Feed Mill Operator Blended Learning Program

Program Overview

Endorsed and Administered by AFMA:

AFMA
SAFE FEED FOR SAFE FOOD
Animal Feed Manufacturers Association

Delivered by Learning Pathways:

LEARNING PATHWAYS

Developed in partnership with:

BÜHLER

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1. INTRODUCTION

Welcome to the overview of the e-learning program for a Feed Mill Operator Blended Learning Program endorsed by AFMA.

The learning program is designed to expose the learner to key **knowledge** areas as well as learning of skills through **application**[1] (Practical/Work-experience) related to the production of formulated or mixed livestock feeds.

2. PURPOSE

The purpose of the Feed Mill Operator Blended Learning Program is to prepare the learner to function at operator level in a livestock feed milling environment.

Persons who have successfully completed this program will be able to:

- Demonstrate an understanding of the animal feed industry, the mixed feed manufacturing process, the work environment, and the importance of a quality culture in the business.
- Demonstrate an understanding of material handling equipment, facilities and systems that are commonly used in the handling of material in a feed mill.
- Attend to the processes related to the receiving of materials delivered in bulk and bags, the storage of material and the release of material to the feed mill.
- Attend to mixed feed production processes and equipment operation – weighing, batching, mixing, additive/micro-ingredient addition, particle reduction.
- Attend to mixed feed processing and equipment operation – Conditioning, pelleting, post pelleting treatments.
- Demonstrate an understanding of concepts that are related to animal nutrition, raw materials, additives and ingredients.
- Attend to the supervisory roles and functions at a first line team leader.

3. PROGRAM DELIVERY MODEL

The learning program will be delivered at participating feed mills by means of the Learning Pathways E-based Work Integrated Learning approach.

This means:

[1] Application refers to the development of a combination of practical and experience-based learning.

Every participating feed mill will act as a site of learning and evaluation. Persons nominated by the feed mill, trained as a E-Learning Facilitator, will guide, and support the learning process for the duration of the program. They will be actively involved in the delivery of the program at the feed mill. The E-Learning Facilitator will deliver topics of a more technical nature with the support of a Subject Matter Expert (SME) should this be required.

The training of the E-Learning Facilitator is an internal process delivered by Learning Pathways.

4. PROGRAM STRUCTURE[2]

The proposed learning process is structured as follows:

Focus	Description	Process Alignment	
Self-paced theoretical learning	Knowledge transfer Knowledge evaluation	Knowledge E-Learning • Self-Paced E-Learning and Evaluation • Program module schedule	
Show and explain to the candidate	Explain applied knowledge areas Practical demonstration by SME Practical exposure to tasks of candidates	Practical Application • Applied knowledge • Demonstration • Facilitated practical session	APPLICATION – Work Integrated Learning
Work Based Observation and Exposure	Observe and assist with the execution of specific tasks – allocate tasks to the trainees	Experiential learning • Observation based experiential learning	
Skills Based Application	Conduct specific tasks – allocate tasks to the trainees, observe and evaluate under guidance of SME	Work Integration • Controlled execution-based skills learning	
Competence Evaluation	Complete and submit competence evaluation records Evaluation of records by LP appointed program administrator	Competence evaluation	

The program is structured into theoretical modules and topics as well as application modules

[2] **Please note that the detail in the program structure may change as the learning program is further developed and reviewed**

Theory Modules

Module 1: The Feed Milling Environment

Module 2: Material Handling Equipment

Module 3: Receiving, Storage and Warehousing

Module 4: Mixed Feed Production

Module 5: Mixed Feed Processing

Module 6: Feed Science

Module 7: Operational Team Leadership

Application Modules

WIL Module 1: Bulk material intake and storage

WIL Module 2: Material Warehousing and Stock Control

WIL Module 3: Material Reclaim from Storage

WIL Module 4: Proportioning, batching, mixing and particle size reduction

WIL Module 5: Mixed feed processing system operation

WIL Module 6: Operational team Leadership

Optimal training period of 6 months

4.1. Program Delivery Schedule

Phase 1: Theoretical Modules

These modules are aligned to the Knowledge Modules (theory) of the qualification.

