Feed Processing & Technology Optimization

Improved Efficiency for Business Sustainability

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Cargill®

Integrated Operations

Cargill

Continuous Improvement

*A **continual improvement** process, also often called a **continuous improvement** process (abbreviated as CIP or CI), is an ongoing effort to improve products, services, or processes. These efforts can seek ‘’incremental“ **improvement** over time or "breakthrough" **improvement** all at once.*

*CI is about creating a culture that is dissatisfied with the status quo…..**a passion for success.***

5 S Toolbox

- **Sort -** All unneeded items are eliminated (recycle, move, sell, throw away, return to supplier or keep it and mark the location)
- **Set In Order** - All needed items are in a correct marked location so anyone can easily find them. Visual Management….
- **Shine** - The work area is clean and kept that way, standards are in place.
- **Standardize** - a consistent, standard way of performing the daily tasks with Standard Operating Procedures is implemented
- **Sustain** - make a habit of maintaining established procedures

5S - Sort

Definition of Sort:

- Remove **all** unneeded items.
- Only leave the bare essentials – "**When in doubt, move it**



Benefits of Sort:

- Less clutter, Safer work environment
- Removes visual barriers
- Lower maintenance costs
- Improved people flow

5S – Set in Order

Before

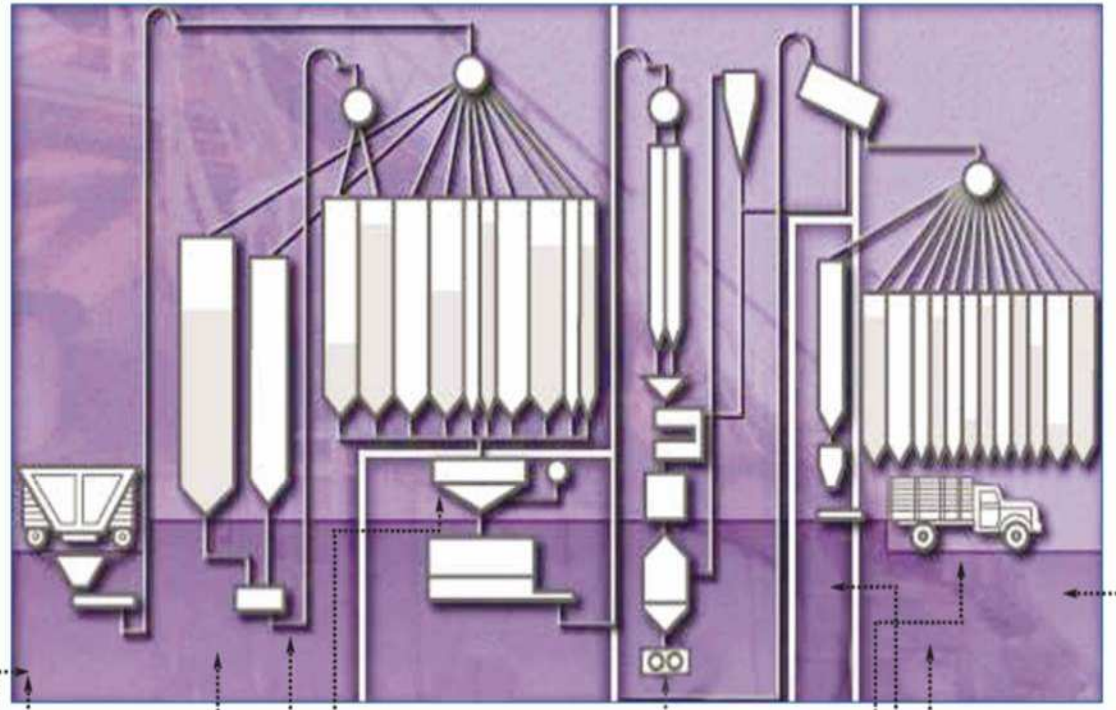
After

5S - Shine

Before

After

What Causes Shrink?



