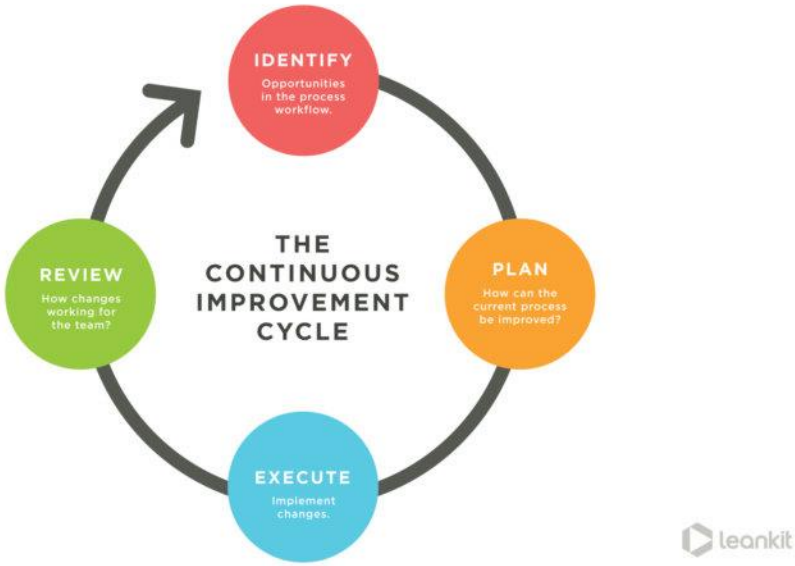
Continuous Improvement

Continuous improvement is a mindset whereby organisations strive to always be looking for better ways to do things - this search for better ways of doing things leads to the evolution of products, services, workflows and other aspects of the organisation so they become more optimal and efficient over time.

Historically the concept has been applied to manufacturing with the ultimate end-goal being the elimination of waste (be that time, raw materials, labour) from the manufacturing process so that the end product could be shipped quicker, faster and cheaper.

Nowadays, continuous improvement has been extended to knowledge-based environments to remove waste or inefficiencies from intangible processes like collaboration in order to create a better end product in a more efficient way.

Kaizen: A Flexible Practice



A Japanese word meaning ‘improvement,’ Kaizen’s ultimate goal is waste elimination. Its origins are in post-WWII Japanese businesses, but it now used worldwide.

It is an inclusive model of continuous improvement in that opportunities for improvement are expected to be identified by everyone from the CEO downwards - this is unsurprising considering its ubiquity in manufacturing, where front-line workers are often best able to spot inefficiencies in the production cycle.

But what this also means is that there’s a distinctive cultural element to Kaizen and the implementation of processes and procedures must work alongside cultural re-alignment to the continuous improvement mindset in order to drive employee suggestions.

When Kaizen is used for continuous improvement there are two distinct elements: flow kaizen and process kaizen. The former deals with how information, products and services flow throughout the organization, while the latter focuses on small changes individuals can make quickly to improve efficiency.

Kaizen has many principles and makes use of underlying processes that include root cause analysis and PDCA.

Root Cause Analysis (RCA) is a popular and often-used technique that helps people answer the question of why the problem occurred in the first place. It seeks to identify the origin of a problem using a specific set of steps, with associated tools, to find the primary cause of the problem, so that you can:

- Determine what happened.
- Determine why it happened.

- Figure out what to do to reduce the likelihood that it will happen again.

RCA assumes that systems and events are interrelated. An action in one area triggers an action in another, and another, and so on. By tracing back these actions, you can discover where the problem started and how it grew into the symptom you're now facing.

You'll usually find three basic types of causes:

- Physical causes – Tangible, material items failed in some way (for example, a car's brakes stopped working).
- Human causes – People did something wrong or did not do something that was needed. Human causes typically lead to physical causes (for example, no one filled the brake fluid, which led to the brakes failing).
- Organizational causes – A system, process, or policy that people use to make decisions or do their work is faulty (for example, no one person was responsible for vehicle maintenance, and everyone assumed someone else had filled the brake fluid).

RCA looks at all three types of causes. It involves investigating the patterns of negative effects, finding hidden flaws in the system, and discovering specific actions that contributed to the problem. This often means that RCA reveals more than one root cause.

You can apply RCA to almost any situation. Determining how far to go in your investigation requires good judgment and common sense. Theoretically, you could continue to trace root causes back to the Stone Age, but the effort would serve no useful purpose. Be careful to understand when you've found a significant cause that can, in fact, be changed.

This problem-solving method will be discussed in more detail in **Module 9: Decision making and problem solving.**

PDCA / PDSA is an iterative, four-stage approach for continually improving processes, products or services, and for resolving problems. It involves systematically testing possible solutions, assessing the results, and implementing the ones that are shown to work.

The four phases are:

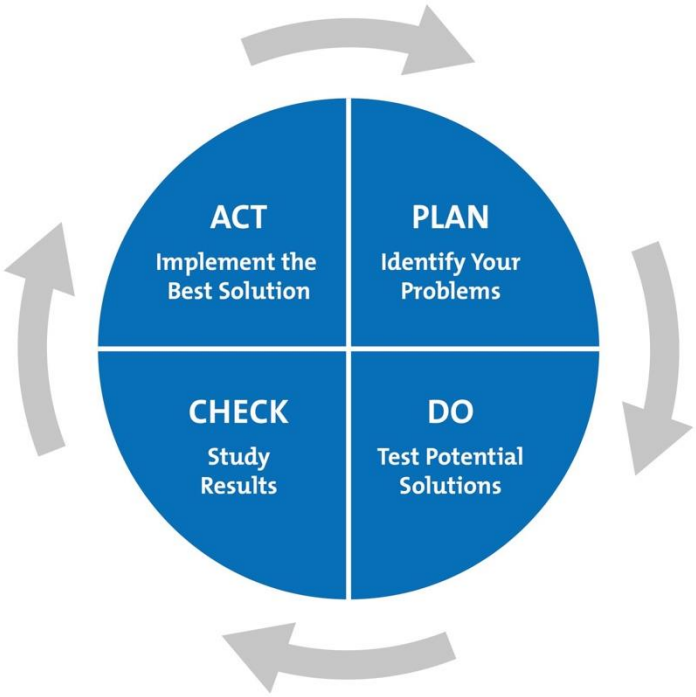
Plan: identify and analyze the problem or opportunity, develop hypotheses about what the issues may be, and decide which one to test.

Do: test the potential solution, ideally on a small scale, and measure the results.

Check/Study: study the result, measure effectiveness, and decide whether the hypothesis is supported or not.

Act: if the solution was successful, implement it.

Figure 1: The Plan-Do-Check-Act Cycle



Note:

There can be any number of iterations of the Do and Check phases, as you continue to refine, retest and trial potential solutions.

We'll now look at the four stages in more detail, below.

When to Use PDCA / PDSA

The PDCA / PDSA framework can improve any process or product by breaking it into smaller steps. It is particularly effective for:

- Helping to implement Total Quality Management or Six Sigma initiatives, and generally helping to improve processes.
- Exploring a range of solutions to problems and piloting them in a controlled way before selecting one for implementation.
- Avoiding wastage of resources by rolling out an ineffective solution on a wide scale.
- You can use the model in all sorts of business environments, from new product development, project and change management, to product lifecycle and supply chain management.

Client Relation Management (CRM)

At its core, customer relationship management (CRM) is all of the activities, strategies and technologies that companies use to manage their interactions with their current and potential customers. A saying frequently heard and said in many businesses is "customer is king."

CRM helps businesses build a relationship with their customers that, in turn, creates loyalty and customer retention. Since customer loyalty and revenue are both qualities that affect a company's revenue, CRM is a management strategy that results in increased profits for a business.

CRM is about making each and every customer feel like they have a one-to-one relationship with you. Effective CRM gives you the opportunity to show your customers that:

• You know and recognize them.

• You understand them.

How Can I Use CRM in My Business?

The table below displays the types of information you can collect with a CRM system, along with the questions that the information can help answer.

Type of information	Questions
Customer profile	• Who are they? • Are they a business or a person? • Where are they located? • If they are a business, how big are they? • If they are a business, what do they do? • Why do they need your product? • How do they communicate with you? • Do they have an account? • How long have they been a customer?
Customer buying profile	• How often do they buy? • When do they buy? • Is there a pattern to their buying habits (e.g., seasonal)?

	• How much do they buy at one time? Over time?
Customer buying preferences	• What do they buy? • Do they always buy the same thing? • Why do they buy it?
Customer service profile	• What kinds of problems/issues do they encounter? • What is the current status of their issues? • How many open tickets are there? • How many cases have been resolved?

Building Value for You

By compiling this information and analysing it, you can then build a strategy with this information to:

• Maximize repeat business opportunities by anticipating your existing customers' needs.

• Identify your best customers.

• Identify potential customers.

• Identify complementary products you can sell to your customers.

• Target marketing campaigns/materials and promotions.

Module 2: GRAIN HANDLING INDUSTRY STRUCTURE AND MARKETS (KM03-KT02)

Learning outcomes

- Demonstrate an understanding of marketing channels (including role players)
- Demonstrate an understanding of grain handling operations within the complexities of the global and local consumer driven markets
- Explain the concepts or competitiveness and traceability

Marketing practices and challenges in the South African grain industry

Marketing in agriculture is not easy, as you are working with a product that is a commodity, so market forces will always play a role. This means that one side of the value chain has many sellers, and the other side has only a few buyers. The most important thing to remember is that agriculture is reliant on weather, which can change the risk very quickly.

Until recently, the global grain industry operated in a relatively predictable business environment. Grain prices usually didn't fluctuate much on a year-to-year basis, nor did production and demand.

Weather patterns were more predictable, grain storage and handling companies had little trouble finding qualified workers to operate their facilities, and government regulations impacting the industry were far less strict than they are today.

Gazing into his crystal ball, Charles Hurburgh, professor in Iowa State University's Agricultural and Biosystems Engineering Department, doesn't see a return to stability for the grain industry in the upcoming years. In fact, he says, the business environment may become an even more volatile.

During his presentation, *"The Bigger Picture: Challenges into the Future,"* at the 83rd Annual GEAPS Exchange on March 5, 2012 in Minneapolis, Minnesota, U.S., Hurburgh outlined the five biggest challenges companies that store and handle grain will face over the next several decades. They are:

- Productivity and demand for natural resources
- Technology
- Standard of living/consumer issues
- Weather variability
- Workforce turnover

"Any one of those five challenges have the potential to put any company represented in this room in a non-competitive situation," Hurburgh said. "Likewise, it has the potential to generate a new and real opportunity for any company in this room. "These challenges aren't going away, so we'll have to face them in a proactive and positive way."

South Africa is only a small producer compared to other countries and is thus a price taker (meaning that we cannot influence world prices). Because of this our local prices can only be between import and export parity.

An import parity price is defined as the price which a buyer will pay to buy the product on the world market. This price will include all the costs incurred to get the product delivered at the buyer's destination.

An export parity price is defined as the price that a local seller could get by selling his product on the world market e.g. excluding the export costs. The price which the seller gets is based on the condition that he deliver the product at the nearest export point (usually a 31ilome) at his own expense. World prices for field crops are usually quoted in US Dollars.

Import and export parity prices are published by the South African Grain Information Service (SAGIS) in order to help producers in their marketing planning.
The following advantages of understanding import and export parity prices are:

- The producer price can be estimated from it.
    - Cyclical and seasonal movements in these prices could be used in marketing

planning.

- With these prices as background knowledge, it is easier to follow discussions on price movements.
- With these prices in mind it is easier to negotiate a good price with possible buyers.

As mentioned earlier, domestic grain prices are largely derived from international grain prices. Changes in the exchange rate are of particular importance to domestic grain producers since devaluation in the exchange rate will benefit domestic grain producers. In other words, if the Rand exchange rate loses value against the Dollar it is more expensive to import grains, thereby putting upward pressure on domestic prices.

When looking at international prices of oilseeds it is not the oilseed price that is important, but rather oilcake and oil prices. The price that an oilseed processor is willing to pay (to any producer) for oilseed should therefore be derived from the import parity price of oilcake and oil. The prices that domestic producers receive for their oilseeds are thus directly influenced by the world market prices for oilcake and natural oil. Again, it should be stressed that the Rand-Dollar exchange rate has a huge impact here. World prices for oilseeds have decreased in recent years which could be ascribed to continuous bumper harvests in major producing countries. The depreciation of the rand has to a certain extent shielded South African producers against this price decline. Although world prices for soya-bean oil and soya-bean oilcake have decreased in the last three years the import parity prices of these products have moved slightly upwards.

Although world field crop prices determine the South African prices, domestic supply and demand still determine whether the domestic price approaches the import or export parity price. In theory, when prices go up there will be a fall in demand and an increase in supply. In time, the amount supplied at a particular price will come to equal the amount demanded.

Quantity supplied	Quantity demanded
▪ Prices of substitutes ▪ Price of the product usually produced ▪ Weather conditions ▪ Access to market channels ▪ Access to inputs ▪ Access to storage facilities	. Prices of substitutes . Changes in tastes, preferences and income . Price and quality produced . Different markets

Summary of quantity supplied, and quantity demanded

In order to obtain a thorough understanding of the supply and demand it is necessary to understand the following:

Quantity supplied

- **Prices of substitutes**

If a farmer who usually produces maize is of the opinion that the price of, for example, sunflower seed will increase substantially in the next season he/she will rather plant sunflowers than maize, thus reducing the amount of maize produced. This could have a significant impact on maize production if a lot of farmers have the same opinion of the market.

- **Price of the product usually produced**

Farmers production decisions are also a function of the price of the commodity they would like to produce, i.e. a farmer that wants to produce maize will take into account the previous season's price, as well as the price he/she is expecting to get for the coming season. If price expectations are favourable the chance is very good that such a farmer will produce maize, especially if this is the crop that he/she is used to planting. However, if price expectations are negative this farmer could decide to plant something else.

- **Weather conditions**

With the unpredictable weather patterns in South Africa it is not strange that record planting of a specific crop could result in lower than average crop. Weather conditions also have a profound impact on the quality of the crop.

- **Access to marketing channels**

Access to marketing channels could have an impact on the quantity supplied in a specific period. For instance, if farmers are situated far away from markets it could happen that

most of their crop will never be actually delivered to the major markets. To obtain a reference price for these farmers if they want to sell their product (for instance to a 34ilomete) is very important. SAFEX could be contacted in order to get a reference price in this situation. It is important that the transport differential is taken into account when calculating the price in a specific area. For example, if the transport cost from Randfontein (this is where Safex prices are quoted) to Mafikeng is R80 per ton for maize and the SAFEX price is R700 per ton then the going price for maize will be approximately R620 per ton in Mafikeng. Other transaction cost, such as delivery to the buyer, packaging, etc. must also be deducted.

- **Access to inputs**

The financial position of a producer at the beginning of the production season may have a significant impact on his/her planting intentions. The more difficult it is to access production loans the less will be planted in that specific production season.

A further restricting aspect is the availability of inputs such as fertilizer, pesticides, herbicides, seed, fuel and labour. It is important to note that these inputs will always be available if one is prepared to pay the price. If these inputs become too expensive in a certain region it would be advisable to consider an alternative crop which requires less inputs.

