Wheat Cleaning System Design

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Lesson Objectives

• Cleaning process design parameters and considerations
• Impact of grain cleaning on finished product quality
• Cleaning other grain types
  o Rice
  o Durum
• Cleaning for Specialty Products
  o Whole Wheat
  o Premium Products
Process Design

Priorities of a cleaning system

- Safety
  - Food, process equipment and employees
- Sanitation (dust and chaff)
- Quality
- Process Efficiencies
Benefits of Pre-Cleaning

- Decrease infestation risk
- Improve sanitation and dust control
- Decrease microbial growth
- Improves flow of grain through the bin
- Increases storage life of grain
Principles of Separation

- Magnetic Properties
- Flow in Air (Terminal Velocity)
- Size
- Shape
  - Length
  - Width
- Specific Gravity
- Surface Characteristics (color and texture)
- Friability (Internal Strength)
- Abrasion
Pre-Cleaning Design Logic

- Size
- Magnetic Properties
- Size
- Behavior in Air

- Grate on receiving pit
- Magnet
- Drum or scalp separator
- Aspirator
Choosing Cleaning Equipment

- Type of grain or class of wheat
  - Different classes = different physical attributes
- Origin
  - Different growing areas = different impurities
- Desired end product
  - Cleanliness of the grain will impact finished flour quality and extraction
Choosing Cleaning Equipment

- Type of wheat
  - Different classes = different physical attributes
Choosing Cleaning Equipment

• Type of wheat
  o Different classes = different physical attributes
Choosing Cleaning Equipment

- Origin of wheat
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Choosing Cleaning Equipment

- Desired end product
  - Cleanliness of the grain will impact finished flour quality and extraction
Impact on Quality

- Color
- Ash
- Microbial
Grain Cleaning System
– Pre-Processing

Equipment
- Magnet
- Aspirator
- Separator
- Combinator

Principle
- Magnetic Property
- Air
- Size
- Density

Priority
- Safety
- Sanitation
- Quality
- Process Efficiency
Fig. 1: Illustration of a Combi Cleaner.
Wheat Cleaning Principle

- Cleaning by abrasion
  - Scouring
  - Peeling
  - Pearling
Cleaning for Specialty Products

- Durum Wheat
  - Granular vs. Powder
- Whole Grain Systems
  - 100% product
  - Grinding style
- Over-cleaning as a design principle (to ensure food safety and product quality)
In Summary

• Cleaning process design parameters and considerations
  o Type and Origin of Grain
  o Quality of end product

• Wheat cleaning for specialty products
  o Focus on what is to be removed vs. what is remaining
  o “Over clean” if necessary, but understand the cost of lost product
Thank you