

IAOM Inaugural South Asia Region Meetings

Delhi, India: December 3-4 2018

Bangalore, India: December 6-7, 2018

FLOUR MILLING: YESTERDAY, TODAY AND TOMORROW

Sunil Maheshwari

Siemer Milling Company

Teutopolis, Illinois, USA



136 Years of Food Ingredient History ...

- **1882:** Hope Roller Mills, Uptmor & Siemer, Proprietors, opens for business on November 6.
- **1906:** Clemens J. Siemer changed company name to **Siemer Milling Company**.
- **1950's:** Under Quintin A. Siemer as President, business commits to flour milling exclusively.
- **1979:** New mill opens in Teutopolis to meet demand. Capacity is twice that of predecessor, and doubles again in the next 20 years.
- **1995:** New mill opens in Hopkinsville. Capacity doubles in the next 20 years.
- **2001:** Siemer becomes Family / Employee Owned - ESOP
- **2015:** New mill opens in West Harrison. Company production capacity increases by 40%.





Siemer Milling Company
Teutopolis, IL
Built in 1979

Whitewater Mill LLC
West Harrison, IN
Built in 2015



Siemer Milling Company
Hopkinsville, KY
Built in 1995



PRESENTATION OBJECTIVES

- Advancements in Grain Cleaning Technology
- Overview of Machine Design Changes to Improve Food Safety, Sanitation and Finished Product Quality
- Internal and External Auditing of Complete Process
- Process of Transferring Finished Product from Mill to Customer
 - How automation plays a key role in overall operation and traceability.



PLANNING FOR MILL DESIGN

- Simpler Housekeeping
- Improved Food Safety
- Improved Industrial Safety and Security
- Steps taken to eliminate product recalls.
- EPA Compliance Considerations
- Design should be fumigation friendly.



PLANNING FOR MILL DESIGN

- Overall Efficiency in all Areas of Planning Included the Following Considerations:
 - Low Energy
 - Low Maintenance
 - Equipment Design to Support High Sanitation Standards – Leading to Enhanced Food Safety
 - Equipment Reliability for High Level of Performance





Large Wall Openings to provide greater access for maintenance and housekeeping around equipment.



Galvanized or Stainless supports and equipment to minimize paint contamination at outer areas (Flour Loadout).



Flour storage bins have rounded corners.



Siemer Milling Facility



Metal and Brick Facility



What do we mean by Food Safety?

- Product Protection
- Allergen Management
- Dust Control - Hygiene
- Avoiding Cross Contamination
- Managing Condensation
- Traceability
- Ingredient management
- GMP
- Key Safety Records



Machines in the Cleaning section

Working principles and
machine adjustment



25 % of Food Crops are Contaminated with Mycotoxins

- Aflatoxin:
- DON (Vomitoxin)
- Storage Mycotoxin (Poor Post-Harvest Handling)
- Distributed in Hot Spots



MYCOTOXIN CONTAMINATED WHEAT KERNELS



Contamination in Advanced Stage

OPTICAL COLOR SORTER

- Reduces Toxins in Grain
- Delivers Maximum Product Purity for the Best Value
- Empowering Sorting Performance
- Ensuring Consistent Operation
- Optimizing Productivity
- Lowering Cost of Ownership