- **Access to storage facilities**

If a farmer doesn't have access to storage facilities it will mean that he/she will have to sell all of his/her crop at the time of harvest. Usually this is the time of the year when the prices are at their lowest (June/July for maize, March for sunflower, April for soya beans, June/July for sorghum, November for wheat). **Helping farmers to identify storage facilities in their region** could help them do more effective marketing. Most of the cooperatives in field crop production areas do have facilities.

The cost of storing should always be evaluated against the benefits of storing. For example, if a producer would like to store his/her maize until December he/she should determine the price at which maize could be sold in December (again the Safex price could be used as barometer). Also, the producer should find out the storage cost until December. If the storage cost is deducted from the December price and the price is still higher than the price at harvesting, then it could be worthwhile to store the maize until December. It should be noted that the producer should take into account the cost of transporting the crop to the storage facility and fetching it again. Selling the crop whilst it is still at the storage facility is preferable.

Quantity demanded

- **Prices of substitutes**

The price of the product determines the quantity demanded of that product. The reason for this is that consumers could switch their demand between different commodities. If the price of maize meal increases drastically due to a shortage of maize consumers would rather buy bread or rice. It is also true that the demand for most agricultural commodities is relatively price inelastic. This entails that the demand for a product does not change very much in response to price changes. Because of taste and preferences consumers do not easily change their staple food. This is, however, sometimes forced onto them by financial constraints.

- **Changes in tastes preferences and income** This is a factor which develops over time and it is not that evident in a specific year. In South Africa there is for instance a tendency for **consumers in the urban areas to consume more bread and rice and less maize meal.** Urbanization also leads to a larger demand for bread than maize meal. With a higher income in urban areas than in rural areas it is also easier to change between different food items. If the per capita income in South Africa increases it will mean that people can afford more luxurious foods and, accordingly, they will consume less of the traditional staple foods.
    - **Price and quality produced** In South Africa there exist good grading standards for all the field crops. These standards relate to moisture content, damaged kernels, protein content and foreign-matter content. Note should be taken of the fact that traders and millers are very aware of quality. There exists a **distinct price difference between different grades of field crops.** In a shortage year the price gap between low and high-grade products decreases. This is because millers don't have any option other than to make use of low-grade products. This can, however, only be done to a certain extent or the end product will become undesirable for the consumer.
    - **Different markets**. The quantity demanded of a commodity is also determined by the availability of the commodity in a specific market. For instance, if there is a shortage of yellow maize in South Africa the animal feed industry will start to include white maize in the feed rations. This will increase the quantity of white maize demanded.

Price movements

As was already mentioned prices for grain products are usually the lowest during harvest, whilst they will increase steadily as the season progresses. Note that the lowest and highest prices from year to year do not necessarily coincide due to various factors that include, amongst others, weather conditions before planting, during the pollination process and during harvesting; stock position domestically and internationally; production intentions of domestic and overseas producers, tariff policy and demand conditions. Nevertheless, we can identify periods where

prices are typically lower and higher during a particular season.

More specifically, factors which can affect the seasonal price patterns of grain are:

- Farmers may decide to sell some of their crop to raise cash immediately after harvest. They will try to sell at least as much of their crop to raise enough cash to meet their financial obligations, such as cooperative input accounts.
- World stocks and world prices for commodities have a great impact on domestic prices. This is because of liberalization in agricultural markets in South Africa.
- It also happens frequently that large traders feel that the price of a product may go up in which case they may try to buy the product cheaply at the beginning of the season and store it until the price goes up enough for them to sell at a profit. There are at least five major traders who could have a profound impact on domestic prices.
- If farmers feel that the price of the product will go up they may decide to store it and wait for higher prices. It is common for producers to store their product at the nearest cooperative silo at a predetermined fee.
- The extent to which information is available has an important influence on prices. This tendency is best illustrated if one looks at crop estimates. If the crop estimate in a specific month changes drastically from the month before there is a sudden and severe price movement for that commodity.

Price barometer

All the above-mentioned factors are reflected in an SAFEX price for a product. This is because SAFEX traders are very well informed and react immediately on new information. SAFEX is a futures market where a producer with a minimum of 100 tons of maize can sell his crop today for a specified price and deliver the crop at a specified date in future (typically in harvesting season). By using this marketing alternative, it is possible to fix a price at a certain level. This decreases the risk of being exposed to fluctuating prices. The following field crops trade on SAFEX:

- White maize
- Yellow maize
- Wheat
- Sunflower seed

SAFEX is typically used as the price indicator by buyers and sellers of these products. Derived prices in the different regions of South Africa differ due to transport costs from the SAFEX reference point, which is Randfontein.

Most producers only sell up to 30 percent of their crop on SAFEX. These arrangements are all legally fixed in futures contracts. It should be noted here that futures contracts are standardized. These contracts are only available for first grade products and the minimum quantity specified is 50 tons for wheat and 100 tons for maize and sunflower seed. Producers make use of brokers to market their products on SAFEX. Over and above the factors which influence South African

prices for field crops, there are some additional factors which have to be taken into account in determining the price which producers will receive. These include all the costs that occur in the transaction process and have to be paid by the producer. Transaction costs could include some or all of the following aspects:

- Transport cost to the delivery points such as the nearest silo.
- Commissions.
- Losses in quality before delivery.
- Handling costs up to delivery.

It is important that producers take note of these factors in order to do financial planning for the next season.

Marketing channels

The available direct marketing channels for the South African grain and oilseed producer are as follows:

- Cash market sales.
- Storage.
- Forward contracts.
- Future Exchange contracts.

Storage

- Storage forms part of the marketing strategy a farmer can follow.
- Grains and oilseeds can be stored on the farm if storage facilities are available or it can be stored somewhere else, normally at a cooperative, but storage costs are charged.
- In times of low prices in the cash market, stock can be stored to be sold at a later stage when prices are higher.
- Depot mangers need to be informed of the crop estimates and the direction/ forecasts for prices. This could influence the decision by the farmers whether to sell in the cash market or to store the grain. The storage costs should be taken into consideration.

- Depot managers therefore need to find out about the storage capacity in the region and the associated costs and the conditions (grade, moisture, packaging, etc.) having to be met to put grain into hired storage facilities. This will influence the feasibility of storage for the producer. This information will also assist the depot manager is marketing its services at the right price as well as the value add it can deliver to the producer.

Availability of different quality grains and oilseeds

No business can survive if value is not added to the product that it is trading in. In the grain storage industry, there are many risk factors that can affect the quality of the product they market to customers. These include:

- Lower grades as Grade 1
- Poisonous seeds in the product
- Screenings
- Insects
- Product damaged during storage (heat and fungi)
- Undesirable odours in the product
- Mixing of grain
- Foreign material
- Hazardous and/or chemical substances
- High moisture

It is however possible to address these quality issues to still ensure that a quality product is delivered in the end. The well-known saying in the grain storage environment that “problems can be mixed away”; is not always the best option.

Each of these risks can be managed in the following ways:

Lower Grades

In theory, a silo bin would be allocated for each grade, but this practice is not always viable and makes it very difficult for depot personnel to handle small quantities of lower grades/class of grain due to the lack of space/silo bins/silo bags.

It is imperative that the depot manager know the overall environmental conditions in his area that may influence the quality of the harvested product. Particular attention must be given to the weather conditions during the growing and drying process of the grain. Examples of these include:

- Drought and cold will result in small or shriveled kernels
- More than normal rainfall during the growth phase will result in the appearance of fungi, under developed cob and more poisonous seeds.
- Strong winds during the growing season may result in uprooted plants and more soil and rocks in the product.
- Excessive rain during the drying season may result in water damage, discolouration, sprouted seeds.
- Early cold or frost during the drying phase may lead to frost damage and empty shells in sunflower and immature kernels.

The depot manager will only be able to upgrade received product if he is aware of the quality of grain that will be harvested. This information will assist the manager to plan properly in order to mix lower grades with higher grades. This mixing action means that a lower grade should in relation, be mixed with the higher grade during the dispatching of grain. This must be done at such a rate that the good product is not adversely affected.

It is imperative to remember that if a buyer has purchased Grade 1 product, he is entitled to a product that meets the Grade 1 requirements.

The mixing of product is a complex process and is not applicable to all products. It is possible for the depot manager to manage its defects above the sieve. The problem occurs when the maximum defects occurs above the sieve and breakage in the silo takes place. In this instance it would be extremely difficult to upgrade the product.
Certain grading factors can be mixed with success, but some factors cannot be upgraded.

- Low hectoliter mass can be mixed with high hectoliter mass to gain a mass that meets the Grade 1 requirements (wheat)
- Low protein can be mixed with high protein in order to obtain an average protein that meets the Grade 1 requirements (wheat)
- Heat damage in sunflower and soya beans can be mixed with other products to get the percentage below 10%.

Regardless of the product, it is impossible to get rid of a musty, sour or undesirable odour. Most of the other grading factors can, however, be mixed away.

Poisonous seeds

If a consignment contains more poisonous seeds than the Act allows at the time of delivery, it is a good practice to screen the seeds before storage and return the screenings to the producer. Remember the screenings sold by the depot must comply with the same laws that apply to the prescribe product. The Consumer Act does not allow the sale of screenings with more seeds than is allowed by the Act.
Grain that is infected with poisonous seeds can also be mixed with clean grain to reduce its presence in the sample. Remember that lighter seeds such as cocklebur and fine bur weed moves to the surface while Datura and other smaller seeds settle at the bottom of the silo/truck due to the vibration that occur. It remains a good working practice to rake the obvious cocklebur of the top of the load before taking the grain in. many loads are placed in dispute unnecessarily because the buyer observed cocklebur on top of the load.

Cocklebur

Screenings

A good storage technique is to remove at least 50 to 100 tons from each silo bin and returning it back to the top of the product in the silo. This will spread the breakage that is caused during intake into the empty silo and spread it through the rest of the product in the silo. The benefit is not only widespread screenings but drawing the screenings from the silo bin means that the core of broken grain in the silo is disturbed and thereby combatting insect infestation. It also improves aeration and/or even circulation fumigation.

Many of the screenings, however, can be mixed with other grades during the discharge. Ensure that the additional breakage during the loading process does not reach the maximum limit. Buyers make a point of returning consignments with excessive screenings. From a business point of view, it makes sense to negotiate with the seller to accept such a load at a reduced price. This allows the buyer to benefit from the screenings that will be lost during the screening process and the discount he negotiated to take the load. The seller saves on the high transport cost as well as the offloading and cleaning of the consignment.

Insects

Insects cannot be mixed away or managed. Grain, oil seeds or dried beans are either used whole or in processed form for human and animal feed. It is therefore essential that hygiene practices should be strictly applied to ensure that the product does not become infested. There is absolutely no tolerance for insects in a consignment during delivery.

The buyer is very concerned about the quality of its product and cannot afford to take contaminated product to the market. Due to the competitive market his brand name is very important.

The old way to get rid of insects by suing a screen to sieve out any insects is just no longer acceptable. Most of the adult insects are removed this way but the immature stages hatch about 1 to 6 days later in the processed product. This means that the consignment is returned to be fumigated involving huge costs. In some cases, the brand name of the buyer associated with infected stock can lead to legal action against the company.

Buyers are increasingly likely to keep sealed samples of consignments and if insects hatch within these sealed samples after a time, the whole silo bin in which the load was received is withdrawn and fumigated.

Product damaged during storage (heat and fungi)

A common problem with long-term storage is moisture migration in the product mass. Moisture migration is the result of convection currents that is caused by temperature differences in the grain mass and heating the silo by sunlight. Most managers expect that when heat damaged product is dumped into the bottom of a truck and good product is dumped on top, the problem is mixed away. The truth is that of there is more than 3 to 4% heat damaged kernels in the grading sample, the sample will emit a typical musty, sour smell. In many cases the damaged grain will be on top of the heap of grain if “side tippers” is used to transport the grain.

Undesirable odours in the product

The occurrence of undesirable odours at depots are not common. These odours are more noticeable from producer deliveries or where the transport company’s trucks were not cleaned. The problem remains the depot’s problem is loaded/offloaded. A bad smell in small quantities could be detected due to insects and/or rodent infestation, especially in bag stacks.

Mixed grain

Grain mixing is part of the storage industry and in many cases this is not declared as it should which leaves the depot with a problem when the product is loaded. The failure to clean elevator boots as well as conveyor belts and shuts only aggravates the problem.

Foreign material

The appearance of foreign material in consignments create problems for the storage facility. Although foreign material is deducted from the producer (so-called clean basis wheat, sunflower and soya beans) upon receipt, it usually increases during storage and handling. Other products that appear in the consignment are considered as foreign material and will result in a greater mass loss when the mass deduction is made.

Dangerous, unwanted and/or chemical substances

The appearance of dangerous, unwanted or chemical substances may originate at the producer, transport company or the storage facility. Product that contains these substances may not be traded. The producer or the depot may spray/treat the product with a chemical that is not acceptable to the buyer. In some cases, a fungus killer/seed treatment chemical is present in the product. It may also happen that the transport company previously transported a substance that is dangerous for humans and/or animals (stones, scrap metal, animal material, fertilizer and coal).

The depot cannot accept product that has been exposed to these substances and will have to be returned.

Traceability

Traceability is the ability to access any or all information relating to a product such as red meat throughout its entire life cycle, by means of recorded identification. This is the definition given in a paper by **Petter Olsen and Melania Borit in 2013.** Presently, South Africa does not have legislation in place that enforces the implementation of traceability systems. Yet it is clear that these systems are becoming essential for every business in the country's food industry.

Traceability means more than simply capturing data; it means sharing the data in a useful way. A traceability system can thus function as an important tool for food protection, defense, safety, sustainability and food security.

In South Africa, a communication gap exists between consumer and farmer. Producers do not always know which target group they should aim for, or what the needs of a specific target group are. Traceability allows for two-way communication between producers and consumers, enabling companies and farmers to build better relationships with the consumer. Due to the cost price squeeze in agriculture, farmers have been forced to become more efficient. Here, a traceability system can help to decrease spoilage, improve processes and decrease waste while enhancing quality.

Global trends in food safety present a challenge for the grain producer to deliver a product of high quality that meets food safety standards. The main food safety risk in the grain industry is residues associated with the use of agricultural chemicals. The latter is fully under the producer's control.

The most important aspects are the use of chemicals and the restrictions on chemicals that are present on the grain that will be delivered. Legal prescriptions determine the use of herbicides, insecticides and several other agricultural chemicals as well as the residue levels of such products that may be present in the commodity. Producers should familiarize themselves with these legal requirements and meet the standards laid down therein.

Except for the grading of grain and oilseeds according to the Agricultural Product Standards Act (Act No. 119 of 1990) there are now also scientific tests to verify product quality. Buyers increasingly demand information about the agricultural chemicals used to ascertain whether the grain is safe and suitable for consumption. Additional information on production practices and the use of chemicals is therefore increasingly important to ensure traceability.

