Managing On-Farm Feed Mills

Alberta
Agriculture and
Rural Development

Eduardo Beltranena©

Why is it important?

1. Food safety
2. Accountable
3. Traceable
4. Feed is the largest cost of production
5. Predictable animal performance

Objective

- To source wholesome ingredients, process them, mix balanced diets, and deliver them to barns

- Considerations:
  - Costs
  - Species
  - Barn feed equipment
  - Feeders

Sourcing Feed Ingredients

- Qualifying suppliers
- Qualifying truckers
- Biosecurity rules
- Delivery contracts
- Tolerances
- Specifications
- MUST BE TRACEABLE

Receiving Feed Ingredients

- Bulk or bagged
- Inspection, sampling
- Assign lot numbers
- Delivery log
- Receiving pit
- Receiving liquids
- Blowing ingredients

On-Site Testing of Ingredients

- **Representative** sampling
- Colour, odour, viscosity, temp, particle size, etc.
- **Tolerances** checklist
  - Foreign material, dockage
  - Seed impurities
  - Chemical, physical hazards
  - Ergot, smut, mycotoxins
- **Specifications** checklist
- Moist, CP, ADF, Ca, P, fat
- Sample storage, labeling

Bulk Ingredient Storage

- Bin capacity & assignment
- Bin cleaning, repairs
- Bridging
  - Live bottom
  - Flow vibrators
- Aeration
- Inventory, contracts
- First-in, first-out

Particle Size Reduction

- Hammer, roller, disc mills
- Smaller particle ↑power, ↓thruput, ↑wear
- Smaller particle ↑feed efficiency, intake??
- Screen size, tip speed vs. gap
- Ingredient dependent
- Dehulling, blowing
- Equipment installed in tandem