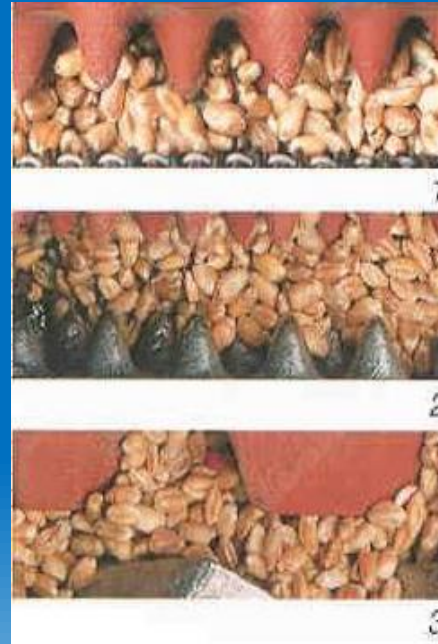


Scourer

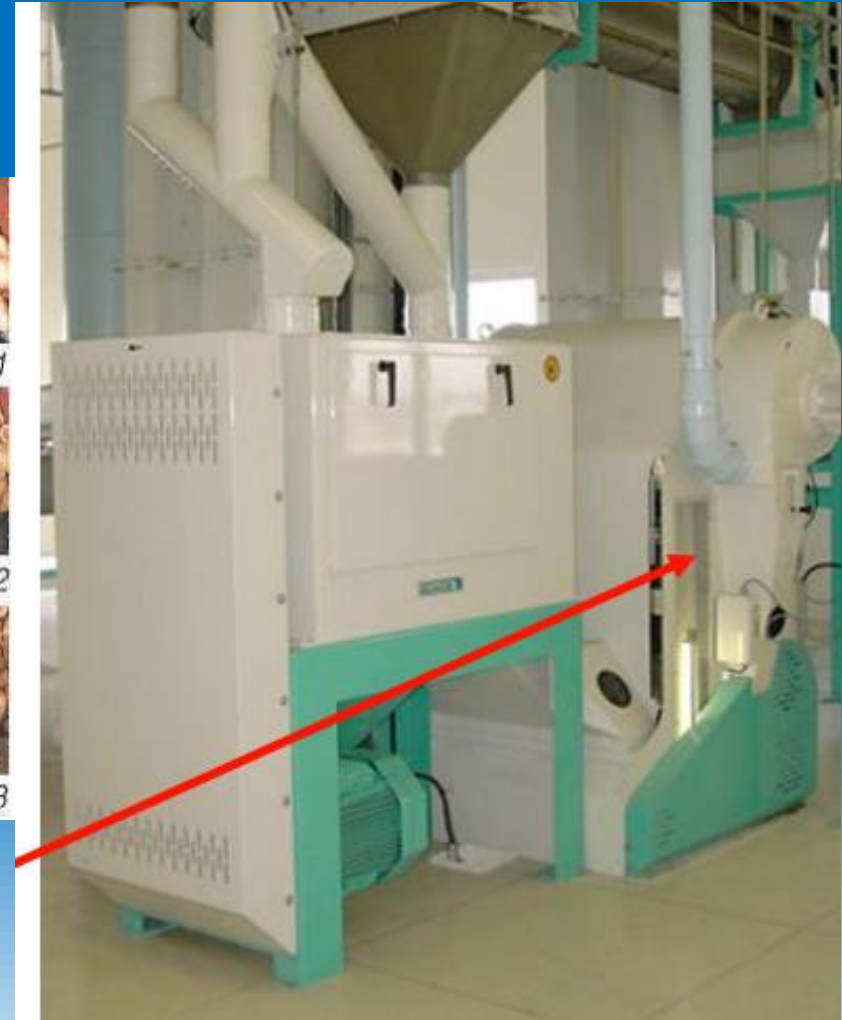
Working Principle

➤ Friction of:

1. Grain Against Screen
2. Grain Against Rotor Segments
3. Grain Against Grain



Aspiration Channel after Scourer
for Removal of Remaining Dust



Light Peeling Process

Peeling with DC-Peeler by “Friction”



ASPIRATION / PNEUMATICS

Application

- For Keeping Machines and Systems Dust-free
- To enable machines to work properly that are using air as a machines like Destoner / Aspiration Channel.
- To provide cooling effect to the product and / or machines.
- Pneumatics Use Air as Transportation Medium



SINGLE FILTER ASPIRATION

Every bin has its own aspiration filter.

Advantages:

- Simple Layout (less ducts)
- Better Sanitation
- Separation of Flour Quality
 - Each aspirated flour will be kept at the destination bin.
 - No Product Cross-Contamination



PNEUMATIC CONVEYING SYSTEMS: FEATURES

- Long Conveying Distances
- Flexible Layout of Conveying Pipe
- Less Space Requirement
- Dust-free Operation
- No Product Residues in the Conveying Lines
- High Sanitation
- Simple Automation
- Less Maintenance
- Closed-loop system for the handling of explosive materials or for the aroma protection or by using nitrogen or other inert gases.
- Lower Investment Costs for Many Applications

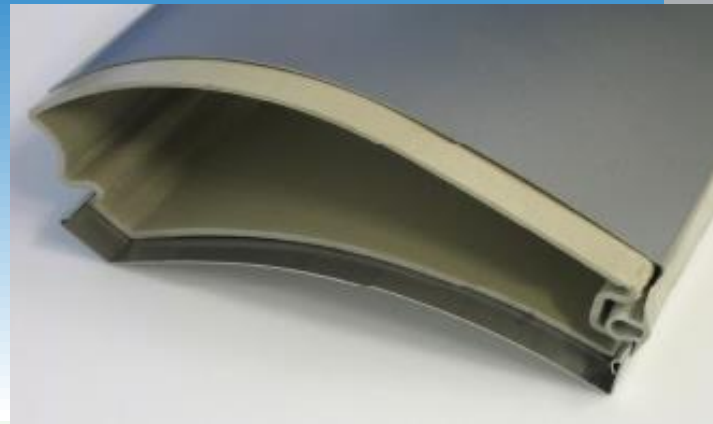


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HYGIENIC DESIGN FOR ULTIMATE SANITATION