Resources for Producers

Records:

Record keeping at farm level is important to ensure traceability. It is advisable for the producer to draw up a table for accurate record keeping at farm level. Suggested entries on such table are as follows:

Information about the crop:

- Name of farm / Stand Number
- Cultivar
- Name / Number of the land
- Hectares
- Date of agrochemical application

Information on herbicide sprays or control remedies for a pest/disease

- Active ingredient
- Lot number
- Provider
- Provider's ACDASA no.
- Concentration applied liters / ha
- Administered by
- Reason for agrochemical application

Labels:

It is important to note the directions on the label regarding the registration of agricultural chemicals for various types of grains and oilseeds for the control of a particular weed, fungus or pest. Except for the lot number, it is also advisable to preserve the date of manufacture of the containers. Pay special attention to poison that remains from a previous crop. The influence of type of nozzles, time of application, spray delivery, use restrictions, compatibility with other products and general safety precautions must be taken into account.

Agrochemicals must also have an L-number, which means the product has been registered for use in South Africa. The producer must also insist on a “Material Safety Data Sheet” (MSDS) from the supplier. The MSDS provides extensive information about the product, even the kind of first aid or emergency relief procedures that can be applied. The MSDS is provided free of charge with the purchase of agricultural chemicals.

Recommendations by agents

Always insist that all recommendations regarding agrochemical applications are made in writing. Make sure the agent or representative who makes the recommendations complies with the necessary requirements, such as prescribed by ACDASA (Agricultural Chemical Distribution Association of South Africa).

If applications are handled by an agrochemical advisor, make sure this person’s name and P-number appear on the recommendation. The P-number is issued by the Department of Agriculture, Forestry and Fisheries after the advisor has undergone the necessary training. The operator’s P-registration must also be in the relevant field of application, for example weed control, fumigation and aerial are all separate registration fields.

Production Guidelines

The Agricultural Research Council (ARC) Grain Crops Institute in Potchefstroom and the Small Grain Institute in Bethlehem publish guidelines in this regard each year in the Maize Information Guide and Manuals for the production of small grains. The publications are free of charge for producers.

Module 3: BASIC FINANCE (KM03-KT03)

Learning outcomes

- Demonstrate an understanding of income vs profit (i.e. profit margins)
- Demonstrate an understanding of the cost of production and factors that impact on this
- Demonstrate an understanding of production cost control (including Elements of production costs, cost of inefficiency and re-work, absenteeism, waste, injuries on duty)

Basic Financial Terminology

This module will introduce the basic concepts and terminology that is used in financial management.
Financial management is a tool that assists Financial Managers to solve business problems every day. Sometimes financial management and accounting are confused – they are not the same. Accounting looks at things from a historical (past) view and at what has already taken place in the business. Financial management, on the other hand, focuses on creating value in the present and in the future.

The basic financial concepts are a good starting place because in finance there are often various financial terms and getting a good grasp of the terminology will assist you as you delve deeper into financial matters. It will enable you to know exactly what is referred to when, for instance, someone refers to the income statement or the balance sheet. These are the most common terms that are used:

Capital

known as 'equity' - value of the total assets of the business expressed in monetary terms

Capital is the money available to the business for the purchase of goods and services with a view to generating an income for the business. The business earns this income by buying and selling goods and services. Capital (equity) is therefore the value of the total assets of a business, expressed in monetary terms. Businesses use the capital available to it to obtain goods (and services). Capital is used to obtain assets.

Types of Capital

Capital can be classified into two main forms:

Fixed capital: Long term assets which are used for a long period of time

This includes long-term assets which are used for long periods of time. (e.g. buildings, plant, and machinery, and vehicles, etc.)

Working capital: Difference between current assets (on hand) and current liabilities

This is the difference between current assets and current liabilities. It is the term used when talking about the availability and management of business funds. Working capital is used in the day-today operations of the business and for this reason, working capital is often called circulating capital.

Assets: **resources a business owns: cash, inventory, equipment and real estate**

Assets are resources a business owns: cash, inventory, equipment and real estate. There is a difference between fixed assets and current assets:

Fixed Assets are assets such as land, buildings, machinery and equipment. Fixed assets have a relatively long life and the business can therefore use them for longer periods.
Fixed assets cannot be easily converted to cash.

FIXED ASSETS = LONG TERM

Current Assets: **assets that are owned by the company and can be converted into cash quickly (within 1 year) or that are already in cash form.**

Examples of current assets: outstanding debtors (people who owe the business money); stock and inventory; cash (on hand or in the bank). The capital used to obtain current assets is known as operating or working capital.

Liability

It is an *obligation* of an entity arising from *past* transactions or events, the settlement of which may result in the transfer or use of assets, or provision of services. A liability is defined by any type of borrowing from persons or banks that is payable during a short or long time; or it could be a duty or responsibility to others that entails settlement by future transfer or use of assets.

Retained earnings

This is the portion of net income which is retained by the corporation rather than distributed to its owners as dividends. Similarly, if the corporation takes a loss, then that loss is retained and called variously retained losses, accumulated losses, or accumulated deficit. Retained earnings and losses are cumulative from year to year with losses offsetting earnings

Ordinary shares

It is a form of corporate equity ownership, a type of security. It is called "ordinary" to distinguish it from preferred stock. If both types of stock exist, ordinary shareholders cannot be paid dividends until all preferred stock dividends (including payments in arrears) are paid in full.

Expense

It is an outflow of cash or other valuable assets from a person or a company to another person or company. This outflow of cash is generally one side of trade for products or services that have equal or better current or future value to the buyer than to the seller. Technically, an expense is an event in which an asset is used up or a liability is incurred. In terms of the accounting equation, expenses reduce owners' equity.

Dividends

Payments made by a corporation to its shareholder members, a portion of corporate profits paid out to stock holders. It is allocated as a fixed amount per share and a shareholder will receive a dividend in proportion to their share holding

Revenue

This is also known as turnover and is income that a company receives from its normal business activities. Revenue may refer to the amount in a monetary unit, received during a period of time

Profit

Profit simply means the revenue that remains after expenses. While net profit is synonymous with net income, profit can be calculated at a number of levels. For example, gross profit is revenue less the cost of goods sold, or COGS. Operating profit refers to revenue less COGS and operating expenses.

Budgeting for the financial resources of a business

A budget (from old French bougette, purse) is a financial plan and a list of all planned expenses and revenues. It is a plan for saving, borrowing and spending.

A budget is an important concept in microeconomics, which uses a budget line to illustrate the trade-offs between two or more goods. In other terms, a budget is an organizational plan stated in monetary terms.

In summary, the purpose of budgeting is to:

1. Provide a forecast of revenues and expenditures, that is, construct a model of how our business might perform financially if certain strategies, events and plans are carried out.
2. Enable the actual financial operation of the business to be measured against the forecast.
3. Establish the cost constraint for a project, program, or operation.

A budget is a financial plan. It summarizes, in financial figures, the activities planned for the forthcoming year by setting out the costs [expenses] of these activities, and where the income will come from to pay for the expenses.

Planning and preparing a budget and the financial reporting cycle

The budget is an essential to tool help you run a more effective organization. In the same way that the government needs to draw up an annual budget, to make sure that all plans and programs are properly funded, an organization needs to prepare a budget in careful detail. Budgeting is part of planning – you start with setting your objectives, then you draw up action plans and budgets.

Unless you know how much money you will need to carry out your plans, and where you expect to get that money from, you may end up halfway through the year with no money to go any further. Preparing a budget forces you to plan your spending and your fund-raising and to be realistic about what you can afford to do. Without a budget there can be no effective implementation.

A budget also serves a lot of other purposes:

- It is a simple way to make financial information accessible to all people in the organization who need to use it. Each member or staff member should know how much money is available for what part of your work.

- It helps you to understand exactly what your work will cost and what limitations you have so that your plans can be made more realistic.
- It clarifies where you have gaps and need to do more fund-raising. It also helps to write fund-raising proposals based on realistic costing.
- All financial statements should be written in terms of the budget so that it is easier to be transparent and accountable and to ensure that no money is spent on costs that you have not budgeted for.
- It helps members or executive members or management to monitor expenditure throughout the year and to make sure that it is in line with the budget amounts – monitoring should happen every month or two and should be in terms of the budget categories.
- It makes reporting to members or funders much easier since the expenditure can be compared to the amounts that you actually budgeted.
- A good budget can also help to avoid waste. When every amount is carefully calculated, it is easy to see how your money is being spent and to decide whether you are making any unnecessary expenditure

A budget should be drawn up on the basis of three main factors:

- A budget should always be based on proper plans, drawn up to make sure that you reach your goals for that year. A budget should be the summary of all the costs and income that you will receive that will make sure that your plans are implemented.
- The costs in the budget should be based on your financial statements of the previous year and the budget items should compare the expenditure of the previous year to this year. This will show that your budget is based on fact and experience.
- The budget should be realistic and should also show what income you expect and what income you would still need to raise.

Every budget should contain a number of categories. The two main categories are “Expected Expenditure” and “Expected Income”.

Under the Expected Expenditure the categories could be:

- **Capital costs** – things that you have to buy like computers, cars etc.
- **Running costs** – expenditure that will help your organization to run an office and administration to do its work: items like rent, electricity, telephone, hiring of equipment.
- **Staff costs** – salaries, staff benefits, staff training etc.
- **Project costs or operational costs** – costs that are linked to the specific projects or campaigns that you plan to run that year. This would include things like buying materials, printing costs, transport costs, workshop costs, catering, media production, venues, sound systems etc.

Under the Expected Income of the organization you should include categories like:

- **Donor funds** – list each funder and the amount you expect from them,
- **Membership fees** – if your members pay fees list the amount you expect to get this year,
- **Donations** – list the amount you expect to get from small public donations,
- **Fund-raising events** – if you plan to organize events, list what profit you expect to make and
- **Sales** – if you sell your services or any products.

The budget should clearly show whether there is a difference between your Expected Expenditure and your Expected Income. If you will get more money than you will spend, this is called an expected surplus; if you will get less money it is called a deficit. When your budget shows a deficit, you will obviously need to either cut the budget or do some serious fund-raising to make up the amount.

It is very important to write a budget in such a way that all amounts are justified and explained. For example, if you want to spend R100 000 on salaries, you should explain how many people will be employed for how much money. For example:

SALARIES	100 000
1 coordinator @ R60 000 per year	
1 administrator @ R40 000 per year.	

The budget can be drawn up by anyone in the organization who is clear about the plans of the organization as well as the possible income and expenditure. Whoever prepares the budget must work together with others, especially people in charge of the programs of the organization and people responsible for bookkeeping. Once the budget has been prepared, it needs to be checked and discussed by other members of your organization such as executive or staff who will be using the money.

Budgets are usually drawn up for one year, but you can also draw it up for a few years at a time or have a budget that is just for a specific project that may only last a month or two. A budget should be used as the basis for any audits that are done of your organization. Audits are usually done by independent accountants who go through all your financial records to check that the money was spent for what it was intended. A budget is used as the main tool for judging this.

The budget is not simply a document for funders and executives to see whether you have used the money properly. It should be a living tool for financial management. The budget is never set in stone. Circumstances and the needs of your organization may change during the year and a budget can also be changed if necessary. The overall budget of your organization is an internal one and can be amended.

How to draw up a budget

The most important thing that should be written at the top of a budget is, what period the budget covers. It is best to make your budget cover the same period as the financial year of the country or, of specific donors. Usually financial years are from the first of March to the end of February of the next year.

You also have to have to decide how detailed you want to make the budget. There are no set rules for this but generally, the more detail you have, the easier it is to use the budget as a financial management tool. The examples we will show in this section are for a detailed budget. The next step is to decide exactly what your organization has to achieve in the next year. This should be based on your strategic planning process. Once you have a list of activities that will make you achieve your objectives, you should calculate exactly what each activity will cost.

When you calculate expenses, it is important to think of everything that you could possibly have to spend. Also, you should look at your financial records of previous years, to make sure that you are not missing any obvious expenses.

Here are some examples of the expenses that you could have in your organization:

CAPITAL COSTS

- Purchase of vehicles
- Purchase of computer and printer
- Purchase of property.

RUNNING COSTS/ADMINISTRATION

Rent, service contracts for copiers, electricity, telephone, cell-phone and fax bills, internet provider, postage, vehicle maintenance, equipment rental, insurance, bank charges, auditor's fees, legal fees.

STAFF COSTS

Salaries, Medical aid, Pension contribution, UIF and other levies, Staff training

OPERATIONAL COSTS

Printing, research, materials development, media production, publicity, transport and other travel, venue hire, catering.

Here is an example of how a particular expense could be written in a detailed budget – the right-hand figure is projected transport costs for the budget year, the left-hand figure is actual expenditure in the last financial year. The calculations below show how you worked out the amount of R20 000:

	2009/10	**2011/12**
Transport:	18 540	R20 000
10,000km @ R1 per 54ilometer R15 000		
Return National Airfares – R4 000		
Public Transport – R1 000		

When you are basing your budget on previous expenditure, it is important to take inflation and cost-of- living increases into account. If your inflation rate is 6% you should add about 7% to costs for the next year. If your activities are going to increase from the last year, you will also have to work out how much more you have to allocate to each item.

Under Income in your budget you should use categories like the following:

- Grants from funders – list each funder separately and the amount that is expected from them.
- Membership fees
- Local donations
- Income generated – fees that you charge for your services, sales of publications etc.
- Fund raising events.

You should make it clear in your budget, which of these amounts you have already received, or have an existing a letter of commitment for, and which amounts you are expecting to raise. In the same way that you put the amount spent in the previous year next to your Expenditure column, you should do the same with expected income. This will help to make it clear whether your expected income is realistic.

If you choose not to have a very detailed budget that shows all the calculations, it is very important to have explanatory notes that accompany your budget, where the calculations are clearly explained.

Before you submit your budget to anyone, double-check all your calculations and make sure that it has been worked out and added up correctly. Check your spelling, make sure that the budget is clearly written or typed, and that it is set out in such a way that it is easy for people to look at separate categories and items. Make sure that you have the dates covered by the budget at the top. At the bottom of the budget, you should write the date when the budget was prepared.

Here is an example of a simple organizational budget for an organization that runs public education workshops on Human Rights. It includes a column on the previous year's expenditure and income:

BUDGET FOR 1 MARCH 20010 TO 28 FEBRUARY 2011

EXPENDITURE	**2009/10**	**2011/12**
1. RUNNING COSTS:		
Rent @ R500 per month	5 490	6 000
Phone @ R333 per month	3 665	4 000
Transport	18 540	20 000
10,000km @ R1 per 55ilometer - R15000 2 Return National Airfares – R4 000 Public Transport – R1 000		
Equipment hire	1 920	2 400
Copier @ R200 per month		
2. CAPITAL COSTS		
Computer @ R7000		7 000
3. STAFF COSTS		
Salaries:	100 000	110 500
Coordinator @ R5000 x 13 mths: R65 000 Administrator @ R3500 x 13 mths: R45 500		

Levies and benefits:	8090	8 500
4. PROJECT COSTS		
Publicity:	2 890	3 300
100 posters @ R3 10 000pamphlets @ R0.30		
Venue hire	5 010	6 000
30 workshops x R200		
Catering;	9 200	10 000
1 000 people x R10		
Materials	9 872	10 000
1000 people x R10		
5. CONTINGENCY	8 909	9 385
@ 5% of R187 700		
TOTAL EXPENDITURE	**173 586**	**197 085**

INCOME

1. DEFINITE INCOME	**2009/10**	**2011/12**
Funder X	50 000	60 000
Funder Y	45 000	nil
Funder Z	45 000	45 000
2. EXPECTED INCOME		
Membership fees	7 900	8 000
Donations	2 300	2 500
Fundraising	23 900	25 000
TOTAL	**174 100**	**140 500**
Deficit		**-56 585**

LIST OF DONATIONS IN KIND:

Office furniture	5 000
Free use of meeting venue	2 400
TOTAL	7 400

This budget shows a deficit of R56 583 which the organization will have to raise. If they cannot do this, they will have to cut their costs by that amount.