Knowledge Modules	**Topics**	**Estimated Study Time**
Module 1 The Feed Milling Environment	KT1.1 The dynamics of the animal feed industry	1 week
	KT1.2 Overview of Feed Milling Operations	
	KT1.3 Productive Work in Feed Mills	
	KT1.4 Occupational Health and Safety	
	KT 1.5 Introduction to quality	

Knowledge Modules	Topics	Estimated Study Time
Module 2 Material Handling Equipment	KT2.1 Material Conveying Equipment (Elevators, Conveyors: (drag chain, screw belt, pneumatic))	1 week
	KT2.2 Material Distribution (Spouting slides, diverters)	
	KT2.3 Material Cleaning Equipment (Sieves, magnets)	
	KT2.4 Dust Control and Aspiration Systems (Dust Filters)	
	KT2.5 Mixed Feed Bagging	
	KT2.6 Bulk Material Out-loading	
Module 3 Receiving, Storage and Warehousing	KT3.1 Bulk Material Receiving	1 week
	KT3.2 Bulk Storage Facilities (Silos, bunkers, dams)	
	KT3.3 Silo Storage Risks	
	KT3.4 Warehousing	
Module 4 Mixed Feed Production	KT4.1 Process Introduction and overview	1,5 weeks
	KT4.2 Batching and Dosing	
	KT4.3 Mixing	
	KT4.4 Liquid addition	
	KT4.5 Particle Size Reduction	
Module 5 Feed Processing	KT5.1 Pelleting process overview	2 weeks
	KT5.2 Pelleting technology	
	KT5.3 Pelleting operations	
	KT5.4 Post pelleting treatments	
	KT5.5 Expansion and Extrusion	
Module 6: Feed Science	KT6.1 Animal Nutrition:	1 week
	KT6.2 Raw Materials and Additives	
	KT6.3 Common terminology	
Module 7: Operational Team Leadership	KT7.1 Team Leadership	1 week
	KT7.2 Team Discipline	
	KT7.3 Team Dynamics	
	Total	9 weeks

Phase 2: Application Modules

The application modules are structured as practical demonstrations and period of exposure in a work environment.

Work Integration Modules	Scope	Exposure
WIL Module 1 Bulk material intake and storage	The application of key knowledge areas and practices related to the receiving and storage of raw material delivered in bulk to the livestock feed mill.	5 Shifts
WIL Module 2 Material Warehousing and Stock Control	The application of key knowledge areas and practices related to the warehousing and stock control operations of the livestock feed mill.	5 Shifts
WIL Module 3 Material Reclaim from Storage	The application of key knowledge areas and practices related to the release of material from storage to the livestock feed mill.	5 Shifts
WIL Module 4 Proportioning, batching, mixing and milling	The application of key knowledge areas and practices related to batching, ingredient addition, mixing and particle reduction operations.	15 Shifts
WIL Module 5 Mixed Feed Processing Operations	The application of key knowledge areas and practices related to feed processing operations such as conditioning, pelleting, crumbling, and extrusion.	25 Shifts
WIL Module 6 Team Leadership	The application of key knowledge areas and practices related to leading and directing the activities of work teams.	5 Shifts
	Total	60 Shifts 12 weeks
	Full Program Total (Theory plus Application)	21 weeks (6 months)

4.2. Knowledge Modules

4.2.1. Reference Material

The knowledge modules of this training program are made up out of different resources to enhance knowledge transfer and to create an interactive learning environment through:

- Knowledge based learner guides
- Audio-visual learning resources
- Refenced internet links
- Graphic illustrations

The learner guides in this learning program are important sources of information to prepare for evaluation and as a future reference to the topic covered by the program.

The guides are not presented as authentic publications but as a learning guide compiled from a range of sources.

Learners are encouraged to download the guides and to build up their own library for personal use only.