- Stainless Steel
- Easy Swing-up Cover
- Swing-out Feed Module for Residue Free Discharge of the Feed Device



Flour Milling Machines Roll Stand Floors



1970's



1940'S



INTERNATIONAL ASSOCIATION
OF OPERATIVE MILLERS



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INTERNATIONAL ASSOCIATION
OF OPERATIVE MILLERS

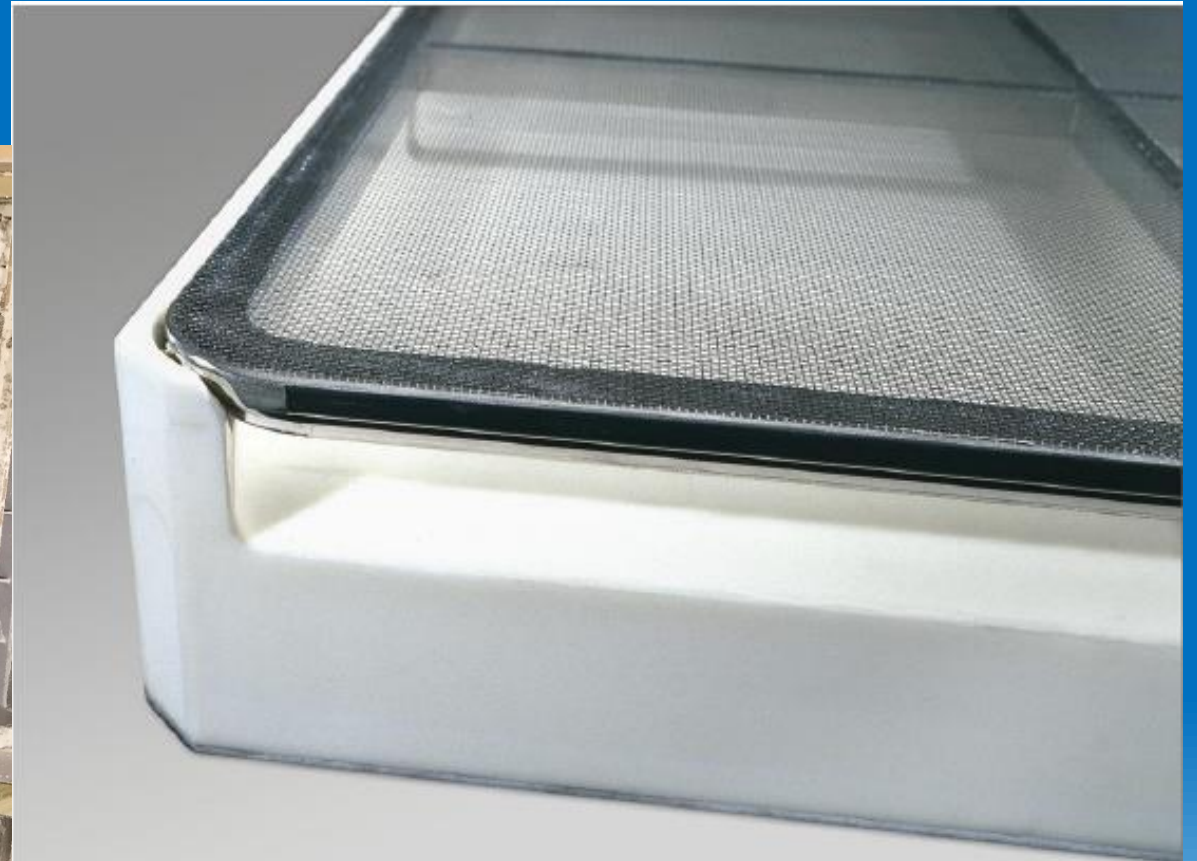
SANITATION/DESIGN IMPROVEMENTS IN SIFTERS



- Completely Insulated Compartments
- Housing of Stainless Steel



Wooden Sieves



NOVAPUR – GENERATION



PLANSIFTER

- All Product Touching Parts in Stainless Steel or Food Grade Plastic – Replacing Traditional Wood Sifter
- 2-10 Compartments with Modular Design
- Optimum Sifting Efficiency
-



FLOUR STERILATOR - 99.9% KILL RATE



QUALITY ASSURANCE – CONTROL SIFTERS

Recommended Positions:

- Directly After the Mill
- Before Bulk Loading
- Before Packing

Benefits:

- Removal of Foreign Particles to Avoid Product Liability Claims
- Indication for Broken Sieves in the Milling Process (Overtailing Product)



Inline Magnetic Monitor

- Magnet Strength Monitor
- Can be Used on Inline Magnets
- Existing Magnets can be Refitted
- Monitor will signal when to clean a magnet.