Receiving
(bagged ingredients)
1 Broken bags
2 Underweight bags
3 Count error

Batch Mixing
1 Moisture loss
2 Scale accuracy
3 Bin mixups
4 Rework due to mixing error
5 Dust Loss
6 Spills and leaks
7 Cleanout material

Bulk Feed Loadout
(shipping)
1 Dust (wind) loss
2 Spills and leaks
3 Weather (rain, snow, etc)
4 Weighing errors
5 Moisture loss
6 Theft

Bagged Feed Loadout
1 Count errors
2 Theft
3 Broken bags
4 Spills, sweepings
5 Damage in railcar or truck
6 Loading errors (wrong product)

Warehousing
1 Broken or damaged bags
2 Moisture loss in bags
3 Theft
4 Damage due to dust, water, insects, rodents, and birds
5 Reword due to poor inventory control and obsolete products
6 Inventory errors

Receiving
(bulk ingredients)
1 Dust loss during unloading
2 Weighing errors
3 Loss in transit (leaks, moisture)
4 Spillage while unloading
5 Railcar/truck/ship cleanout
6 Shipper practices (water, foreign materials)

Continuous
(in line) mixing
1 Moisture loss
2 Feeder accuracy
3 Rework due to operator error
4 Spills and leaks
5 Cleanout material

Grain Processing
1 Dust loss
2 Moisture loss
3 Spills and leaks
4 Spoilage (mold, etc.)

Pelleting
1 Moisture loss
2 Dust loss
3 Off-grade pellets
4 Spills and leaks
5 Cleanout material

Packaging
1 Overfill
2 Scale accuracy
3 Rework from setbacks, cleanout, and errors
4 Broken or damaged bags
5 Loss of packaging materials (bags, twine, tape, etc.)

Feed Delivery
(trucking)
1 In-transit leaks or damage
2 Theft
3 Damage while unloading
4 Dust loss or spills while unloading

Management Factors in Today's Feed Mills.

	2002 average	2001 average	2000 average	1999 average	1998 average	1997 average
Age of mill, years	27	31.6	31.5	30.5	30.4	28.6
Capacity, tons/year	186,106	113,692	122,981	89,459	90,776	85,423
Percent capacity	78.6	69	70.5	71.3	70.2	72.7
Number of Employees	20.8	22.1	23.8	20.9	19	21
Shifts per day	2.1	1.9	2.1	1.9	1.8	2
Safe days (1)	1290	944	875	1152	898	903
Number of formulas	394	495	573	628	443	480
Types of feed (2)						
Beef	61.9	76.8	81.0	87.3	88.7	92.1
Dairy	58.3	79.3	84.1	93.0	91.9	92.1
Swine	67.9	81.7	76.2	84.5	87.0	87.1
Poultry	71.4	84.1	79.4	90.1	82.2	88.1
Sheep	42.9	67.1	58.7	71.8	70.9	75.2
Horse	51.2	67.1	69.8	74.6	70.9	78.2
Pet	10.7	9.8	9.5	11.3	11.2	5.9
Fish	9.5	12.2	11.1	15.5	9.6	7.9
Ratite	21.4	32.9	38.1	47.9	33.8	49.5
Shrink	***0.62***	***0.74***	***0.60***	***0.84***	***0.68***	***0.80***
Production efficiency, man-hours/ton	0.47	0.63	0.54	0.77	0.92	0.81
Internet access, %	87.5	85.4	73.0	63.4	43.5	18.8
E-mail, %	84.5	82.9	88.9	85.9	79.0	70.3

(1) Days without a reportable lost-time accident.
(2) Percent of feed mill operators who report manufacturing feed by livestock class.

Taken from FEED MANAGEMENT magazine, January 2002, Vol 53, N 1 and January 2003.

Where Does Shrink Occur?

Rank	Department or Cost Center
1	Receiving Department
2	Warehouse
3	Packaging Department
4	Pelleting System
5	Grain Processing
6	Loadout
7	Mixing System
8	Delivery

Taken from Feed Manufacturing Technology, Ed IV. Copyright 1994 by AFIA.

0.1%: World Class shrink standard for feed.
3.0%: World Class standard for extruded pet food.
2.5%: World Class standard for extruded aqua feed.