How do you use a budget for financial management?

Once you have drawn up and finalized your budget, it becomes the most important tool for financial management in your organization. To manage your finances, you should:

- Analyze projected income and expenditure and Identify shortfalls and make plans to raise the deficit
- Cut costs if needed
- Monitor monthly spending

Analyze projected income and expenditure

In your budget, you have all your different expenditures first and then all your different sources of income. The budget alone cannot tell you which sources of income will pay for which expenditures.

It is useful to draw up a table that will show this more clearly. Here is an example:

ITEM	Funder A	Funder B	Members fees	Funds needed	TOTAL
Running Costs	10 000	20 000	5 000	5 000	40 000
Staff Costs	20 000	40 000	5 000	35 000	100 000
Project costs	50 000	60 000		40 000	150 000
TOTAL	80 000	120 000	10 000	80 000	290 000

On the left-hand side of the table are the items of expenditure: running costs, staff costs, project costs. On the right side are the totals you have in your budget for each of these items. Each source of income is then listed in a column, with the amount from that source that is allocated to each item of expenditure.

So, for example, Funder B in Column 2 will give you R120 000 and is paying for 40% of your salary costs, half of your running costs and R60 000 towards your project costs.

The membership fees in Column 3 will pay for a small part of your running and staff costs but does not cover any project costs.

Once you have filled in all the columns, you can then add up each item to see whether you have reached the total income that you need to pay for all the expenses you will have in that category.

If there is a shortfall, it should be written in the column, Funds Needed. This is your deficit and is the amount what you will have to fundraise for. Decide if it is realistic and possible to raise that amount and make plans to do so immediately. If it is not possible, your only alternative is to cut the expenses in your budget.

Manage costs effectively (minimize/manage risk)

No organization can plan to run with a deficit. It simply means that at some point in the year you will run out of money, your staff will not be paid, your offices will close, and your projects will collapse. If you are forced to cut costs, do it as early as you can so that you can plan to do the least possible damage.

When you are trying to cut a budget, it is important to categorize the different items under expenditure into those that are absolutely essential for your organization to survive and those that are not essential. This will guide you and help you decide which cuts you can make. When you look at the expenditure items, you should also decide if any of them can be found in kind rather than in money. For example, if you have a salary budget for 10 people, can you budget for only 5 people and use volunteers to do the rest of the work? Or if you have a budget for office furniture, can you try to get donations of furniture from businesses in your area, instead of buying them.

Cost cutting can be difficult and painful. It may involve people losing their jobs or projects closing down. But if you do not have the money you have no choice.

There are two very important rules in financial management for organizations:

1. Do not spend on an item that there is no income for.
2. Do not borrow money, since you are not a business and have no assurance of income in the year ahead.

Monitoring

You cannot monitor your budget and use it for financial management, unless you have a proper bookkeeping system. Your financial records should be added up at the end of every month and you should check against the budget to see how much money has been spent in each category.

It helps to divide your budget into the 12 months of the year so that you can tell at a glance whether you are over-spending on an item or not. So, for example, if your budget for telephone costs is R6000 per year, you should spend around R500 per month on your phone bills.

You should monitor spending in two ways:

1. The amount spent each month should be checked against the amount allowable in each month, and
2. The accumulated amount that you have spent that year should be checked against the amount allowed for the number of months that have passed. It is not good enough to only check the monthly expenditure since you will spend much less in holiday months than in very busy months.

Proper monitoring of your expenses should happen every month if possible, but at least every 2 months at a minimum. When you give financial reports to your executive or your members, it should be done in a format that makes it easy for people to compare the expenditure to the budget. A detailed financial statement is not a very useful way to report, since most people cannot easily understand accounting detail. It is much better to report by showing people the budget, and the amounts spent so far.

For example, you can show your running costs like this:

Item	Budget	Budget for 2 mths	Spent 1st 2 mths	Difference
Phone	6 000	1000	1420	420
Copier	5 000	832	720	-112
Rent	6 000	1000	1 000	nil
Insurance	2 400	400	390	10
Total	19 400	3 232	3 530	298

In this example the organization overspent by R298 in two months. The reasons for overspending on the phone bill should be analyzed. There are three options:

1. Manage costs on the phone bill
2. Change the budget and allocate extra funds from another item
3. Find more money for the budget as a whole

If costs cannot be cut, the budget should be changed to accommodate this spending pattern. The best way to re-allocate funds is to do it within a category – so to take from one part of running costs and add it to the phone budget. In this example it would be possible to take some

of the copier budget and re-allocate it. It is not always this simple and often the money has to be found by cutting project costs. If donor's funds are involved in the changed allocation, they should be consulted.

If the overspending means that there will be a shortfall of funds, immediate action should be taken to raise more funds.

BUDGET VARIANCES, MONITORING AND REPORTING DISCREPENCIES FOR REMEDIATION

Budgets are prepared annually to estimate future financial positions. Accounting department creates monthly reports that show both the budgeted amounts and the realized amounts. Accountants use these reports to calculate the difference between the budget and actual amounts, called the variance. Accounting then works with individual departments to understand the variances.

A variance report is a way for business executives to gauge their company's performance by comparing one set of figures to another. This usually means comparing a planned amount to an actual amount. Companies frequently use variance reports to analyze how close they've come to hitting forecasted sales targets or to see if they've met their budgetary goals. A well-rounded budget variance report will address trends, overspending, and under spending.

Trends: In challenging economic times, it is important for businesses to carefully monitor overspending and under spending. If there is a trend towards either, then the entire budget may need to be revisited. A graphic depiction of trends should reveal to the analyst if there are minor budget lapses or if there is a more serious problem.

Overspending: Overspending: this can pose a serious threat to the project, to other projects, and to the company if resources are scarce.

Under Spending: Under spending may indicate a problem in quality control (i.e., the manufacturing process may be cutting corners) if the project budget was correct at first. It can be as serious a problem as overspending.

Financial Statements

A financial statement (or financial report) is a formal record of the financial activities of a business, person, or other entity.

For a business enterprise, all the relevant financial information, presented in a structured manner and in a form easy to understand, are called the financial statements.

They typically include four basic financial statements, accompanied by a management discussion and analysis:

1. Statement of Financial Position: also referred to as a balance sheet, reports on a company's assets, liabilities, and ownership equity at a given point in time.
2. Statement of Comprehensive Income: also referred to as Profit and Loss statement reports on a company's income, expenses, and profits over a period of time. A Profit & Loss statement provides information on the operation of the enterprise. These include sale and the various expenses incurred during the processing state.
3. Statement of Changes in Equity: explains the changes of the company's equity throughout the reporting period
4. Statement of cash flows: reports on a company's cash flow activities, particularly its operating, investing and financing activities.

For large corporations, these statements are often complex and may include an extensive set of notes to the financial statements and explanation of financial policies and management discussion and analysis. The notes typically describe each item on the balance sheet, income statement and cash flow statement in further detail. Notes to financial statements are considered an integral part of the financial statements.

Purpose of producing a financial statement

The objective of financial statements is to provide information about the financial position, performance and changes in financial position of an enterprise that is useful to a wide range of users in making economic decisions.

Financial statements should be understandable, relevant, reliable and comparable. Reported assets, liabilities, equity, income and expenses are directly related to an organization's financial position.

Financial statements are intended to be understandable by readers who have "a reasonable knowledge of business and economic activities and accounting and who are willing to study the information diligently. Financial statements may be used by users for different purposes:

- Owners and managers require financial statements to make important business decisions that affect its continued operations. Financial is then performed on these statements to provide management with a more detailed understanding of the figures. These statements are also used as part of management's annual report to the stockholders.

- Employees also need these reports in making collective bargaining agreements (CBA) with the management, in the case of labour unions or for individuals in discussing their compensation, promotion and rankings.

- Prospective investors make use of financial statements to assess the viability of investing in a business. Financial analyses are often used by investors and are prepared by professionals (financial analysts), thus providing them with the basis for making investment decisions.

- Financial institutions (banks and other lending companies) use them to decide whether to grant a company with fresh capital or extend debt securities (such as a long-term bank loan or debentures) to finance expansion and other significant expenditures.

- Government entities (tax authorities) need financial statements to ascertain the propriety and accuracy of taxes and other duties declared and paid by a company.

- Vendors who extend credit to a business require financial statements to assess the creditworthiness of the business.

- Media and the general public are also interested in financial statements for a variety of reasons.

Identifying financial statement information

When analyzing financial statement information, the general purpose and elements of financial statements used in various organizations should be correctly identified. We look at the balance sheet and income statement. Elements include assets, liabilities, ownership interest, income, expenditure, contribution from owners, distribution to owners, and gains and losses. The relationship between elements within financial statements is identified and explained, and includes financial profitability, liquidity, efficient use of resources and a company's financial position.

BALANCE SHEET

In financial accounting, a balance sheet or statement of financial position is a summary of the financial balances of a sole proprietorship, a business partnership, a corporation or other business organization for a specific financial period.

Assets, liabilities and ownership equity are listed as of a specific date, such as the end of its financial year. A balance sheet is often described as a "snapshot of a company's financial condition. Of the four basic financial statements, the balance sheet is the only statement which applies to a single point in time of a business' calendar year.

A standard company balance sheet has three parts: assets, liabilities and ownership equity. The main categories of assets are usually listed first and typically in order of liquidity. Assets are followed by the liabilities. The difference between the assets and the liabilities is known as equity or the net assets or the net worth or capital of the company and according to the accounting equation, net worth must equal assets minus liabilities.

Another way to look at the same equation is that assets equal liabilities plus owner's equity. Looking at the equation in this way shows how assets were financed: either by borrowing money (liability) or by using the owner's money (owner's equity). Balance sheets are usually presented with assets in one section and liabilities and net worth in the other section with the two sections "balancing."

A balance sheet summarizes an organization or individual's assets, equity and liabilities at a specific point in time. There are two forms of balance sheet. They are the report form and the account form. Individuals and small businesses tend to have simple balance sheets. Larger

businesses tend to have more complex balance sheets, and these are presented in the organization's annual report.

Large businesses also may prepare balance sheets for segments of their businesses. A balance sheet is often presented alongside one for a different point in time (typically the previous year) for comparison.

INCOME STATEMENT

An Income statement is also referred to as profit and loss statement, a revenue statement, a statement of financial performance, an earnings statement, an operating statement, or a statement of operations. It is a company's financial statement that indicates how the revenue (money received from the sale of products and services before expenses are taken out, also known as the "top line") is transformed into the net income (the result after all revenues and expenses have been accounted for, also known as Net Profit or the "bottom line").

It displays the revenues recognized for a specific period, and the cost and expenses charged against these revenues, including write-offs (e.g., depreciation and amortization of various assets) and taxes. The purpose of the income statement is to show managers and investors whether the company made or lost money during the period being reported. The important thing to remember about an income statement is that it represents a period of time. This contrasts with the balance sheet, which represents a single moment in time. Charitable organizations that are required to publish financial statements do not produce an income statement. Instead, they produce a similar statement that reflects funding sources compared against program expenses, administrative costs, and other operating commitments. This statement is commonly referred to as the statement of activities. Revenues and expenses are further categorized in the statement of activities by the donor restrictions on the funds received and expended.

The income statement can be prepared in one of two methods. The Single Step income statement takes a simpler approach, totaling revenues and subtracting expenses to find the bottom line. The more complex Multi-Step income statement (as the name implies) takes several steps to find the bottom line, starting with the gross profit. It then calculates operating expenses and, when deducted from the gross profit, yields income from operations. Adding to income from operations is the difference of other revenues and other expenses. When combined with income from operations, this yields income before taxes. The final step is to deduct taxes, which finally produces the net income for the period measured.

Income statements should help investors and creditors determine the past financial performance of the enterprise, predict future performance, and assess the capability of generating future cash flows through report of the income and expenses. However, information of an income statement has several limitations:

- Items that might be relevant but cannot be reliably measured are not reported (e.g. brand recognition and loyalty).
- Some numbers depend on accounting methods used for example using first in first out (FIFO) or last in first out (LIFO) accounting to measure inventory level.
- Some numbers depend on judgments and estimates for example depreciation expense depends on estimated useful life and salvage value.

Names and usage of different accounts in the income statement depend on the type of organization, industry practices and the requirements of different jurisdictions.

If applicable to the business, summary values for the following items should be included in the income statement:

Operating section

- Revenue – Cash inflows or other enhancements of assets of an entity during a period from delivering or producing goods, rendering services, or other activities that constitute the entity's ongoing major operations. It is usually presented as sales minus sales discounts, returns, and allowances. Every time a business sells a product or performs a service, it obtains revenue. This often is referred to as gross revenue or sales revenue.
- Expenses – Cash outflows or other using-up of assets or incurrence of liabilities during a period from delivering or producing goods, rendering services, or carrying out other activities that constitute the entity's ongoing major operations

- Cost of Goods Sold / Cost of Sales – represents the direct costs attributable to goods produced and sold by a business (manufacturing or merchandising). It includes *material costs*, *direct labour*, and *overhead costs* (as in absorption costing), and excludes operating costs (period costs) such as selling, administration and advertising
  - Selling, General and Administrative expenses (SGA) – consist of the combined payroll costs. SGA is usually understood as a major portion of non-production related costs, in contrast to production costs such as direct labour.
  - Selling expenses – represent expenses needed to sell products (e.g. *salaries of sales people, commissions and travel expenses, advertising, freight, shipping, depreciation of sales store buildings and equipment*, etc.).
  - General and Administrative (G&A) expenses – represent expenses to manage the business (*salaries of officers / executives, legal and professional fees, utilities,*

insurance, depreciation of office building and equipment, office rents, office supplies, etc.).

- Depreciation / Amortisation – the charge with respect to fixed assets / intangible assets that have been capitalized on the balance for a specific (accounting) period. It is a systematic and rational allocation of cost rather than the recognition of market value decrement.

Expenses recognized in the income statement should be analyzed either by nature (raw materials, transport costs, staffing costs, depreciation, employee benefit etc.) or by function (cost of sales, selling, administrative, etc.). If an entity categorizes by function, then additional information on the nature of expenses, at least, – depreciation, amortization and employee benefits expense – must be disclosed. The major exclusive of costs of goods sold, are classified as operating expenses. These represent the resources expended, except for inventory purchases, in generating the revenue for the period. Expenses often are divided into two broad sub classifications selling expenses and administrative expenses.

Non-operating section

- Other revenues or gains – revenues and gains from other than primary business activities (for example *rent*, *income from patents*). It also includes unusual gains that are either unusual or infrequent, but not both (for example *gain from sale of securities* or *gain from disposal of fixed assets*)

- Other expenses or losses – expenses or losses not related to primary business operations, (for example *foreign exchange loss*).

- Finance costs – costs of borrowing from various creditors (for example interest expenses, *bank charges*).