Inline Magnetic
Separator w/
Monitor



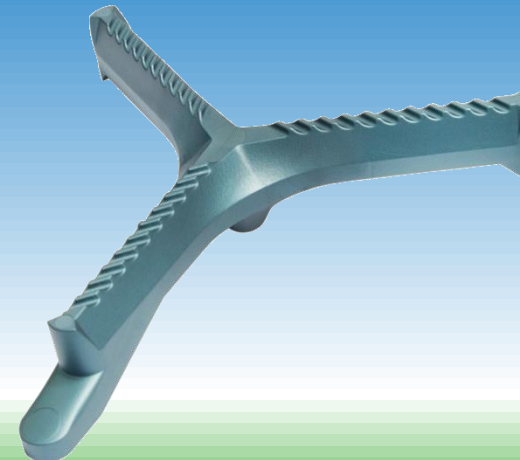
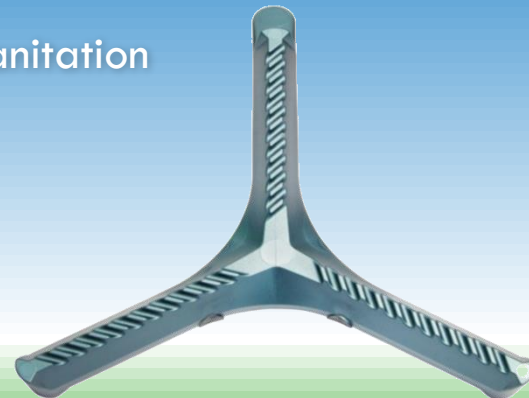
NOVABLUE - BRISTLELESS AND DETECTABLE SIEVE CLEANER

The new sieve cleaner is our answer to increasing food safety requirements. This sifter comes without bristles and is detectable.

- For our customers who prefer cleaners for flour sieves without bristles or for those who are not allowed to use sieve cleaners with bristles, the new NOVABLUE is the perfect solution.
- NOVABLUE is suitable for use in the production of hard and soft wheat as well as durum.
- No more Bristles → Highest Sanitation

Benefits

- Bristleless Sieve Cleaner
- Detectable: Optically and by Metal Detectors
- Temperature-; Fat- and Enzyme-Resistant



NIR MULTI ONLINE ANALYZER

- The measurement system guarantees precise monitoring in real time thanks to NIR spectroscopy.
- Product data is available in real time.
- Immediate corrective measures can be undertaken during the ongoing production process.
- Online testing of moisture, protein, and ash contents of raw material and final products.
- Reliable and Reproducible Measurement Results

Benefits

- Precise Monitoring in Real Time
- Reduced Costs and Lower Maintenance
- Flexible Installation and Absolute Product Safety



NIR Multi Online Analyzer

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FLEXIBLE INSTALLATION AND ABSOLUTE PRODUCT SAFETY



- Compact measurement probes.
- Hardware is not affected by dust, temperature, vibrations.
- Compact, flexible installation – for example directly on the gravity spouting.
- The compact sensors are excellently suited for the retrofitting of existing plant.



TRACEABILITY WITH ONLINE-SENSORS

- Problem: Color and specks are important quality parameters in fresh dough.
- Measurement: Color
- Measurement: Specks (black, brown, colorless $>80\mu$)
- Benefit: Real-time Intake Control
- Quick Reaction Time
- Consistent, High End Product Quality



ASPIRATION SYSTEMS ENSURE DUST-FREE OPERATION



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PRODUCTION TRACEABILITY – INTEGRATED IN CONTROL SYSTEM

Transfer Silo - Buchweizensilo : Job Detail Statistics

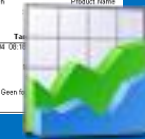
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Chargennummer	: A009	
Additional Job	:	
Product Ident	: Austr. Weizen	Product Name
Het cyclische testen Conditionering	: 80 [h]	Onbest.
Start Time	: 14.07.2004 06:15:55	Target
End Time	:	
Job Weight	: 103	
Job Flowrate	: 5	
Error Message	: 0	Geen fout
Component Class	: Sender	