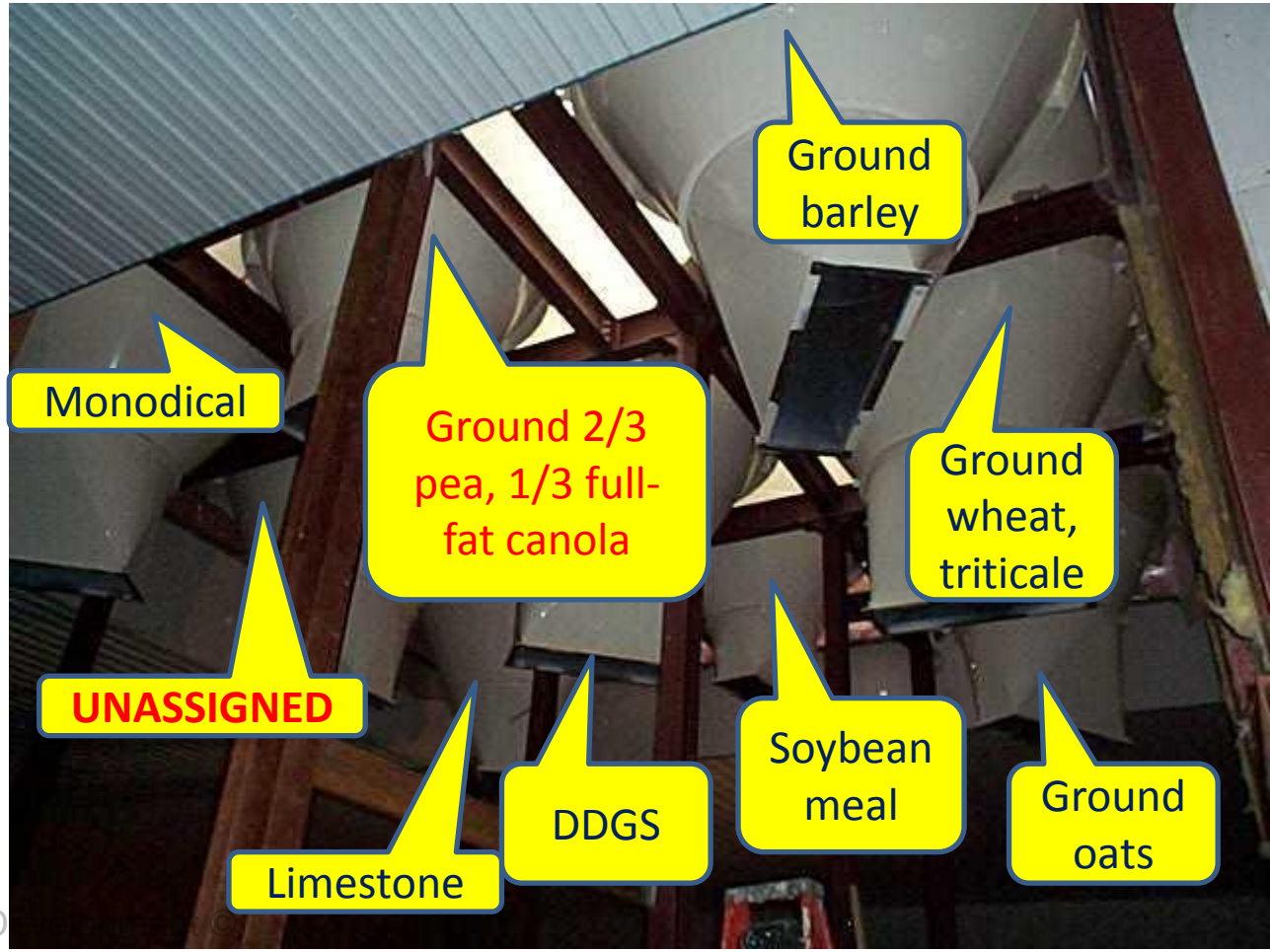
Skiold.com

Accessory Grain Equipment

- Offers GREAT OPPORTUNITIES
- Grain dryer
- Scalpers
- Dehullers
- Blowers
- Oil pressing
- Vibro-sieving

- OPPORTUNITY INGREDIENTS
- Tote hangers
- Proportioner mill

Overhead Bins



Warehouse Management

- Bagged ingredients
- Totes, pallets, tubs
- Floor plan
- Inventory
- Sanitation
- Pest control
- First-in, first-out

Storage & Handling of Medications

- Drug concentration
- Properly identified containers in marked area
- Expiry dates
- Cross-contamination
  - Scoops
  - Weighing containers
  - Scales, mixer, bins used
  - Turnheads, legs, augers
- DRUG RESIDUE TESTING

- Corresponding records:
  - Medication inventory
  - Medication purchased
  - Daily production log

Scales & Metering Devices

- Calibration
- Standardization

Check weights

Scales, Metering Devices

- Appropriate range
- **Accuracy** => tolerance or variance from true wt.
  - ✓ 0.1% of scale capacity or +/- 1 graduation, whichever is greater for new scales (<1y)
- **Sensitivity** => smallest weight change that will cause the indicator to move
- **Graduation** => finest division of readout display

SCALE CHECK: Scale ID _____ Tolerance, kg _____

0.1% of capacity or ± 1 display graduation

	Before		After	
	Expected wt, kg	Actual wt, kg	Expected wt, kg	Actual wt, kg
Light reference weight ID _____	_____	_____	_____	_____
Heavy reference weight ID _____	_____	_____	_____	_____
Added (light + heavy)	_____	_____	_____	_____
	Accept (circle)	Reject (circle)	Accept (circle)	Reject (circle)
	Initials _____	Date _____ yyyy, Mmm, dd	Initials _____	Date _____ yyyy, Mmm, dd

Mixing Feeds

- Mixer types
- Order of addition
  - Bulk ingredients
  - Hand-adds
  - Liquids
- Mixed batch lot #

- Mixing time
  - Emptying
  - Capacity at testing
  - Collection of samples
  - Salt, tracers