- Income tax expense – sum of the amount of tax payable to tax authorities in the current reporting period (current tax liabilities/ tax payable) and the amount of deferred tax liabilities (or assets).

Sample Products Co.

Income Statement

For the Five Months Ended May 31, 2012

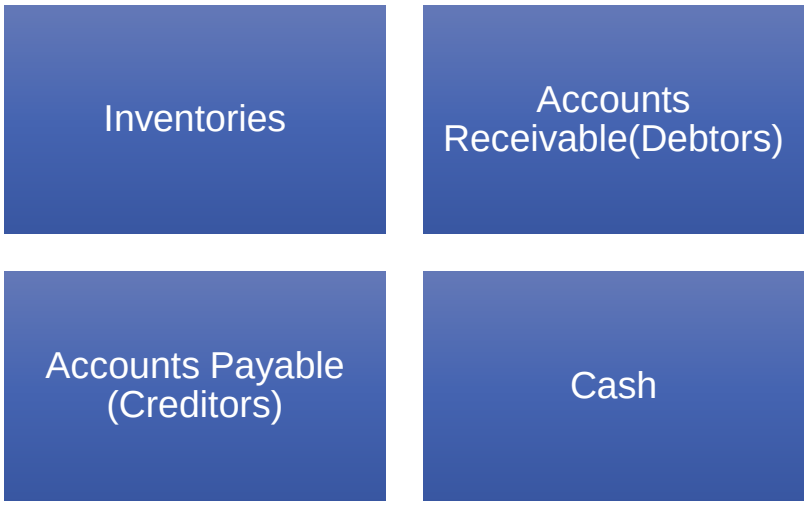
Sales		100,000
Cost of Goods Sold		75,000
Gross Profit		25,000
Operating Expenses		
Selling Expenses		
Advertising Expense	2,000	
Commissions Expense	5,000	7,000
Administrative Expenses		
Office Supplies Expense	3,500	
Office Equipment Expense	2,500	6,000
Total Operating Expenses		13,000
Operating Income		12,000
Non-Operating or Other		
Interest Revenues		5,000
Gain on Sale of Investments		3,000
Interest Expense		(500)
Loss from Lawsuit		(1,500)
Total Non-Operating		6,000
Net Income		18,000

An example of an income statement

Managing working capital

The effective management of working capital will increase the profitability of the organization. It also enables managers to concentrate on their jobs without worrying too much about the potential for insolvency. A shortage in working capital can cause a company to not be able to pay its workers or suppliers even though there are sufficient sales and profits. Even in cases where these short-term liabilities can be met, the deterioration of cash flow critically undermines a company's ability to reinvest in the business and ultimately, to survive.

The four factors that affect the amount of working capital are:



The management role that you perform may only influence one of these areas directly but having a clear understanding of them all will give you an insight into how well your organization controls its working capital, and by extension how well it is managed financially.

Debtors

These are entities that owe your organization money. Many organizations have problems caused by slow payment of invoices and this in turn affects working capital and in particular, liquidity.

Chasing up unpaid invoices can be very time consuming and there is a fine line between maintaining a good working relationship with your customers and upsetting them by demanding payment to aggressively.

There are some things you as a manager may be able to do to help:

- Make sure that the payment terms are agreed in advance

- Send out invoices and statements promptly
- Deal with queries quickly and efficiently
- Ask early and ask often, preferably by telephone
- Remember you are only asking for something that has been previously agreed
- Give credit control highest status and priority
- Have comprehensive credit policies
- Concentrate on the biggest debts first

Inventory/Stock

Your aim should always be to keep stock as low as realistically possible and to achieve a high rate of stock turnover. There are three components to what accountants refer to as inventory:

- Raw materials – these are the materials required to produce goods
- Work in Progress – includes partly finished goods and those raw materials and components already committed to production
- Finished goods – are all those goods ready to be sold

Many organizations have sophisticated stock control systems, which keep track of stock levels. Once a pre-determined level of stock is reached, an order is automatically generated so that items are never entirely out of stock. In this way minimum levels of stock are held, and supply is replenished.

Creditors

Many organizations adopt a policy of delaying payment of suppliers as long as possible. There is an obvious advantage in adopting such a policy as the purchaser is effectively getting an interest-free loan from the supplier.

There is, however, some disadvantages in adopting such a strategy:

- Suppliers will be reluctant to give discounts
- Suppliers my treat you as a problem customer and make all your requests the lowest priority
- It will become harder to change suppliers because you will have a reputation of being a slow payer
- Suppliers will also be reluctant to extend credit if you have a crisis

Cash

It is quite common for an organization to be profitable but short of cash. There are several reasons why this may happen:

- Spending on materials before goods are sold
- Capital expenditure, in the form of buying equipment, has an immediate impact on the cash available.
- Sales tax and taxes on profit can both take cash out of an organization and cannot normally be deferred without incurring a penalty of some sort.
- Money may be collected from customers more slowly than expected. This often happens when sales people are motivated to bring in revenue but have no responsibility for, or interest in, enforcing the payment terms.

To avoid your organization becoming “cash insolvent”; it is essential that you and all the company’s managers accurately forecast and monitor their area’s cash receipts and payments.

As a manager, you need to plan for the unknown costs and to allow some contingency for unanticipated problems, e.g. late payment by a customer or a supplier withholding raw materials until payment has been processed.

This type of planning is usually referred to as cash flow forecast and should be part of your overall budget management process. A Cash Flow Forecast includes known costs plus an allocation for unexpected costs.

Assessing financial performance

The ability to evaluate the financial position of an organization is a valuable skill for any manager to have.

Key Financial Ratios assess the financial performance of an organization.

A key financial ratio is calculated by comparing certain values taken from an organizations financial statements, including the income statement, balance sheet and cash flow statement.

Generally, financial ratios are not useful unless they are benchmarked against something else, for example past performance or another organization in the same business area.

Key financial ratios allow for useful comparisons between:

- Organizations in the same industry sector
- Different time periods for the same organization
- An organization and its industry average

There are several different key financial ratios and they are categorized according to the financial characteristic they measure. These are:

- Solvency
- Profitability
- Performance
- Investment

Solvency

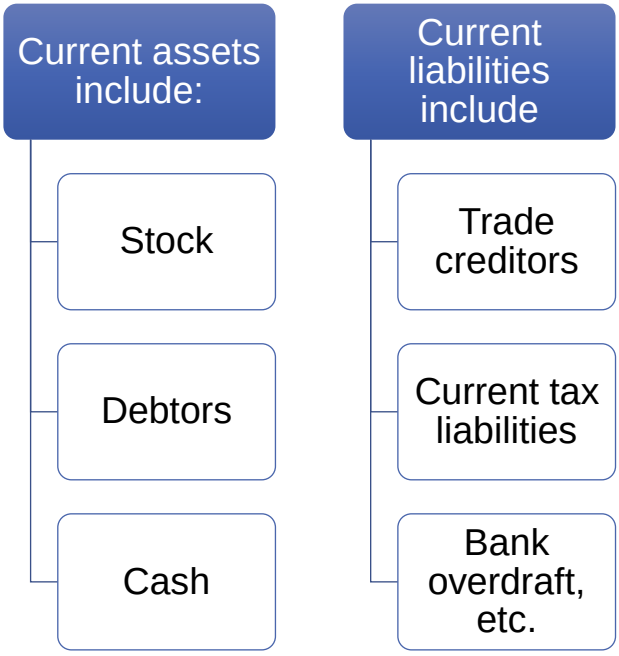
An organization is considered to be solvent when it can pay its debts as they fall due. In day-to-day terms, this means that an organization has enough working capital to pay its suppliers.

There are two key ratios that can help you to determine whether an organization is solvent:

- Current ratio
- Quick ratio

Current ratio

The current ratio looks at the relationship between current assets and current liabilities. The word “current” implies short-term assets of liabilities, which are payable or receivable within one year.



These figures are always shown on the balance sheet. To calculate this ratio you would divide current assets by current liabilities:

For example:

An organization has:

- *Current assets of R200 000*
- *Current liabilities of R100 000*

Its current ratio calculation would be R200 000 ÷ R100 000

The current ratio would be expressed as 2:1

This ratio of 2:1 would be considered a healthy result as it shows that the organization has sufficient current assets to pay its current liabilities as soon as they are due.

Quick ratio

The quick ratio, or acid test, measures liquidity more precisely than the current ratio. It does not include the value of stock within current assets because turning stock into cash takes time since payment terms are usually anything between 20 and 90 days.

You can calculate the quick ratio by dividing current assets (excluding stock) by current liabilities. You can find the stock or inventory figure on the balance sheet.

For example:

An organization has:

- *Current assets of R200 000*
- *Stock worth R80 000*
- *Current assets (less stock) of R120 000*
- *Current liabilities of R100 000*

Its current ratio calculation would be R120 000 ÷ R100 000

The current ratio would be expressed as 1:2:1

This example shows that an apparently healthy level of current assets might hide the fact that a large proportion of the current assets is made up of stock. Whilst this can usually be turned into cash, it will take time and to do it quickly might require heavy discounting.

When you need to review the liquidity of an organization, it is common practice to calculate both the current ratio and quick ratio. This is so that you are aware of the extent to which

stock held influences its current assets. It is vital that you understand what the organization actually does and the industry it operates in before you draw any conclusions from these ratios.

How profitable is an organization?

You can see if an organization is profitable by looking at the income statement, but you need to put that profit into perspective. This can be done by looking at various ratios that compare profit as a percentage of sales or assets.

There are three ways this can be achieved:

- Gross profit margin
- Net profit margin
- Return on assets

Gross profit margin

One of the most commonly used ratios is the gross profit margin, which looks at gross profit as a percentage of turnover (sales). You will find both of these figures in the income statement.

Gross Profit Margin = Gross Profit ÷ Turnover

The formula used is gross profit divided by turnover, multiplied by a hundred to turn it into a percentage.

For example:

An organization's

- *Gross profit is R300 000*
- *Sales/Revenue were R 1 200 000*

Its percentage gross profit margin would be (R300 000 ÷ R 1 200 000 x 100 = 25%

This means that for every R1 of sales the organization achieves profit (after taking off the costs of production) is 25 cents.

Net profit margin

This ratio is similar to the gross profit margin but looks at net profit as a percentage of turnover. Net profit is shown on the income statement and is defined as follows:

Net profit is the figure left after all operating and non-operating expenses have been deducted from total revenue or income.

To calculate the net profit margin of an organization as a percentage you would divide net profit by total revenue or income and multiply the answer by a hundred to turn it into a percentage.

Net Profit Margin = Net Profit ÷ Total Sales

For example:

An organization's

- *Sales/Revenue was R 1 200 000*
- *Net profit is R 120 000*

Its percentage net profit would be: R120 000 ÷ R 1 200 000 x 100 = 10%

You need to be mindful that your net profit is calculated after taking into account of all costs and therefore can be affected by a variety of things, such as:

- Declining gross profit
- Increased selling
- Rising administration costs

If your net profit percentage is declining it is worth looking at your costs on an individual basis to see what you can do about those that have increased the most as a proportion of the sales.

It is important to look at the trend that emerges over several accounting periods, as opposed to individual figures. The ratios can be used to measure periods other than a full year, as long as you have the relevant income statement.

NOTE:

- Whilst you can compare the ratios of organizations in different industries is usually of limited value because of differences in market conditions, capital requirements and competition.
- The trend over time is often more revealing than one figure in isolation and that comparisons between industries may not be very useful.

You must have a clear understanding of what the organization actually does and the industry it operates in before you draw any conclusions from these ratios.

When making comparisons using key financial ratios you must select one of the following was to perform this action:

- Organizations in same sector
- Different time periods for same organization
- An organization to its industry average

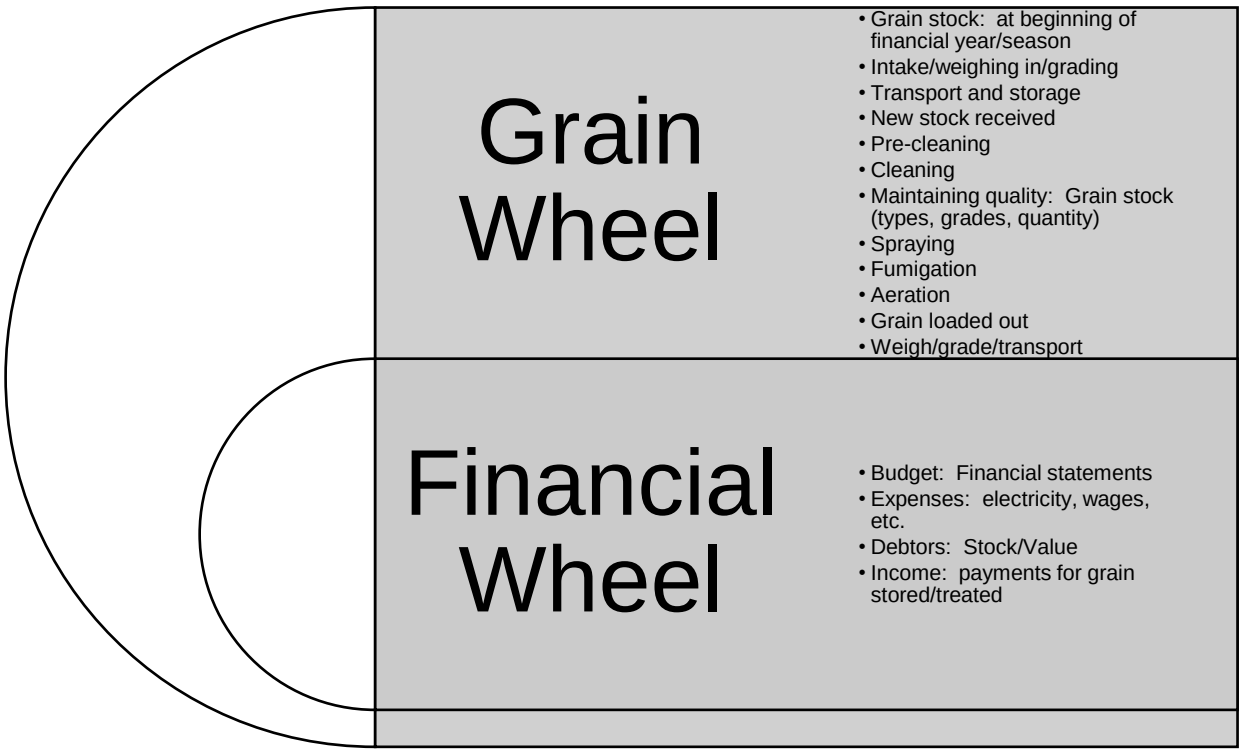
If you wish to make global comparisons, you need to consider:

- Seasonal influences on markets
- Different national market practices

Applying the financial principles in the grain storage business

Most of the activities that take place at silos, have a money value implication. A bulk grain handling business has a budget for income and expenses that are expected, receive new stock during the season and out-load of stock if and when needed. The business's money of cash flow has a similar cycle of available funds that decrease or increase with the different operational expenses or income. The final financial value of a bulk grain handling business is based on the assets (buildings, structure, machinery, stock, cash, debtors) minus the liabilities (loans, creditors).

The financial wheel is a specific sequence or circle that indicates the logical order of activities in a business.