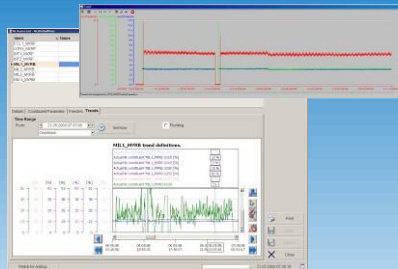
Report Manager

Transfer Silo - Buchweizensilo : Job Detail Statistics

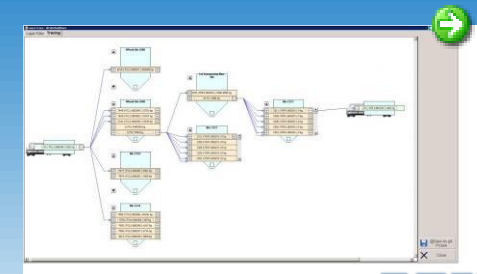
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Statistic Manager

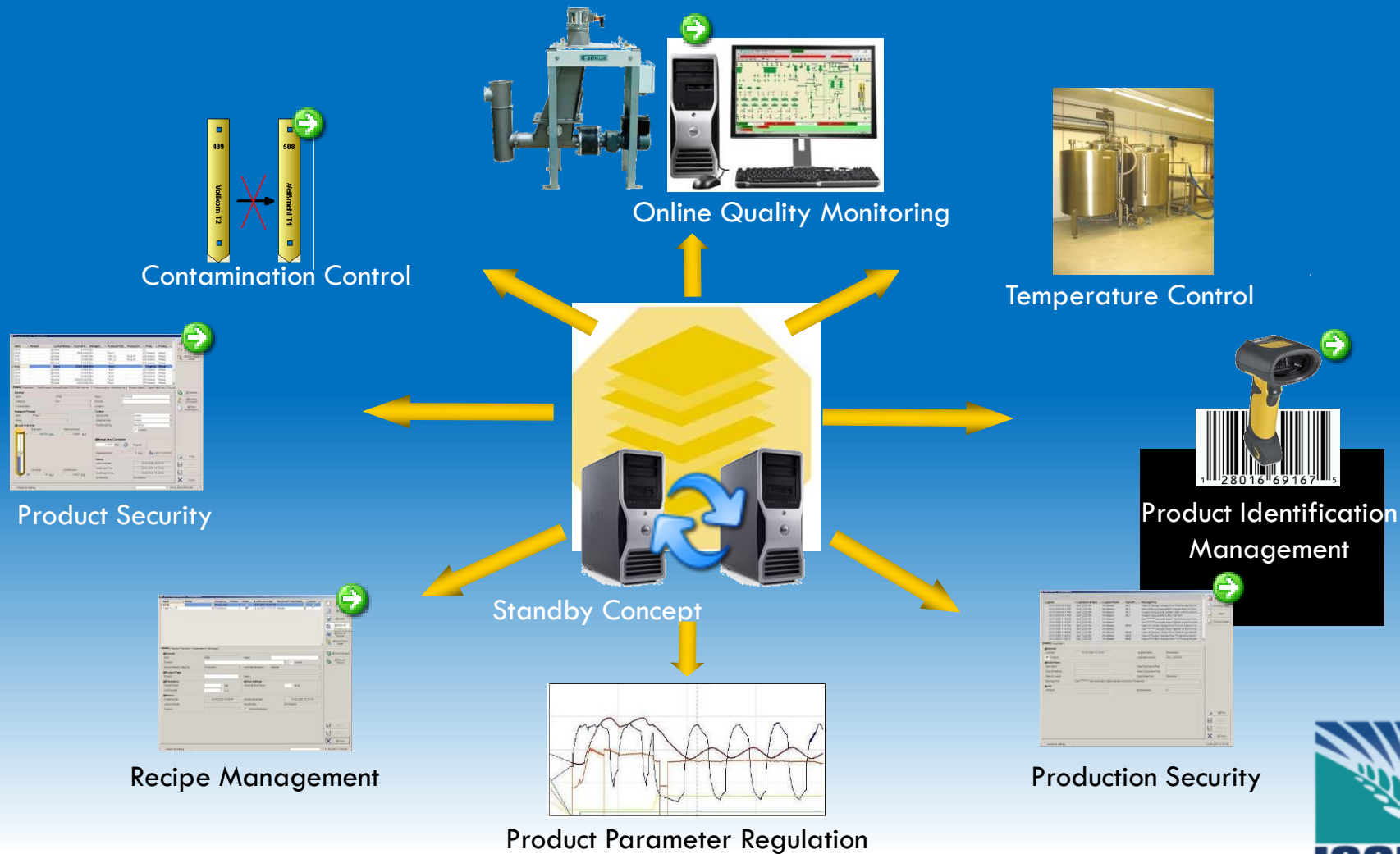


Trending Manager



Traceability

PRODUCT AND PRODUCTION SECURITY



TOP SANITATION ON FINAL TRANSFER SIFTERS

- NOVAPUR sieve stacks made of polyurethane with stainless steel frame inserts guarantee maximum sanitation: wood, nuts and brackets are things of the past.