Cargill Animal Nutrition

Shrink Management

1. Check all scales a minimum of 1x per year

2. Moisture Control
   - Ingredients in Storage
   - Grinding loss
   - Pelleting/Cooling loss
   - Moisture Addition

3. Standard Tolerance for Packaging

4. Accounting (Actual vs Books)

Operational Effectiveness

Operational effectiveness *involves any number of practices that enable an organization to (i) better utilize its resources, (ii) better implement its processes, and (iii) achieve its mission and goals. In other words,* ***operational effectiveness*** *is about continuously improving functional performance*

Pellet Mill - Autocontroller

- **Production control efficiency**
- **Consistency for pellet quality**
- **Dependability**
- **Energy savings and longer die life**
- **Lower costs**

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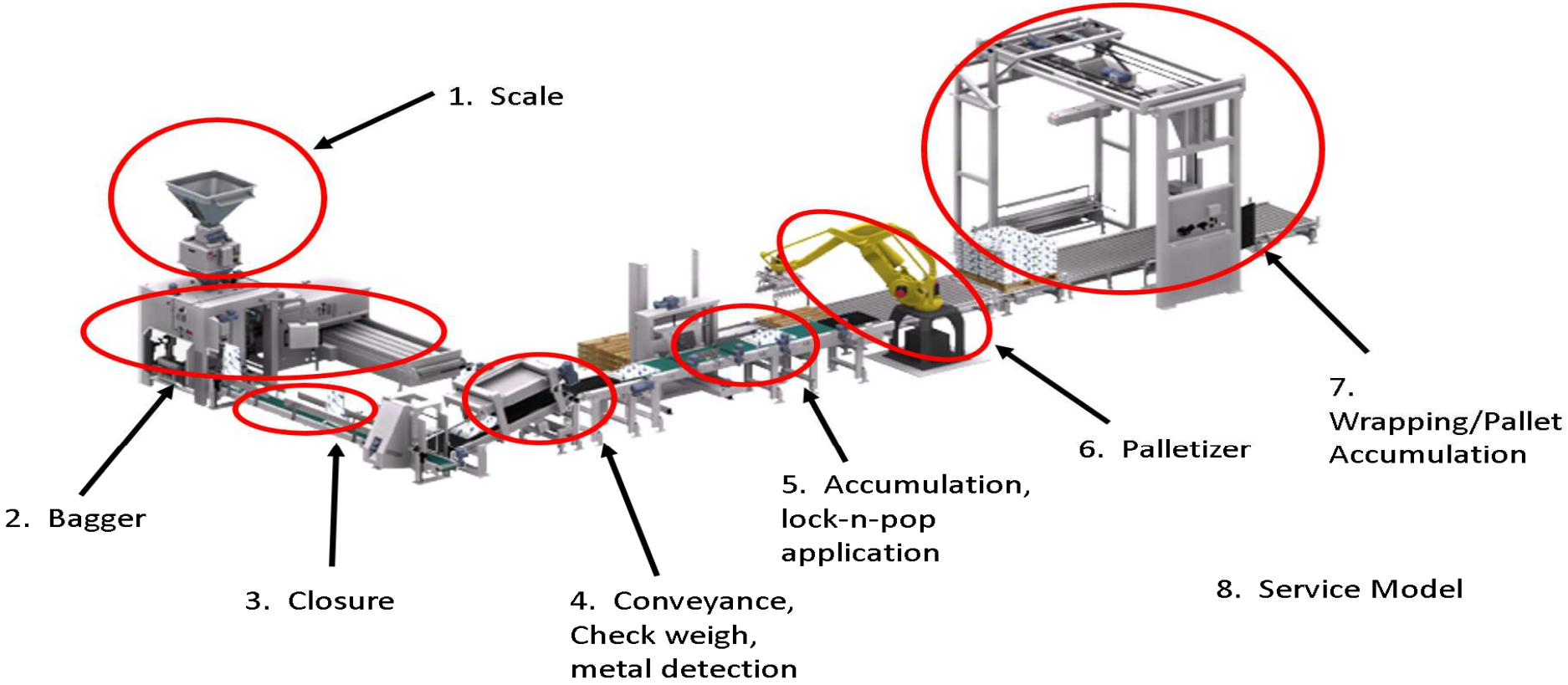
Automated Packaging