The following publications was used as references in the development of the Learner Guides:

- Principles of Mixed Feed Production, Components, Processes, Technology, By J Kersten, HR Rohde and E Nef. An AgriMedia Publication, 2005
- Feed Manufacturing Technology, The American Feed Industry Association, 2005
- Various equipment manuals, technical information and illustrations made available by Bühler, Area Sales Manager Feed. Buhler AG, Feed & Biomass Department, Uzwil / Switzerland
- Specific reference is also included in the Learner Guides

4.2.2. Module 1: The Feed Milling Environment

An induction or orientation program for persons employed in the livestock feed milling industry.

Module 1 The Feed Milling Environment	KT1.1 The dynamics of the animal feed industry
	KT1.2 Overview of Feed Milling Operations
	KT1.3 Productive Work in Feed Mills
	KT1.4 Occupational Health and Safety
	KT 1.5 Introduction to quality

KT1.1 The dynamics of the animal feed industry: *A basic overview of key role players in the South African feed industry.*

KT1.2 Overview of Feed Milling Operations: *An introduction to the various stages in the production of mixed animal feeds.*

KT1.3 Productive Work in Feed Mills: *Productive work practices and elements of costs and cost control.*

KT1.4 Occupational Health and Safety in the Feed Milling Environment: *Occupational health and safety orientation and safety signs, symbols and personal protective equipment.*

KT1.5 Introduction to quality: *An orientation on quality assurance concepts and practices in the livestock feed milling environment.*

4.2.3. Module 2: Material Handling Equipment

General introduction to material handling equipment. A basic description of a range of equipment that is commonly used in a livestock feed milling plant to handle material.

The modules introduce the candidate to the common application of the equipment, the main components of the equipment and safety considerations.

Module 2 Material Handling Equipment	KT2.1 Material Conveying Equipment
	KT2.2 Material Distribution
	KT2.3 Dust Control and Aspiration Systems
	KT2.4 Dispatch and Packaging Equipment

KT2.1 Material Conveying Equipment: *Elevators, Conveyors: (drag chain, screw belt, pneumatic)*

KT2.2 Material Distribution: *Spouting slides, diverters, distributors, gates*

KT2.3 Dust Control and Aspiration Systems: *Gravity separators Cyclones, Baghouse dust collectors, Mechanical shakers, Pulse jet collectors*

KT2.4 Dispatch and Packaging Equipment: *Packaging equipment, Bulk Material Out-loading equipment*

4.2.4. Module 3: Receiving, Storage and Warehousing

The module focuses on the receiving and storage of raw materials and ingredients in bulk storage facilities and warehouses.

Module 3 Receiving, Storage and Warehousing	KT3.1 Bulk Material Receiving
	KT3.2 Bulk Storage Facilities (Silos, bunkers, dams)
	KT3.3 Silo Storage Risks
	KT3.4 Warehousing

KT3.1 Bulk Material Receiving: *The receiving of materials that are delivered in bulk (mostly with road transport), such as maize, is discussed in this topic.*

KT3.2 Bulk Storage Facilities: *After reception of raw materials, the second major operation in a feed mill is storage of the raw materials in such a way that there will be no losses in quality and quantity of these materials. This topic explores the different facilities that are commonly used for bulk material storage.*

KT3.3 Silo Storage Risks: *This topic explores safety risks employees are exposed to (entrapment, dust explosions).*

KT3.4 Warehousing: *The warehouse offers services to the livestock feed mill by ensuring that a range of stock items are properly stored and available to produce mixed feeds when required.*

4.2.5. Module 4: Mixed Feed Production

Production of mixed livestock feeds through batching, dosing, mixing and particle size reduction.

Module 4 Mixed Feed Production	KT4.1 Process Introduction and overview
	KT4.2 Batching and Dosing
	KT4.3 Mixing
	KT4.4 Liquid addition
	KT4.5 Particle Size Reduction

KT4.1 Process Introduction and overview: *A general description of the layout and design options for a mixed feed production system*

KT4.2 Batching and Dosing: *Batching and dosing process and equipment*

KT4.3 Mixing: *The equipment and processes related to mixing of material*

KT4.4 Liquid addition: *The equipment and process related to addition of liquids during mixed feed production*

KT4.5 Particle Size Reduction: *Particle size reduction equipment and processes.*

4.2.6. Module 5: Feed Processing

The module focuses on feed pelleting equipment and processes in livestock a feed mill. Some information is also provided on expansion and extrusion.