- In addition, product build-up is prevented by the smooth profiles.
- Fully insulated, stainless steel compartment: all interior walls and doors are effectively insulated, thereby reducing the formation of condensation significantly.
- Each component in contact with the product is made of stainless steel or high-quality PUR.



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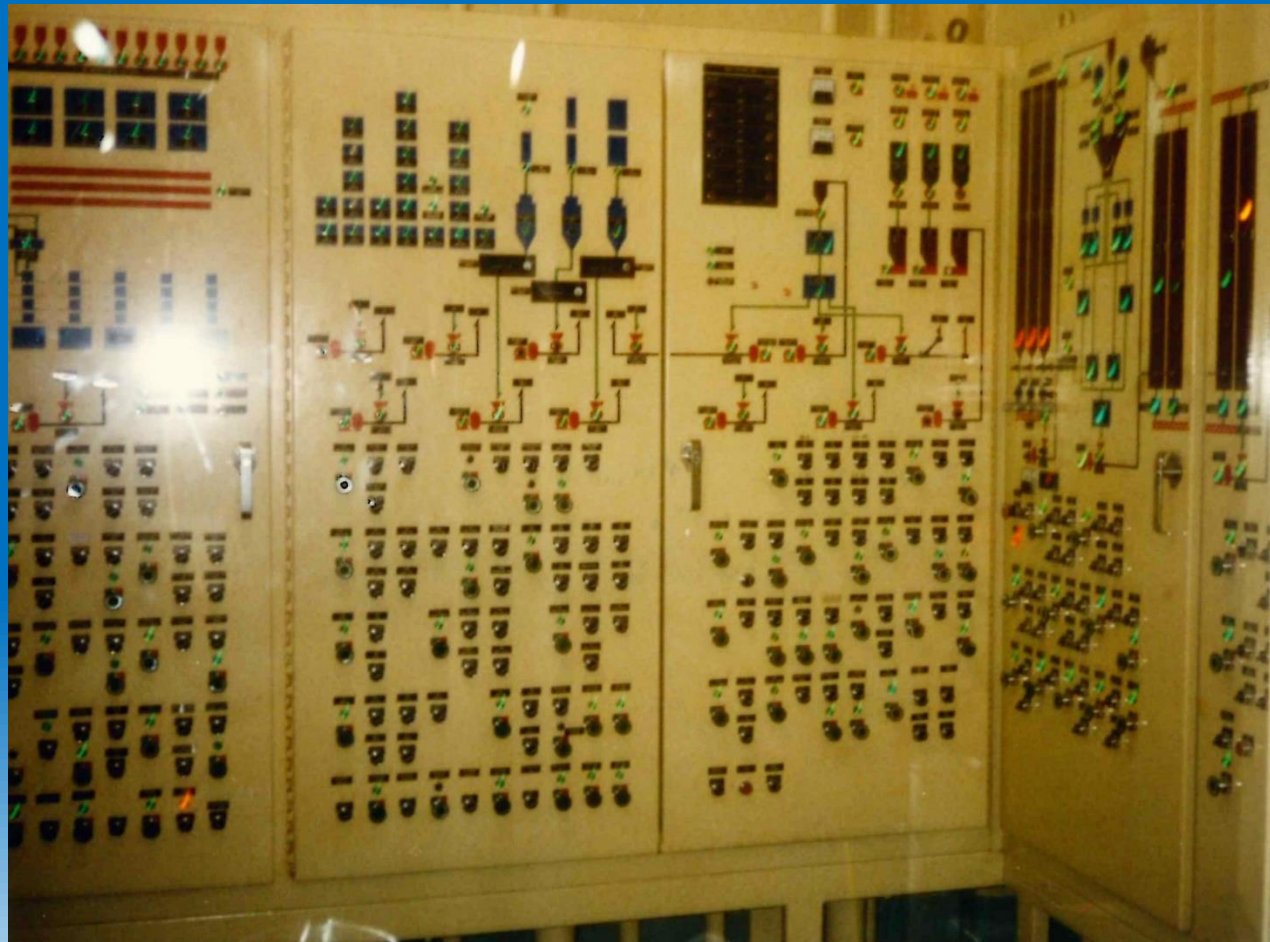
THE FUTURE?