Packing Line Equipment

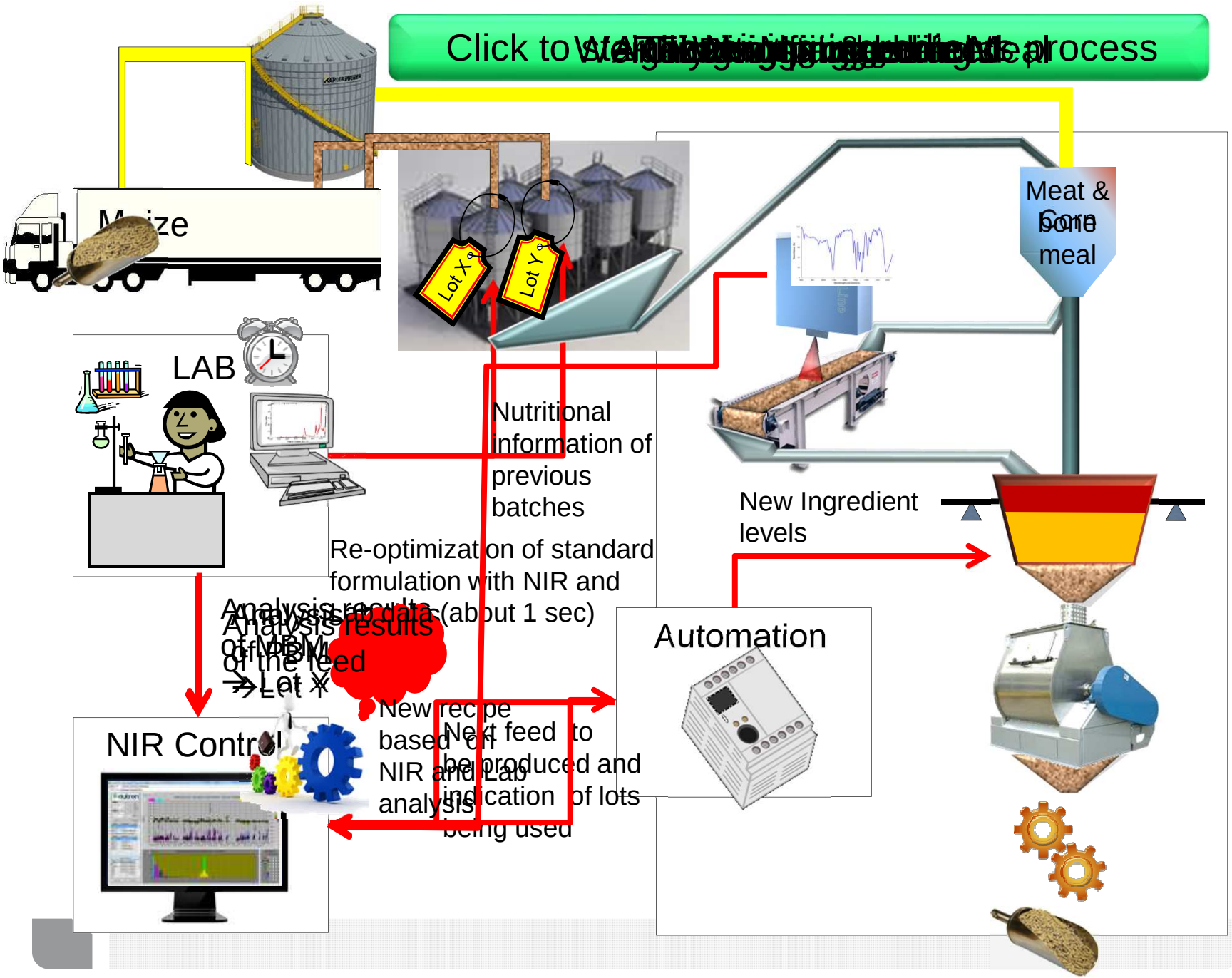


Digitalization – The Future

Complete connectivity of technology from receiving to formulation to automation to mixing & processing?

A system that consistently delivers the best nutrients, the best cost of formula, and the best productivity?

What would that look like?


Click to view the process
Maize
Lot X
Lot Y
Meat & bone meal
Corn
LAB
Nutritional information of previous batches
New Ingredient levels
Re-optimization of standard formulation with NIR and
Analysis results
Automation
NIR Control
New recipe based on NIR and Lab analysis
Next feed to be produced and indication of lots being used

Concluding Remarks

- **Creativity before Capital**
- **You cannot manage what you do not measure**
- **Technology and like investments are worthless without culture and discipline**