Transactions at a bulk grain handling business are captured daily on a computer and then summarized daily, monthly, quarterly and annually. Separate records or books or journals are kept for the intake (receipt) and out-loading (dispatching) of stock. Similar transactions are summarized in a general ledger that contains separate accounts for the stock of every class and grade of grain and screenings; all the transactions for each producer (stock delivered and dispatched; charges and fees; credits); other suppliers or creditors for products and services delivered (including electricity and the maintenance costs of machines); and internal transactions (salaries, wages, administration, transport, marketing, etc.)

Module 4: FACILITY AND EQUIPMENT MAINTENANCE (KM03-KT04)

Learning outcomes

- Demonstrate an understanding of preventative maintenance management and inspection methods (including, planned preventative maintenance, Inspection methods)
- Demonstrate an understanding of grain handling equipment maintenance principles and concepts (including Maintenance requirements for grain handling mechanical and electrical equipment, interpretation of operation and maintenance budgets, Use of operation and maintenance manuals)

Principles of Planned Maintenance

The purpose of planning and implementing maintenance of machinery and equipment are to:

- Diagnose faults and repair them before breakdowns occur
- Minimize delays in grain handling
- Repair machines or replace worn components routinely to decrease or eliminate repair costs at a later stage
- To optimize the lifespan of machinery and equipment

A planned maintenance system has the following requirements:

- It must be authorized by management. Every depot manager must ensure, in collaboration with engineering services, that a planned maintenance program is implemented.
- A unique identification for every production machine (inventory or serial number and place)
- The specific maintenance tasks and inspection routines needed for each machine.
- Records must be kept for each machine (costs, corrections, replacing of components, diagnostic tests, checklists completed, inspections, technical reports)

Inspection Techniques

- Checklists
  The condition and working of machinery and equipment should be monitored continuously and checklists must be completed. The information gathered will be based upon sensory and critical observations by the silo operator: to watch, smell, taste, listen and to feel. For example, a high vibration or heat of an engine can be heard or felt.
- Personal observation skills
  The silo operator must at all times be aware of the status of the grain handling processes and actual happenings at the depot in order to identify issues.
- Fault finding and problem solving
  The silo operator should also, beside critically observing the grain handling process, be able to analyze the facts pertaining to the circumstances that he noticed as a fault or a potential problem. To be successful in this, the operator must know that a fault or deviation from the standard procedure has occurred and must know how to rectify the situation. Such a decision can only be made if the operator knows the work procedures, including the correct functioning and maintenance of silo machinery in detail.

Inspection of machinery and equipment

Inspection of machinery takes place in order to comply with the regulations in the Health and Safety Act. Inspections make use of the following aids:

Distance Controlled System

- Limit switches
  Inspect status on control panel of limit switches at every valve, sluice and hopper to ensure that it is firmly fixed and that the lever regulates the arm of the switch. Adjustments to the switches can only be made by the maintenance electrician.
- Labour factor unit
  Inspect and test unit at least two times per shift (bucket elevators are started one-by-one without load). If the unit does not start, the maintenance electrician must be informed. Clean the panel with a dry cloth. The unit should be serviced by a qualified person on a monthly basis.

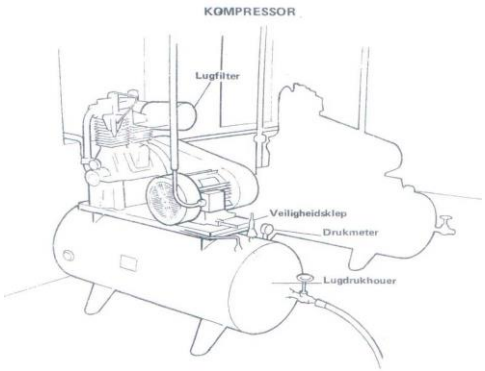
- Control room fan
  An air filter is situated in front of the fan to purify the air. The air filter must always be clean and in working order. It must stay switched on while the silo is in operation because dust can penetrate the control room and cause an explosion.

- Electrical Interlocking
  The operating system of the silo is interlocked to prevent grain being conveyed on incorrect routes. This means that sluices and valves must be interlocked in such a way that two streams of grain cannot be dumped on one belt or flow together. Adjustments must thus be made carefully. Check that grain is withdrawn from the intake container, as well as the correct operation of the conveyor belts, valves, chutes, bucket elevator and front cleaner. If the upper bin belt of the front cleaner is out of order, the grain will be dumped incorrectly. The panel and fuses must be wiped regularly with a dry cloth. Compressed air must not be blown into the panel as it can cause condensation in pipe and a short circuit or explosion.

Electro-pneumatic system

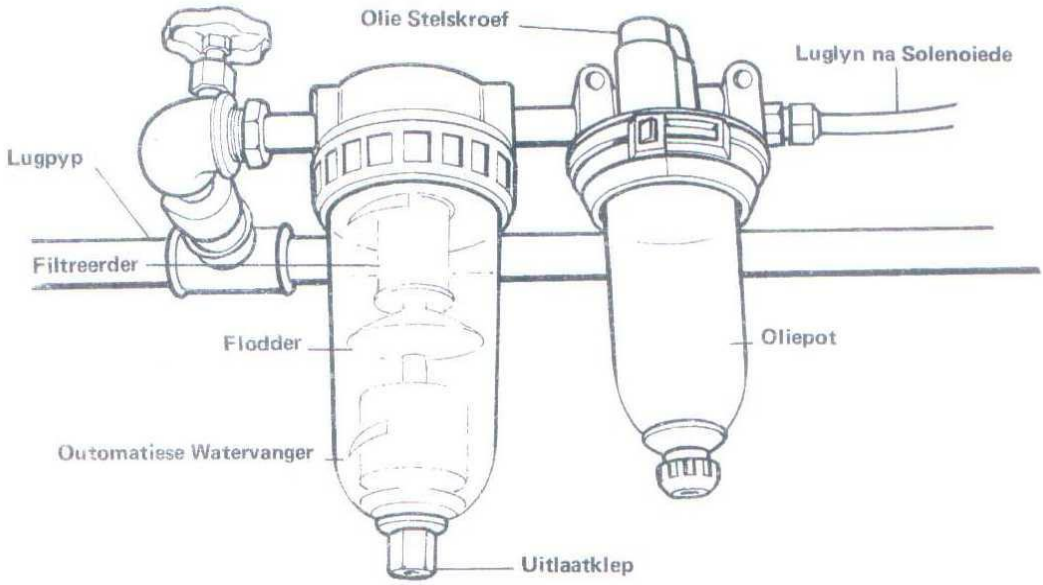
- Compressor
  Routine inspections and tasks will include:

- Compressor room must be well ventilated and clean
- Clean air filters weekly
- Check oil level of compressor daily. Use the oil prescribed by the manufacturer.
- Clean valves of piston once a month.
- Ensure that the cooling grids of rotating compressors are clean and that there is no obstruction that hampers the air flow.
- Top up the water every day if needed.
- Check for unnecessary air leakages.
- Inspect pressure meter reading after the compressor has been switched on.
- Ensure that the safety valve is always with a lock.



- Water bottle

  Wash the bottle at least every two weeks with clean water. Check that the floater of the automatic emptier works effectively. Bottles without an automatic emptier must be emptied once a day.



WATER-OLIEPOT KOMBINASIE

- Oil Bottle

  Check daily and fill up if needed. Clean at least once a month. Oil with a milky colour has mixed with water and must be replaced immediately. Control set-screw for applying the correct amount of oil.

- Pipe work and other accessories

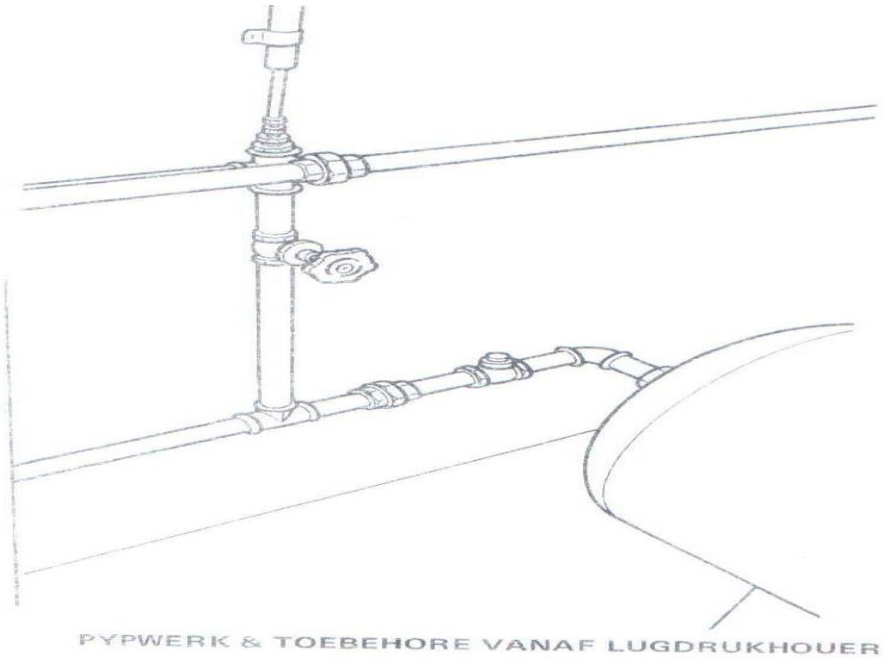
  Control checks include the following:

  - Ensure that there are no leakages in the pipe network. The necessity to limit leakages to the absolute minimum is illustrated in the following table:
  -

Leakages in size in pipe network (mm)	**Air pressure loss @ 7 bar (l/s)**	**KW claim by compressor to make up for loss (based on 300w/l/s)**	**Cost at an average of R0,50/KWh**	
			Per shift	**Per annum**
0,5	0,2	0,06	R 0,27	R 64,80
1,0	0,8	0,24	R 1,08	R 259,20
1,5	1,8	0,54	R 2,43	R 583,20
2,0	3,1	0,69	R3,11	R 745,20

6,0	28,2	8,5	R 38,25	R 9 180,00
10,0	78,1	23,4	R 105,30	R 25 272,00

- Pipe network must be tightened properly against the silo structure to prevent vibrations and subsequent breakages.
- Control that stop valves close tightly.



- Valves

  Valves are a closed unit and don't need much maintenance. The following is however important:
  - Limit switch must be mounted securely and only activated when the valve has closed fully and tightly.
  - Ensure that valve boxes close tightly and that it can move freely (no obstructions or clogging)
  - Report any wear and tear of valve cases.
  - Control the operation of the pneumatic system.
- Latches

  Routine inspections include:
  - Ensure that latches close tightly and move freely in the latch with no obstruction in grooves.
  - Limit switches must be set correctly in order for it to only be activated if the sluice is fully open and closed
  - Control propulsion on pneumatic system. Report excessive wear and tear.

- Bolts and nuts must be tightened properly. Also, components such as solenoids, cylinders and the tooth gear wheel.
- Ensure that side latches of flat-floored bins with three-sluice openings are locked and that the necessary warning signs are in place.
- Valves and screws must be switched on and off at least once every two weeks. Ensure that side latches are locked (remember warning signs).
- Switch valves and sluices on and off at least every two weeks. It must move freely and have no obstruction or rust.
- Especially off-loading pit sluices must be maintained between seasons and regularly switched on to prevent rust or that dust and sand make it jam.

- Duct work

  This is also one of the parts of the silo that are used the most and therefore needs regular inspection:

  - Inspect all ducts regularly. Bolts and nuts must be tight and not stick out on top of the wear plate.
  - Report excessive wear and tear in order for a notification to be made out.

- Smaller holes that leak grain and grain dust can be covered with a small plate with silicon until it can be taken off and fixed properly. Do not use bags and cloths as it is ineffective and still releases dust into the atmosphere. It is also a fire hazard and a source of insect infestation.
- Remove clogging and obstruction continuously.
- Ensure that rubber inspection lids are on and closed tightly.
- Ensure that duct work is dustproof and water tight.
- Clean flanges of duct work regularly as it is a gathering place for dust and insects. Flanges must therefore also close tightly. Again, use silicon if the flanges have been bent too much to close properly.

Receipt, Off-loading and out-loading of grain

- Off-loading pits and grids

  Routine inspections and tasks will include:

  - Check grids frequently and remove any big obstructions and objects. Blow the grid with a compressor from the inside, if possible.
  - Some grids have round rods on the surface. These grids must be welded regularly to prevent damage to vehicle tires.
  - Check whether the grid is firm and level on the supporting framework.
  - Grain in the corners must be removed so as to avoid mixing and contamination.
  - Ensure that oil, fuel and water from the truck does not leak and contaminate the grain. This is especially important where there are pressure beams that tilt the truck.
  - Check that all nuts and bolts on the structure are firmly fixed.
  - Clean chutes and drain pipes regularly to prevent blockages and rust.
  - Check oil levels and pipe network of pressure beams daily.

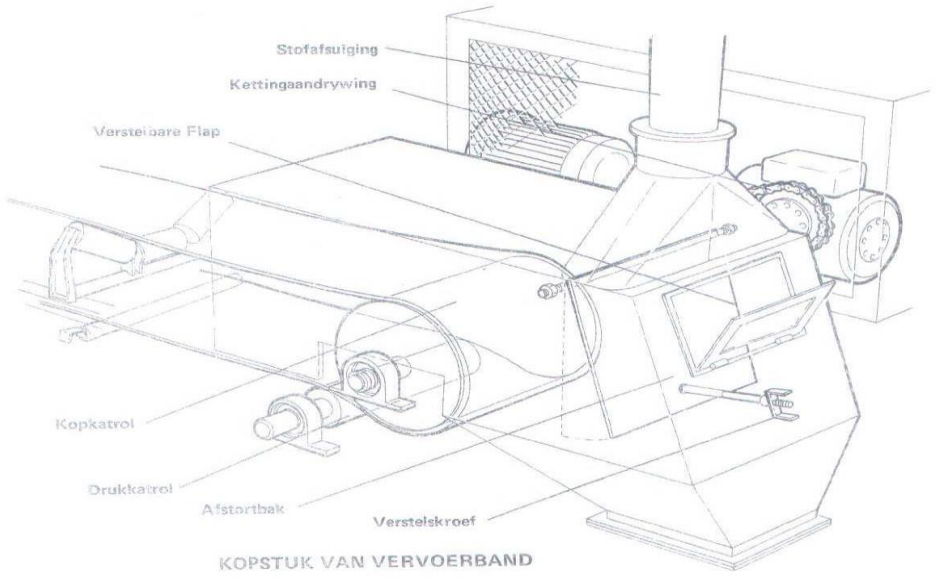
Storage of grain

- Conveyer belts

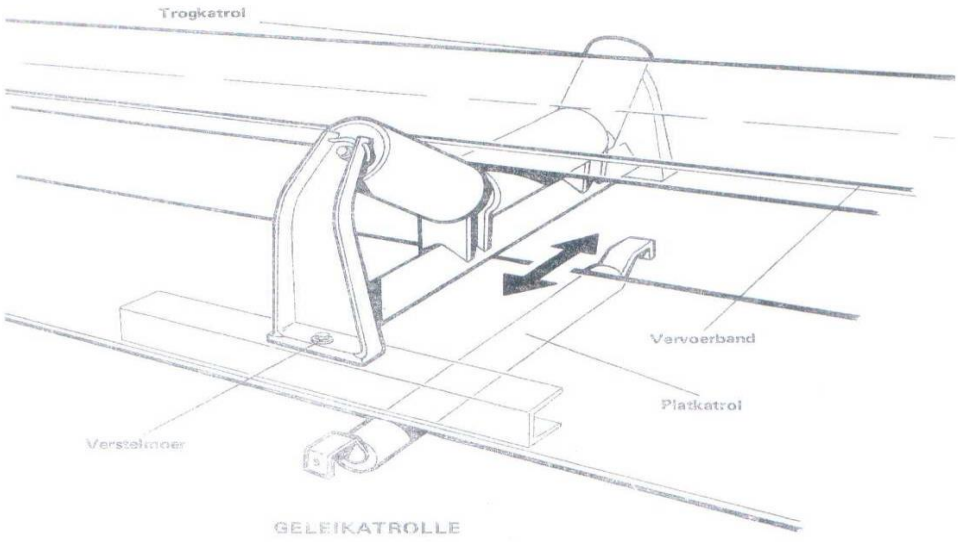
  This is part of the silo that is often used and must thus be maintained properly:

  - Check carrier level, tread and sides of belts carefully as well as the belt joint for possible damage. If damaged, it must be repaired as soon as possible.