Mixing Time Records

- Lab results
- CV% calculation

Sample #	alue of sample X	(X-mean)	(X-mean)^2		
1	1.985	0.179	0.032		
2	1.625	-0.182	0.033		
3	1.715	-0.092	0.008		
4	1.625	-0.182	0.033		
5	1.950	0.144	0.021		
6	1.800	-0.007	0.000		
7	1.800	-0.007	0.000		
8	2.025	0.219	0.048		
9	1.625	-0.182	0.033		
n = 10	1.915	0.109	0.012		
Sum =>	18.065		0.219	/n-1=variance	
Mean=sum/n =>	1.807		0.024	<= variance	
Stdev=sqrt variance =>	0.156		0.156	<= stdev=sqrt varianc	
CV%=(stdev/mean)*100 =>	8.640				

Mixing Sequence

1. Diets for “market-ready” animals
2. Mix script-medicated diets 1st (2.5x)
3. Mix MIB-level medicated diets 2nd
4. Mix zero-withdrawal diets 3rd

- Watch for cross-specie toxic meds
- Use granulated drugs when possible

Sequencing Records

- ***Daily Production Log !!***
  - ✓List equipment involved
  - ✓Manufacture date
  - ✓List feeds in order in which they passed
  - ✓Amount mixed
  - ✓Medication & level or not medicated
  - ✓Flushing or cleaning used?

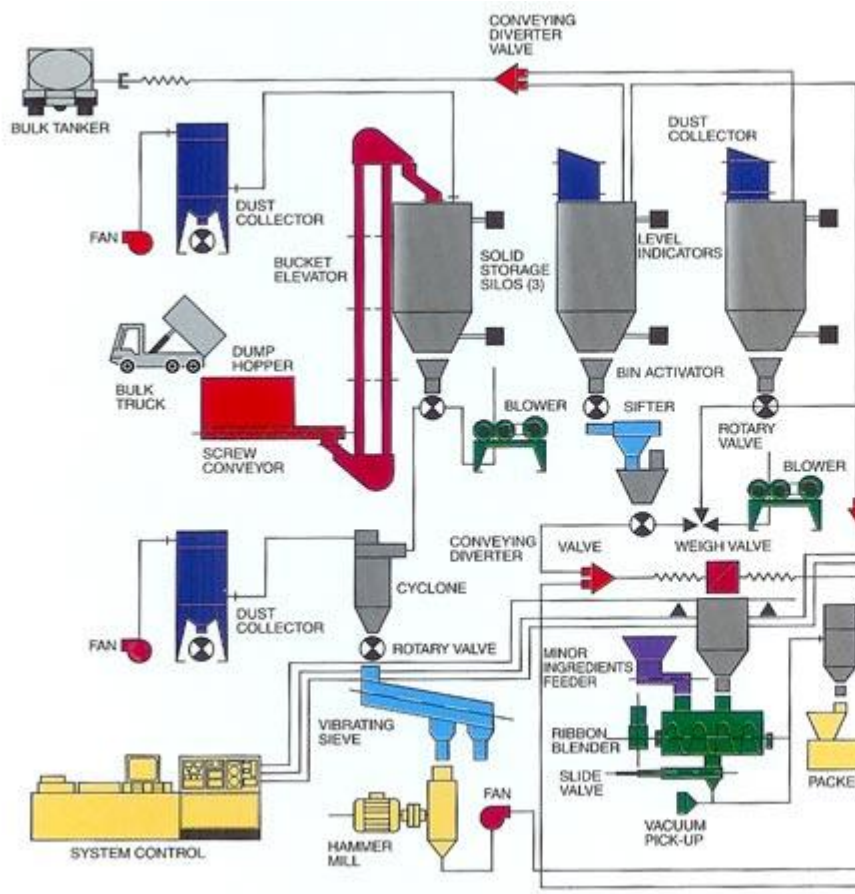
- Mixed feed lot number

Flushing

- Type & amount of flush material
- Additional flush material used?
- Flush used as ingredient in feeds with same medication
- Feed only to approved species
- When stored, label according to medication

