The paper chain:
Why packaging flour in paper bags makes perfect sense

How the packaging material properties influence the speed of a flour filling line material

Presented by:
Mark Wild & Lars Bergström
“The Paper Chain”

- **Paper Supplier**
  - Stephen Hollinshead
  - BillerudKorsnas

- **Converter**
  - Vijay Chandaria
  - Dune Packaging Kenya

- **The Miller**
  - Nirmal Shah
  - Goldleaf Mills Kenya

- **The Packaging Machine Supplier**
  - Mark Wild
  - FAWEMA Germany
Each element in the chain plays an important role:

Let’s look at each one more closely
Good packaging meets a lot of requirements throughout the supply chain

what's important?
- output
- cost
- consistency
- food safety
- hygiene
- logistics
- durability
- shelf-life
- brand
- visual appeal
- tactility
- brand connection
- functionality
- ease of disposal
- environment
- cost
Drop testing in our packaging lab
Reliable bag making, filling and sealing process

- High output
- Consistent weight and quality
- Food safety and hygiene
- Cost-efficient packaging operation

Bag making machine
Considerations in selecting the packaging of my product:

- Hygiene and food safety
- Environmental impact
- Cost effectiveness
- Suitability in hot and humid climate
- Attractiveness on the shelf
- Availability of packaging material
- Print quality and appearance
- Availability of packaging material
Settling (compacting) of the flour influence

- Filling speed
- Palletizing
- Appearance
Air Resistance - Gurley

The time in seconds for 100 ml air to pass through a paper sample of a specific area.

*Unit: s*
Surface roughness

The volume of air per unit of time that passes between the edge of a measuring head and the surface in question under specific conditions and at operating pressure.

*Unit: ml/min*
Filling trials at Lantmännen Denmark

Participants from Fawema, BillerudKorsnäs and Lantmännen

Date: May 28th 2018

- Test the filling rate for different paper bags
  - Six different 1 kg bags
  - Seven different 2 kg bags

- Test both 1 kg and 2 kg flour bags *(produced at Fiorini International)*
  - Lantmännen standard flour
  - 1 kg machine speed: 75 bags/min
  - 2 kg machine speed: 90 bags/min
Settling (compacting) rate

1. Measure the flour height every second "settling station".

2. Stop the machine every 25th second
   - Enough time to get new “untouched” bags on the stands
   - Five measurements at each station/bag

3. Using a metal ruler to measure the height
   - The height was measured at 6 different stations

4. Analyze and compare the results
2 kg – “same” air resistance but different roughness of the bag inside
2 kg, Same paper, changed smooth/rough side on bag inside

FLOUR HEIGHT (MM)

- Conflex Silk MG side in
- Conflex Silk MG side out

STATION 1 | STATION 2 | STATION 3 | STATION 4
1 kg, “Same” roughness but different air resistance
1 kg, Same paper, changed smooth/rough side on bag inside

- Conflex Silk MG side in
- Conflex Silk MG side out
1 kg, Same paper, changed smooth/rough side on bag inside
Conclusions

- The trials shows that the surface roughness of the inside of the bag is NOT important for the settling of the flour.

- The air resistance (Gurley, s) of the packaging material influence the settling of the flour. This means that plastic bags, clay coated or varnished paper bags and paper bags with high Gurley can be problematic. Attention should also be paid to how the printing is done.
Final Conclusion

WHY PACKAGING FLOUR IN PAPER BAGS MAKES PERFECT SENSE

1. Paper bags offer a safe and strong packaging material for flour
2. Paper bags can be sourced locally world wide and be produced efficiently
3. Paper bags offer the miller a hygienic and attractive route to market
4. Paper as a packaging material guarantee a compact final package at high speed
5. Paper bags on an automatic filling line deliver high volumes, high reliability and high efficiency

SAFE, Economical and environmentally friendly solution for the consumer
Thank you