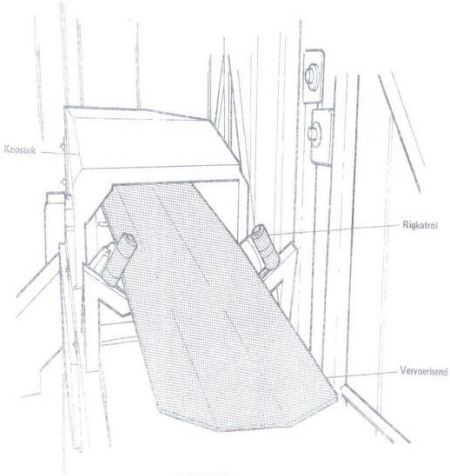
- Ensure that there is no oil, water or strange objects lying on the belt.
- Check that the belt pulls straight (end trough and guide pulley must be aligned)
- Belts must be tight enough. Adjust both nuts on end pulley, especially if the belt doesn't have an automatic weight adjustment. Slack belts wear quickly and become a fire hazard. Belts that are too tight damage the top end and the bearings.
- All pulleys must turn freely; repair or replace if they get stuck.
- Check that enough through pulleys work correctly at the point where grain is dumped on the belt.



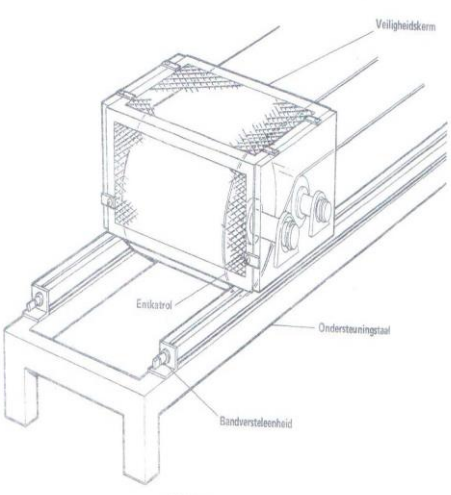
KOPSTUK VAN VERVOERBAND



GELEIKATROLLE



RIGKATROLLE



ENTSTUK VAN VERVOERBAND

- Chain Conveyers

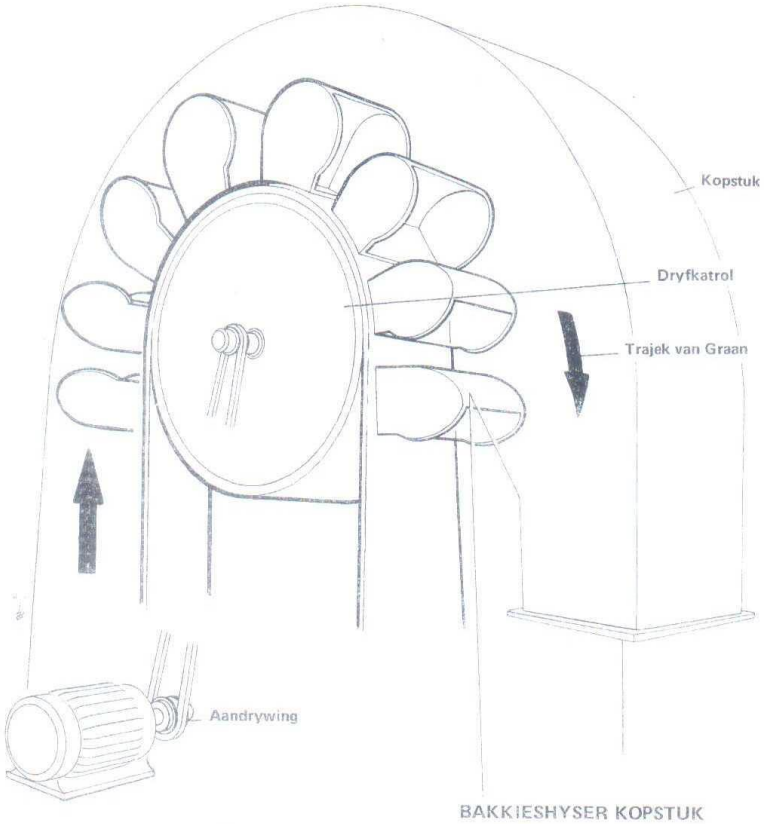
  The following tasks must be carried out:

  - Bearings are packed with grease and don't need further lubrication
  - Set correct tension on chain – the two screws on end piece must be uniformly set. If it is too slack, it causes more wear and tear of chain and wheel. It could also cause more grain breakages.
  - Check propulsion's connection regularly to ensure that it is parallel and concentric.
  - Ensure that the cover closes tightly (water tight, dust proof, tight but easy to remove, clean and not rusted).
  - Remove obstructions and foreign objects on the bottom plate of the driving head.
  - Investigate abrasion and chafing noises and report it.
  - Remove dust and foreign material from the bottom plate on the driving head.
  - If whiplash occurs at the end wheel, the chain may be too slack or distance to lower grain too long.
  - Visual inspections: "circlip/split pin" fastened, cover horizontal, gears and links right side to the front, walking areas safe, shear pin not damaged.

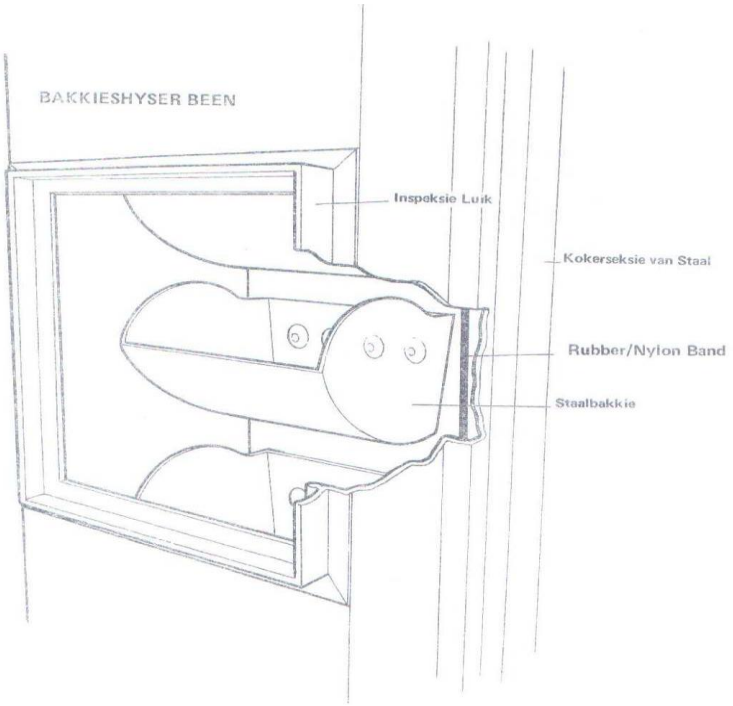
- Bucket elevators

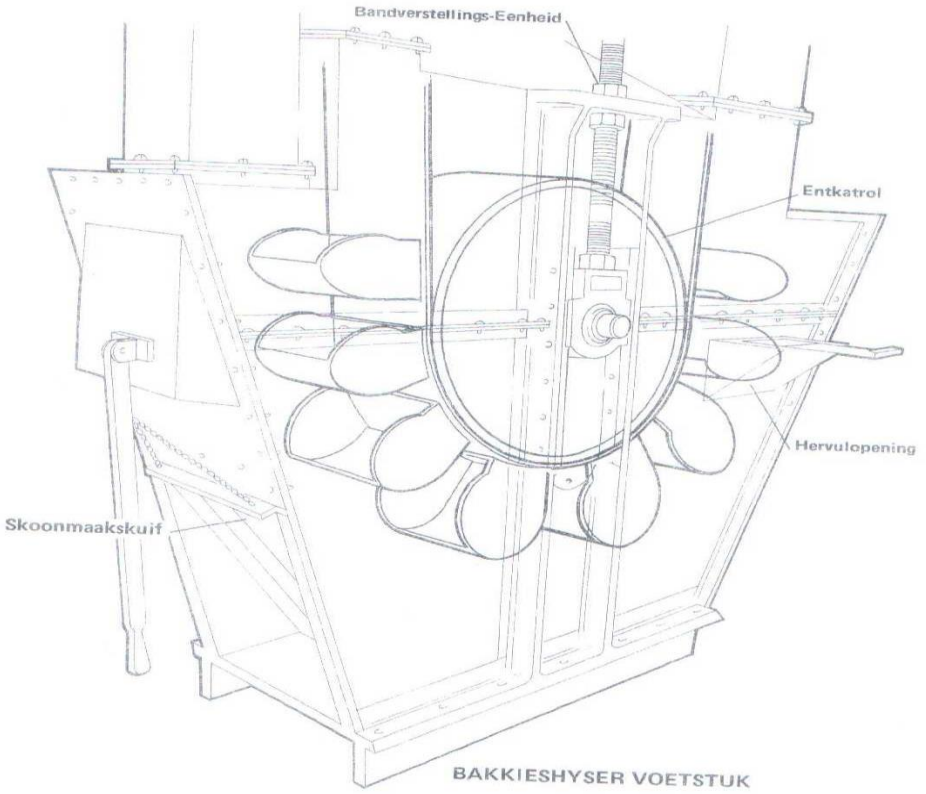
  Controls and tasks include:

  - Check the condition of the thread and sides of the belt carefully and report any damage.
  - Check the condition of the belt joints carefully and whether the bolts and nuts are securely fastened. There must be no damage.
  - Ensure that all buckets are bolted tightly onto the conveyer belt.
  - Ensure that the belt moves straight. The drives and end pulley must be perpendicular on top of each other.
  - Inspect the conduction of belts through windows in elevator legs and listen for scraping or thumping noises.
  - Check belt tension frequently, especially where screw adjustments may be necessary and with new belts. With automatic weight adjustments check if the tension rig moves the guides.
  - Check inspection openings and latches frequently.
  - Inspect bucket elevator covers for dust leakages.
  - Inspect air valves for working of dust suction.
  - Check for wear and tear in pedestal at head piece and covers.
  - Check that the tonnage of grain in the pedestal is not too much and that the belt doesn't move too fast as it will cause the grain to fall back. The motor can overload and kick out.
  - The back-stop on the steering mechanism must work properly to prevent the belt from running back. Delays will be caused because the pedestal must first be emptied.



BAKKIESHYSER KOPSTUK



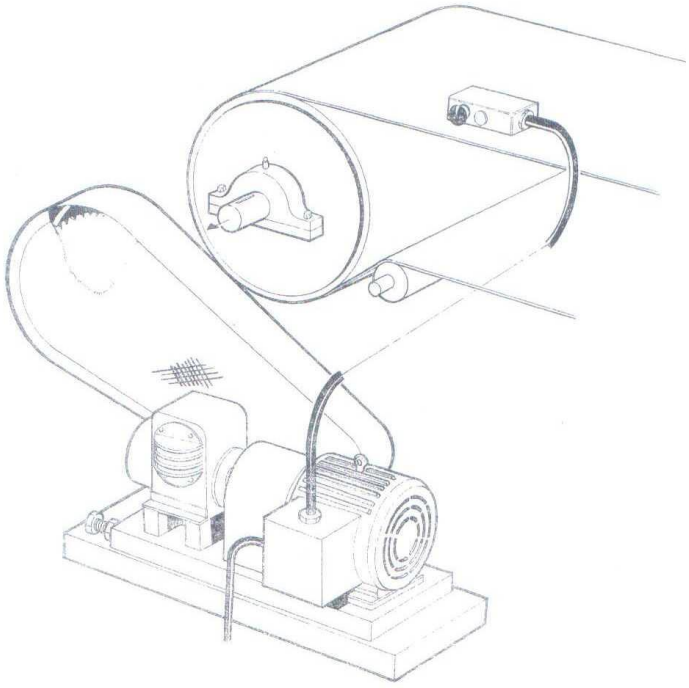


- Propulsions

  The driving components are highly sophisticated and expensive machines without which the silo as a system cannot function:

  - Inspect every machine after it has been switched on. Listen for any unnatural scraping, grinding and thumping noises.
  - Feel with the palm of the hand if any components become unnaturally warm during use.
  - Flexible drag-links may not be in contact with each other.
  - Check oil level at hydraulic clutches frequently (Tellus 32 oil)
  - Gear box must be fitted tightly and not able to move around.
  - Tow bar of gear box must be in position and fitted tightly with no bending possible.
  - Tension on V-belts and chains must not be too tight or slack. Where chains are too tight, it strains the tooth gear and axis. A chain that is too slack causes too much wear and tear to the tooth gear.
  - V-pulleys and cog-wheel must be in line.

- Report oil leakages at gearboxes so that a notification can be made out. It could be due to over-filling, leaking seal, blocked ventilator.
- All components must be fitted tightly on their foot plates.
- Motors must first run at full speed before any load is put on it and it must not be switched on and off.
- To lubricate bearings, propulsions must be started at least every two weeks. It prevents rust.
- Fan and fan lid must be fitted tightly and must be clean. Its purpose is to protect the motor against overheating.
- The operator may NOT grease the motor.
- Ensure that the safety screen is placed back after working on the equipment. Under no circumstances may the equipment be started before the screen is in place.
- Look for the forming of sparks on the brushes of slip-ring motors.
- With a liquid or automatic transformer type of starting method, the motor may not be started more than once every half hour.
- Screens on moving parts of propulsions must be fitted tightly and not rub or scrape against anything.
- Replenish gear box oil by draining, cleaning oil pans and filling up with the correct grade oil.
- When not in use, start motors every two weeks to prevent rust.



TIPIESE AANDRYWING BY KOPSTUK

- Mass meters

  Routine checks include:

  - If there is doubt about the accuracy of a mass meter, it must be withdrawn from use immediately and be repaired.
  - It must at all times be clean and ready for operation.
  - Do mass meter testing frequently with both heavy and light masses.
  - Keep a record of tests, tickets and calibrating certificates for control purposes.
  - The wheels of trucks must stand freely. Trucks must first be switched off and must be weighed without driver and passengers.
  - The capacity of the mass meter may not be exceeded.