Flushing Records

- Noted where?
- Taken to landfill?
- Who bagged it?
- How was it labeled?
- Where was it stored?
- Where was it used up?
- Dust from sweeping, vacuumed, cyclones



Pelleting, Crumbling

- *“Birds can see very well*
- *Waste feed and time searching*
- *Prefer pellets over fines*
- *Prefer larger fines over smaller fines*
- *Prefer courser feeds over finer feeds*
- *Prefer largest pellet that suits them*
- *Rake feed to make choices*
- *Rake feed if different colors or textures present”*

Scott Beyer

Loadout Bins

- Medicated diets to labeled loadout bin
- Flushing and sequencing
- Mixed in error => it's a recall
- Re-routing back to mixer
- Manufacturing tag transfer from mixer to loadout bin

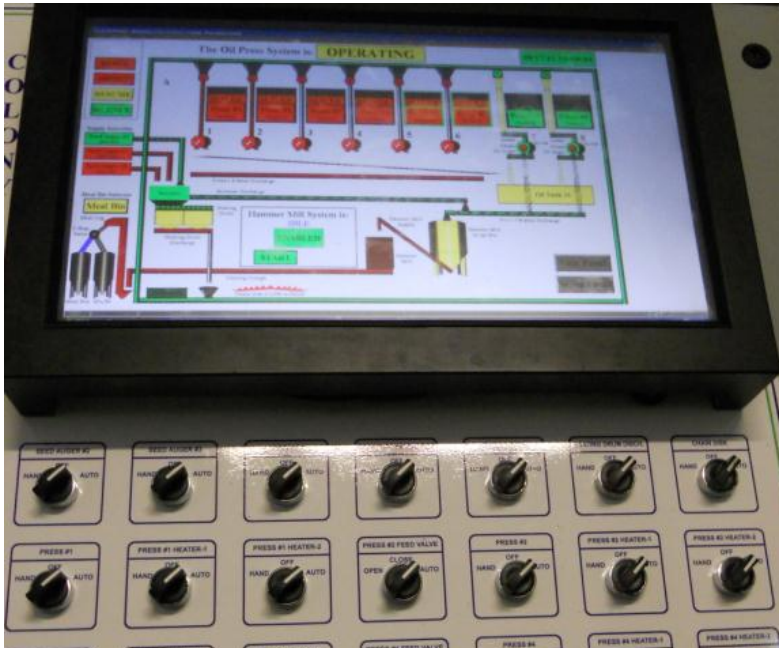
Feed Distribution

- Truck compartments
- Manufacturing tag follows feed
- Sequencing and flushing
- Medicated in aft compartment(s)
- Contaminating broom
- Manifolds

- Records:
  - Truck log
  - Tag placed/removed
  - Consecutive lot #s

Diet Production & Testing

- Ordering feed vs. scheduling
- Visually checking farm feed bins
- Feed Manager ⇔ nutritionist
- Changes in feed formulation
- 3-sieve particle size testing
- Lab analyses vs. NIRS
- Chemistry vs. calculated
- Diet tolerance, specs



Feed Recalls

FEED MIXED IN ERROR

Where is it ??

- Mixer ? — yes → Redirect to bagging
- no → Loadout ? — yes → Redirect to receiving pit
- no → Truck ? — yes → Return truck to feed mill
- no → Farm bin ? — yes → Lock bin; vaccum out
- no → Being fed ? — yes → Notify stockperson
- no → Stockyard ? — yes → Notify packing plant, CFIA
- no → Cooler ? — yes → Notify packing plant, CFIA
- no → Pork sold? — yes → PORK RECALL