Module 5 Mixed Feed Processing	KT5.1 Pelleting process overview
	KT5.2 Pelleting technology
	KT5.3 Pelleting operations
	KT5.4 Post pelleting treatments
	KT5.5 Expansion and Extrusion

KT5.1 Pelleting process overview: *A general introduction to the pelleting process, equipment used and stages in a pelleting line.*

KT5.2 Pelleting technology: *The main components that is commonly associated with the pelletizer is discussed (Conditioner, Pellet Press, Pelleting Dies, Spreaders and Rollers)*

KT5.3 Pelleting operations: *General guidelines are provided on the operation of a pellet press.*

KT5.4 Post pelleting treatments: *The treatments that are applied to pelleted feeds are explained. These include cooling, sieves, crumbling and liquid addition.*

KT5.5 Expansion and Extrusion: *The expansion and extrusion equipment and processes are briefly introduced.*

4.2.7. Module 6: Feed Science

The module focuses on concepts that are related to animal nutrition, raw materials, additives and ingredients as well as the language of livestock feeds (common terminology)

Module 6: Feed Science	KT6.1 Animal Nutrition:
	KT6.2 Raw Materials and Additives
	KT6.3 Common terminology

KT6.1 Animal Nutrition: *The focus of the topic is on the biology of animal nutrition and digestive processes.*

KT6.2 Raw Materials and Additives: *The materials that are commonly included in the production of mixed livestock feeds is discussed in this topic.*

KT6.3 Common terminology: *A link to a publication titled "Common Terms used in Animal Feed and Nutrition" is provided. This is an excellent resource that describes the terminology that is commonly associated with animal nutrition.*

4.2.8. Module 7: Operational Team Leadership

Operational team leadership explores the supervisory roles of a team leader. This is introduced as team leadership concepts, teamwork and team discipline.

Module 7: Operational Team Leadership	KT7.1 Team Leadership
	KT7.2 Team Discipline
	KT7.3 Team Dynamics

KT7.1 Team Leadership: *The team leader, as the person who interacts with the employees daily and who holds a position of authority is introduced by exploring roles, ethics, team work, instructions and controlling standards of performance.*

KT7.2 Team Discipline: *Work floor discipline, conflict and handling of conflict is presented in this topic*

KT7.3 Team Dynamics: *In this topic the learner is introduced to the role and characteristics of groups and teams in organisations, in terms of their influence on the attainment of organisational goals.*

4.3. Application Modules (Work Integrated Learning)

The application modules are delivered as three learning activities:

Activity 1: *The focus is on explaining knowledge that is applied when performing a specific task, a practical demonstration of the specific task and opportunities to the individual learners to perform specific activities.*

Activity 2: *Learners gain exposure by:*

- Observing and assisting an experienced person executing activities related to task in the workplace.
- Attend to activities related to a task under guidance and with the support of an experienced person.

Activity 3: Evaluation of the competence of the learner and compiling required reports and records

4.3.1. Recognition of Prior Learning

It is common for employers to enrol learners to the program who has gained work experience in a Livestock Feed Mill at various levels of operation.

The standard allows the e-learning facilitator to record the previous work experience as sufficient experiential learning and exposure. In practice, the learner will then not be required to gain the recommended exposure in a specific work process.

4.4. WIL Module 1: Bulk Material Intake and Storage.

The module focuses on the various activities that are associated with bulk material intake and storage in livestock a feed mill.