CONFIRMING QA DEVICE IS OPERATING CORRECTLY

- Using Online Particle Size Analyzer to confirm final sifter is operating correctly.
- Machine Assembled Correctly
- No holes in sieves, that mean final screening not operating correctly.



Today's State of the Art Milling Technology

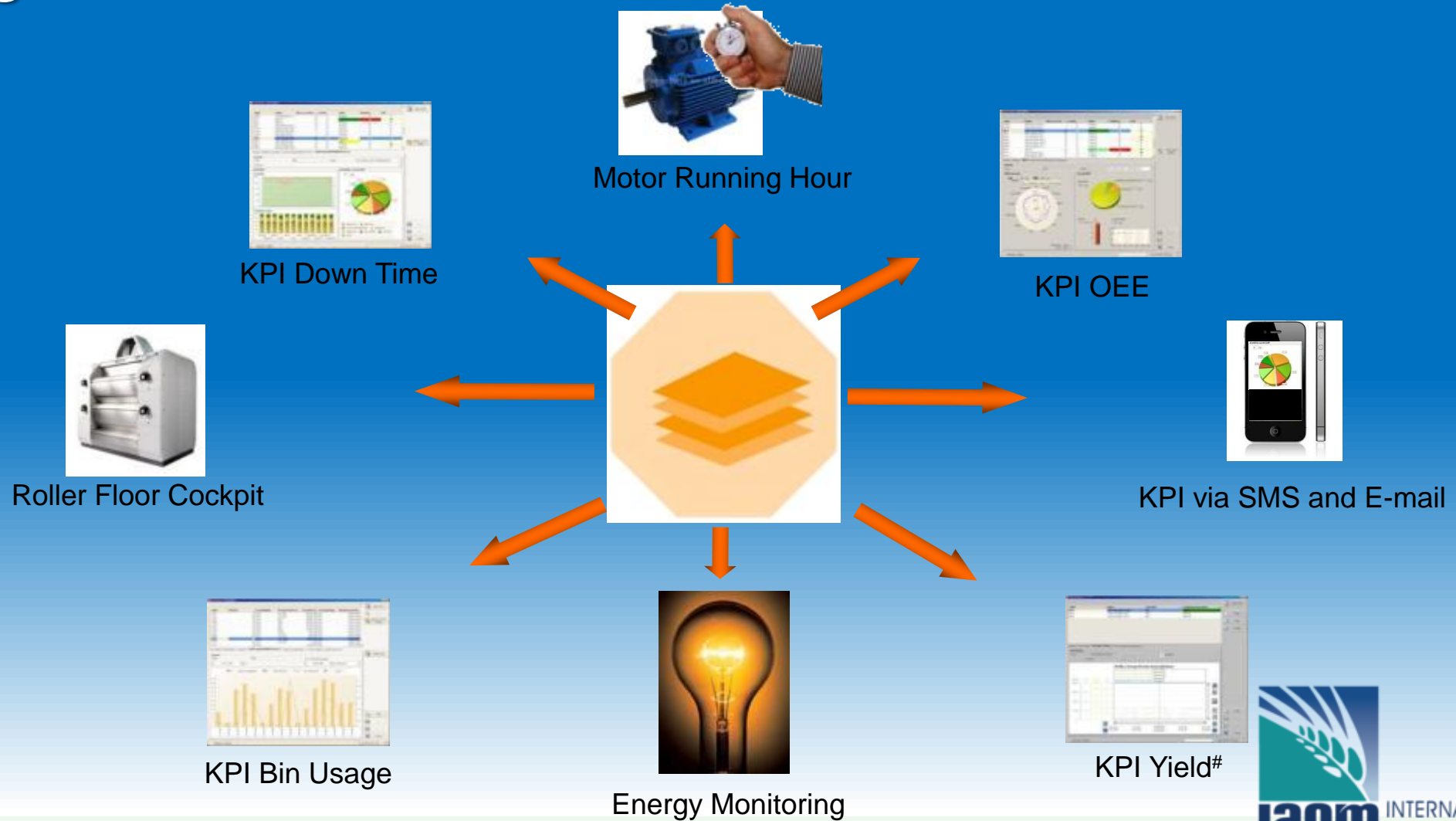


1960'S
MILL CONTROL TECHNOLOGY



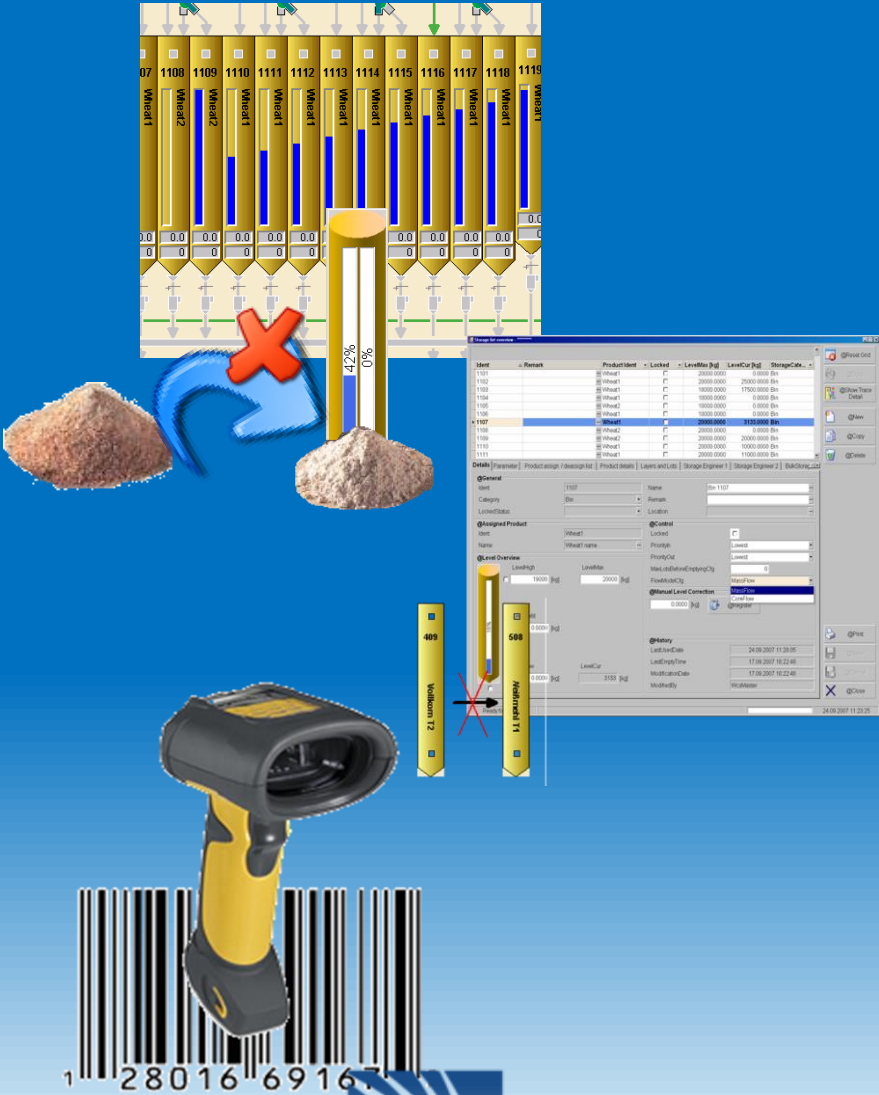
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Management Information



Plant Control System

- Avoids an unintentional mixing of various products in the receiver bins.
- The system is checking the receiver bins prior to starting the conveying process.
- Avoids cross-contamination in the production process.
- To Increase Product and Production Security
- Prevents Production Losses
- Make sure, that your clients have no reasons for complaints.
- Automatic lock or cleaning request for silos or production lines.



Plant Control System

- Identification of raw material supply by the use of Barcode or RFID-Scanner.
- A communication interface allows a smooth data transfer.
- Allows to Compare Target Values
- Scanned data will be registered and stored.
- Reduce operating faults and improve product safety.



Summary

- Product Protection
- Allergen Management
- Dust Control - Hygiene
- Avoiding Cross Contamination
- Managing Condensation
- Traceability
- Ingredient Management
- GMP
- Key Safety Records
- Management of Operator Risk
 - Errors
 - Hygiene



THANK YOU!

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