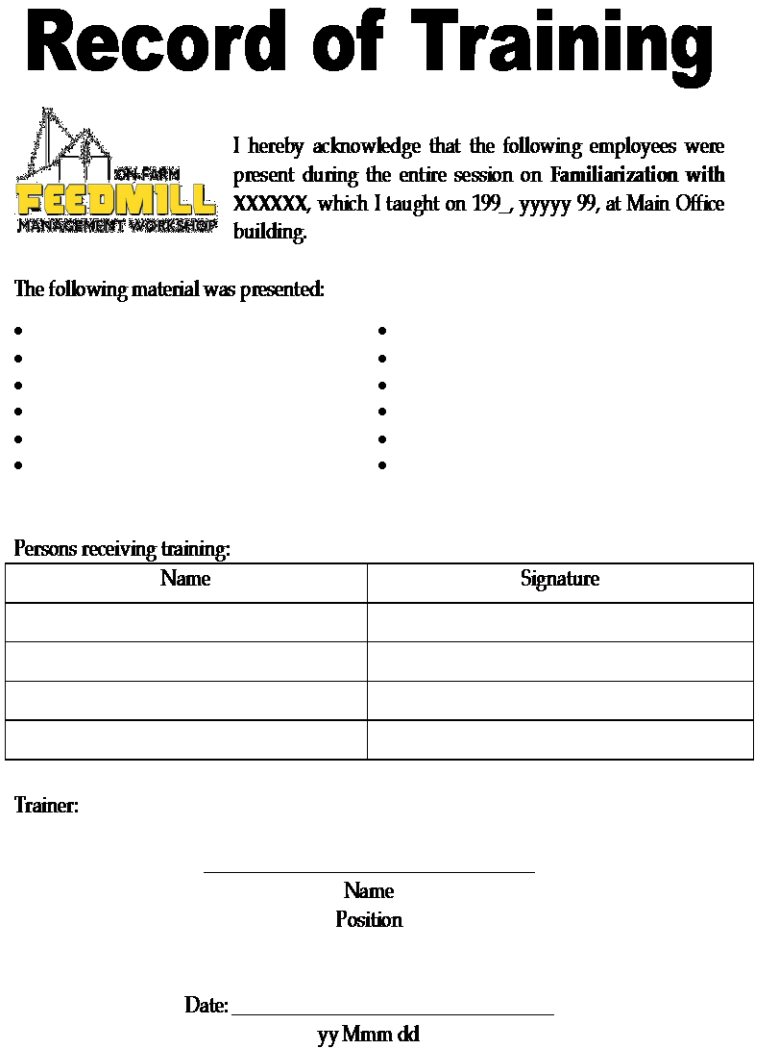
- Records:
  - Investigation report
  - Preventing steps

Maintenance and Repairs

- Commissioning equipment
- Scheduled maintenance
- Repairs
- Equipment replacement
- Contractors
  - Biosecurity
  - Workers Comp

Training

- Training program
  - In-house
  - External
    - HACCP
    - Medications
- CFIA licensing ???
- Who can do what ?



Record of Training

ON-FARM FEEDMILL MANAGEMENT WORKSHOP

I hereby acknowledge that the following employees were present during the entire session on **Familiarization with XXXXXX**, which I taught on 199_, yyyyy 99, at Main Office building.

The following material was presented:

Persons receiving training:

Name	Signature

Trainer:

Name
Position

Date: _____
yy Mmm dd

Archiving

- **Feed Samples**
  - As long as they afford evaluation (for drug target or residue)
  - X months after flock ended or meat animals slaughtered
- **Documents**
  - 3 years minimum
  - Fire proof location
  - Double lock
  - Investigations of non-compliance
  - Corrective actions
  - Specs, residue results
  - Distribution records

Administrative Procedures

- **Shopping for commodities**
- Hedging, risk-spreading
- Tenders and contracts
- Quotes and purchasing
- Accounting procedures
- Process control

Conclusions

- On-farm feed milling can be a complex activity
- Multitasking, but it is a process
- Large $ tided in assets, inventory
- Realistic QC, QA, HACCP
- Avoid mixing medicated feeds
- Predictable animal performance
- Who's the *doer*, who's the *thinker*?

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