Scope of Applied Knowledge and Activities

- **Applied knowledge:** *Safety inspection procedure, Mechanical equipment inspection procedures, Safety devices, Potential risks, Sensory quality indicators of material received, Personal protective equipment, Reporting and recordkeeping, housekeeping standards and Biosecurity measures.*
- **Demonstration, Practical and Experience:** *Inspections for safe operating conditions and mechanical soundness, equipment start-up and shut down, material unloading, transfer, routing and storage, monitor sensory quality of raw materials, recordkeeping, selection, use and care of PPE, biosecurity and housekeeping.*

4.5. WIL Module 2: Material Warehousing and Stock Control.

The various aspects of storage and control of stock items in a warehousing environment is addressed in the practice module.

Scope of Applied Knowledge and Activities

- **Applied knowledge:** *Material warehousing and storage practices, Personal health and safety protection, Pests and material spoilage, Quality specifications, Warehousing records and administration, Stock taking principles.*
- **Demonstration, Practical and Experience:** *Material inspection upon delivery, reconciliation of delivery notes and orders, directing goods to correct storage area, stock rotation, the FIFO principle, inspection for pests and material spoilage, housekeeping standards in the material store, administer storage documentation and records (including stock taking records).*

4.6. WIL Module 3: Material Reclaim from Storage.

The focus of this module is on the reclaim of material from storage as required to produce specific feed formulations.

Scope of Applied Knowledge and Activities

- **Applied knowledge:** *Material reclaim practices, personal health and safety protection, reclaim equipment operation, quality specifications, reclaim records and administration.*

- **Demonstration, Practical and Experience:** *Reclaim equipment operation, prevention of cross contamination, sensory quality inspections, select use and care of PPE, reporting and recordkeeping, monitoring of stock levels, release and routing of material, stock rotation (LIFO), housekeeping.*

4.7. WIL Module 4: Batching, Mixing and Particle Reduction System Operation

The batching, mixing and particle reduction system operation can be considered as the core process in mixed feed production and is covered by this module

Scope of Applied Knowledge and Activities

- **Applied knowledge:** *Safety inspection procedures, Mechanical equipment inspection procedures, Safe operating procedures and safety devices, Potential risks, Sensory indications of conformance to quality standards, Personal protective equipment, Standard responses to common problems, Reporting and recordkeeping, housekeeping standards, Batch contamination prevention.*
- **Demonstration, Practical and Experience:** *Operation of equipment used in a batching and mixing system, inspection for safe operation, equipment settings, mechanical inspection, equipment set-up, start up and shut down, upstream, routing and downstream readiness, monitor and control equipment operation, specific procedures related to the process (e.g. change-over, cleaning, emergency stops), quality indicators and inspections, select use and care of PPE, reporting and recordkeeping, housekeeping and contamination prevention.*

4.8. WIL Module 5: Mixed Feed Processing System Operation

Mixed feed processing system operation such as conditioning, pelleting, cooling, sieving, crumbling, post pelleting treatments and if relevant, extrusion is addressed in this module.

Scope of Applied Knowledge and Activities

- **Applied knowledge:** *Safety inspection procedures, Mechanical equipment inspection procedures, Safe operating procedures and safety devices, Potential risks, Sensory indications of quality, Quality standards tests, Personal protective equipment, Standard responses to common problems, Reporting and recordkeeping, housekeeping standards, Batch contamination prevention.*
- **Demonstration, Practical and Experience:** *Operation of equipment used in mixed feed processing system operation, inspection for safe operation, equipment settings, mechanical inspection, equipment set-up and start up, upstream, routing and downstream readiness, monitor and control equipment operation, specific procedures*

related to the process (e.g. change-over, cleaning, emergency stops), sensory quality indicators and inspections, select use and care of PPE, reporting and recordkeeping, housekeeping and contamination prevention.

4.9. WIL Module 6: Team Leadership

The application of key knowledge areas and practices related to leading and directing the activities of work teams.

Scope of Applied Knowledge and Activities

- **Applied knowledge:** *Formulating and issuing clear instruction, Setting targets and monitoring progress, Completing records and reporting*
- **Demonstration, Practical and Experience:** *Guiding team performance, clearly worded and measurable targets, clear instruction on what must be done, realistic and achievable targets that must be met, evaluation and feedback of performance, collection of information, compiling reports and reporting*