- Drainage pumps

  Pumps must always be in clean and working condition:

  - Remove grain, chaff and obstructions from the drain as it can damage the pump.
  - Remove obstructions in the drainage pipe since it can hamper the pumping out of water. Also remove rust in pipe work.
  - Control that the one-way valve functions correctly and ensure that water in the pipe cannot flow back.
  - Remove lime from pumps, pipes and supply taps at the drain to prevent clogging.
  - Check that the floater can move freely.
  - Sensors at electro-sensor type motors must not be placed in damp areas especially not in the sides of the gathering points.

- Service elevator

  The elevator must comply with the safety requirements of the OHS Act. Adjustments and repairs must be done by qualified service elevator artisans. Important aspects are the following:

  - Comply with the limit of the permissible load as shown in the elevator.
  - Don’t transport heavy equipment that can roll around.
  - Don’t force the doors open when the elevator is moving or not standing directly over a landing.
  - Ensure that the door closes tightly when leaving the elevator, otherwise the elevator will not be able to move.
  - Ensure that the machine room, lift and elevator entrances are always clean and without obstructions.
  - Control that all maintenance services are done monthly according to the schedule.

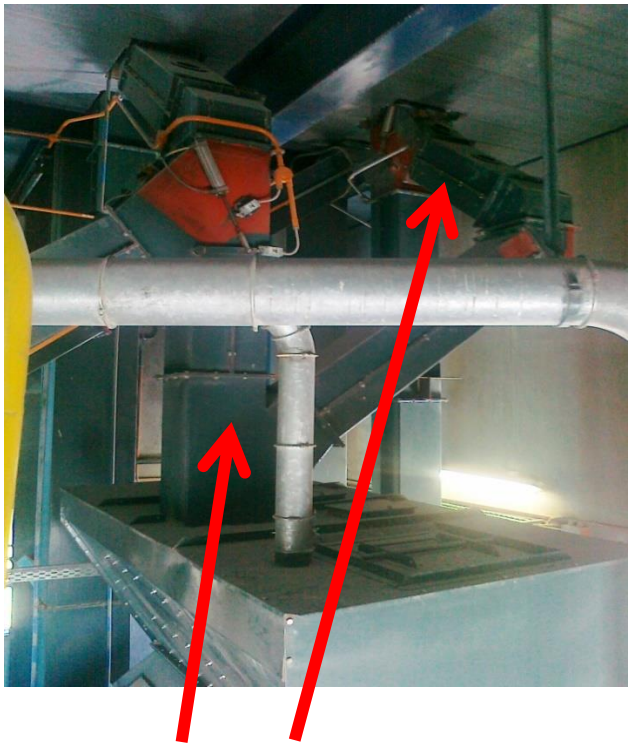
- Ensure that the cog wheel always has enough oil.
- Ensure that the cables that regulate the weights of the cog wheel elevator door moves slowly over the rollers.
- Check whether the emergency stop is in working order and not pressed in by accident.
- Use the hand-break opener gradually and with intervals when a power failure occurs.

Cleaning and drying of grain

- Pre-cleaning machines

  Routine checks and tasks include:

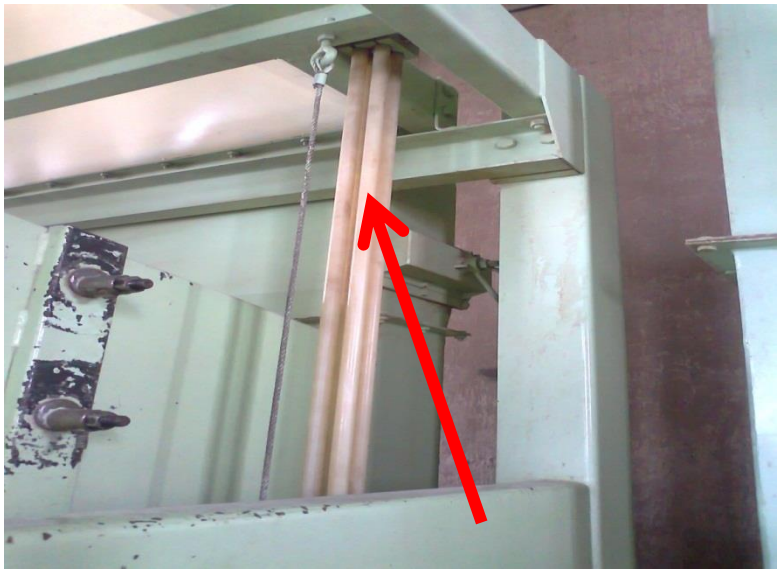
  - Inspect bolts and nuts and tighten.
  - Check flaps and sluices in ducts daily. Grain must flow evenly over rollers.
  - Remove any foreign objects and obstructions on the sieve.
  - Look out for blockages on the screw feeder and flaps.
  - Check that dust suction is not set too high or too low. It must not suck in the whole kernel together with impurities.
  - Check that the surface of the sieve does not have holes; it will hamper the cleaning action.



- Cleaning machines

  Routine checks and tasks include:

  - Ensure that control sluices in the draining ducts and the control valve on top of the sieves work properly. Grain must be spread evenly over the upper sieve.
  - Dust suction must not be too strong because too much light material and whole kernels can be sucked away.
  - Sieves must be clean, intact and firmly affixed. There should be no loose objects, brushes and balls, and the sieves must be in a working condition.
  - When the sieves are exchanged, the guides within which they are placed must be clean.
  - Check and tighten nuts and bolts. Projected pieces of sieves may not be hit with a heavy object.
  - Sieves must come to a complete stop when machines are switched off, especially where sieves move with rotating action.
  - Areas around sieves must remain tightly sealed to reduce leakages.
  - Listen for any unnatural vibration in the machine and structure as well as the dust extraction system.
  - Where sieves are connected to the framework with a steel plate of fiberglass hangers, inspect regularly.



- Dryers (empty)

  Routine inspections are required when dryers are empty:

  - Open all inspection hatches.
  - Check for blockages and general hygiene in the combustion chambers, coolers, fan covers, thrusters as well as buckets over the bins and for releasing grain.
  - Check for blockages in cyclone fan propulsion, return channels, cyclones and dust system.
  - Inspect the burner, ignition points and fuel filter. The burner must be serviced yearly just before the start of the season and every two weeks thereafter.

- Ensure that mechanical controls for the dryer, fans and ducts work properly.
- Inspect the correct placing and operation of grain level sensors and temperature sensors.

- Dryers (full)

  When dryers are full, the following must be checked:
  - Switch fans on and control air flow by measuring static pressure or stream strength. Use the fan performance work sheets.
  - Control working of level sensors.
  - Calibrate the burner.
  - Verify the accuracy of sensors.
- Hot water kettle and grids

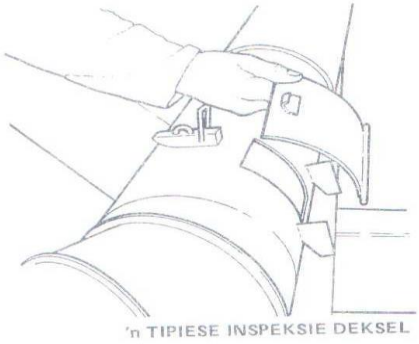
  Controls, readings and record-keeping include:
  - Clean burner and grids every two weeks. Blow the grid with a compressor from the inside.
  - Isolation of pipes and grids must not show any water leakages.
  - Correct working of pressure meter and water container.
  - The water pump must not have any leaks.
  - Correct working of pressure meters on pump.
  - Check kettles for a too high pressure in the fire room. It indicates a dirty kettle.
  - Record coal usage per shift.

Storage Hygiene

- Dust extracting equipment

  The following inspections are important:
  - Control that steel valves at different suction points let in the correct amount of air.
  - Chaff and solid materials may not be blown out with the clean air as it will clog the dust outlet. Whole grain kernels must not be sucked in.
  - Full bags at the dust outlet must be replaced. Inspect and clean clogged pipes and cyclones.
  - Pipes may not be hit as it causes dents. Use inspection hatches and suck more air through the slot below the part that is clogged.
  - Check for any leakages at welding seams, joints and inspection openings.
  - Feel with the palm of the hand for abnormal vibrations and heat on fans. The bearings could be faulty or the impellor out of balance.

- Control rotation valves. They must close tightly and no clogging must occur in the cyclone above the rotating valve.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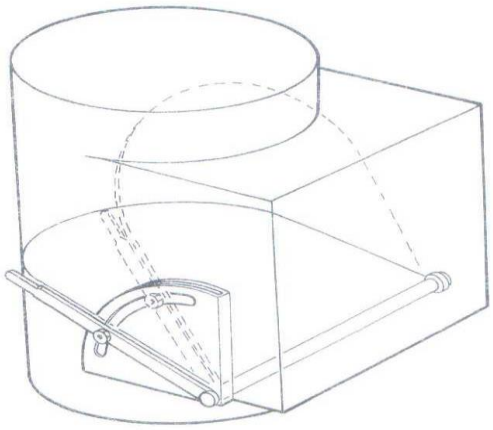
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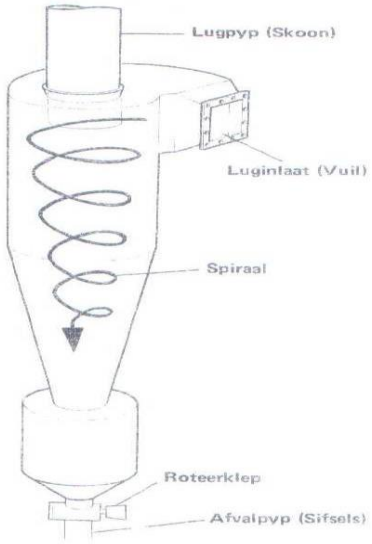

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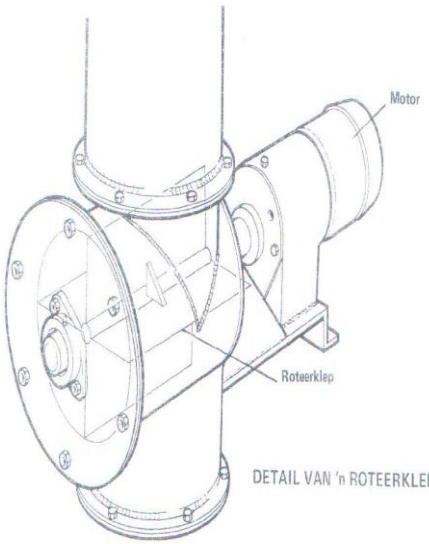
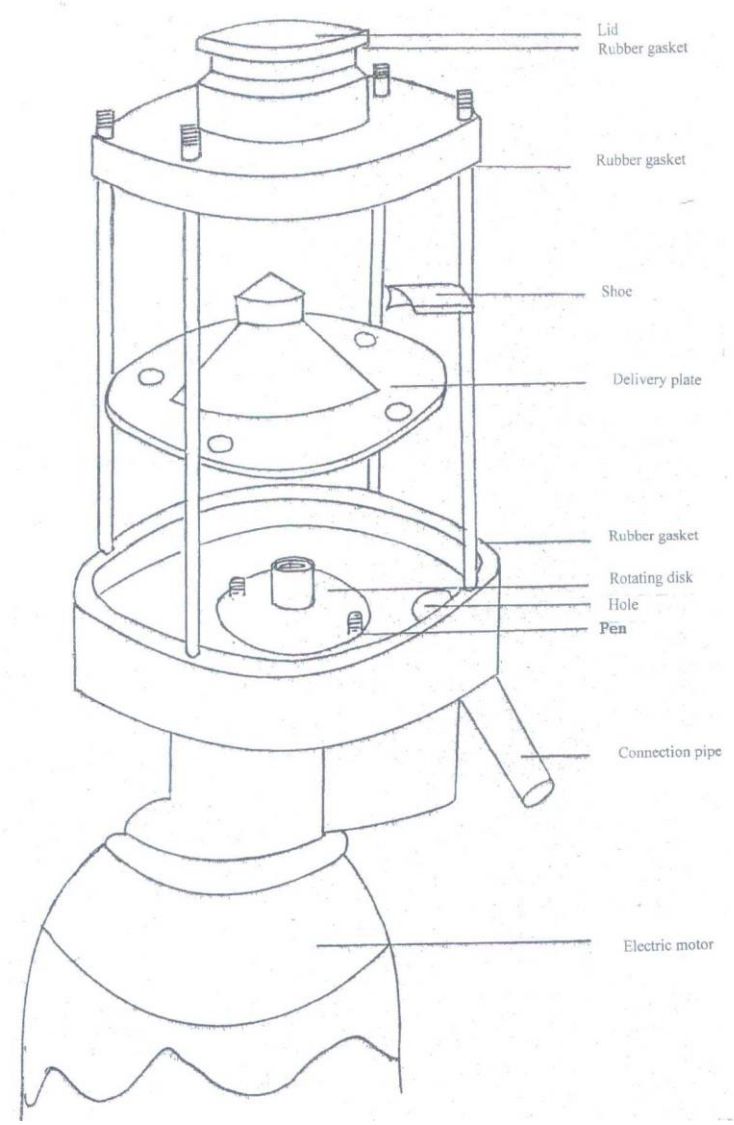


DETAIL VAN 'n ROTEERKLEP

- Fumigation equipment (tablet dispenser)
  Daily, weekly and seasonal checks include:
  - Check rubber gloves, gas masks, filter cans for phosphine gas as well as the gas test appliance.
  - **Daily** maintenance:
    - Check rotation delivery plate. If the pin on rotating disc is broken, replace it.

- Powder can build up and lift the delivery plate or hamper the free rotation. This can break the driving pin, or it could cease the motor. Thus, all powder must be removed.
- Check the connection pipe to the grain stream and clean the clogged area.
- Check the feeder that prevents more than one pill being administered per opening. The scraping action of tablets causes wear and tear and it may require replacement.
- Check rubber seals and replace, if needed.
- Check automatic on/off switch and warning light on the control panel.

- **Weekly** maintenance
  - The electrical motor is sealed to prevent dust explosions. Check the fan and remove dust from the cover with a brush.
  - Control electrical connections. Report problems to electrician.
- **Pre-season** maintenance
  - Follow all the controls as set out above.
  - Inspect the delivery plate for abnormal wear and tear. The scrape action of pills enlarges the grooves in the openings with the result that two tablets are administered. When this happens, replace the delivery plate.
  - Inspect the rotating disc underneath the delivery plate for unnecessary looseness. The pin or holes through which it moves, may be worn and need to be replaced.



- Spraying equipment

  Routine checks include the following:

  - Check pressure meters daily.
  - Check flow meter daily.
  - Clean filters daily as well as those at nozzles.
  - Clean nozzles daily.
  - Rinse the apparatus every evening with clean water.
  - Inspect washers of taps and replace where necessary.
  - Inspect for leakages and repair where necessary.
  - Inspect electric wiring and locking.
  - Test the on and off switch of the grain stream.
  - Investigate pipe system for possible defects and replace where necessary. All parts must be replaced before the intake season in accordance with maintenance schedule.

	Please complete Knowledge Activity: Multiple Choice Test
	Please complete Practical Activity: Tasks 1- 3 Tasks 4 – 5 Tasks 14 - 16
	Please complete Workplace Activity: WM - 01