

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**

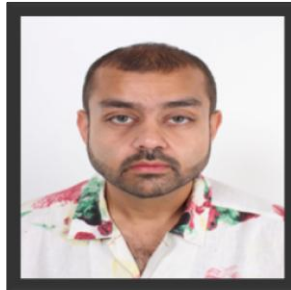
“The Paper Chain”

Paper Supplier



**Stephen
Hollinshead
BillerudKorsnas**

**Converter
Paper Bag Supplier**



**Vijay Chandaria
Dune Packaging
Kenya**

The Miller



**Nirmal Shah
Goldleaf Mills
Kenya**

**The Packaging
Machine Supplier**

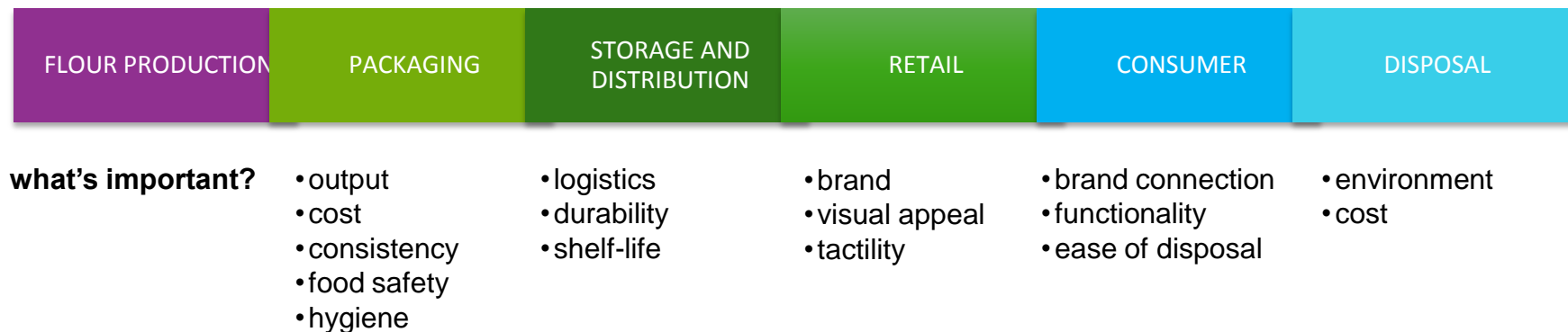


**Mark Wild
FAWEMA
Germany**

**Each element in the chain plays an
important role:**

Let's look at each one more closely

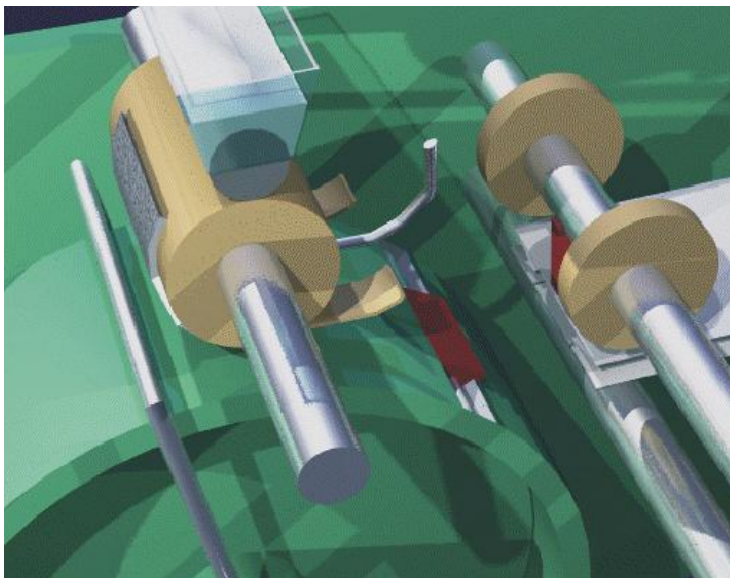
Good packaging meets a lot of requirements throughout the supply chain



Drop testing in our packaging lab



Reliable bag making, filling and sealing process



Bag making machine

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

Hygiene and
food safety

Availability of
packaging material

Environmental
impact

Considerations in
selecting the
packaging of my
product

Print quality
and
appearance

Cost
effectiveness

Attractiveness
on the shelf

Suitability in
hot and humid
climate

 BILLERUDKORSNÄS



Settling (compacting) of the flour influence



Filling speed



Palletizing

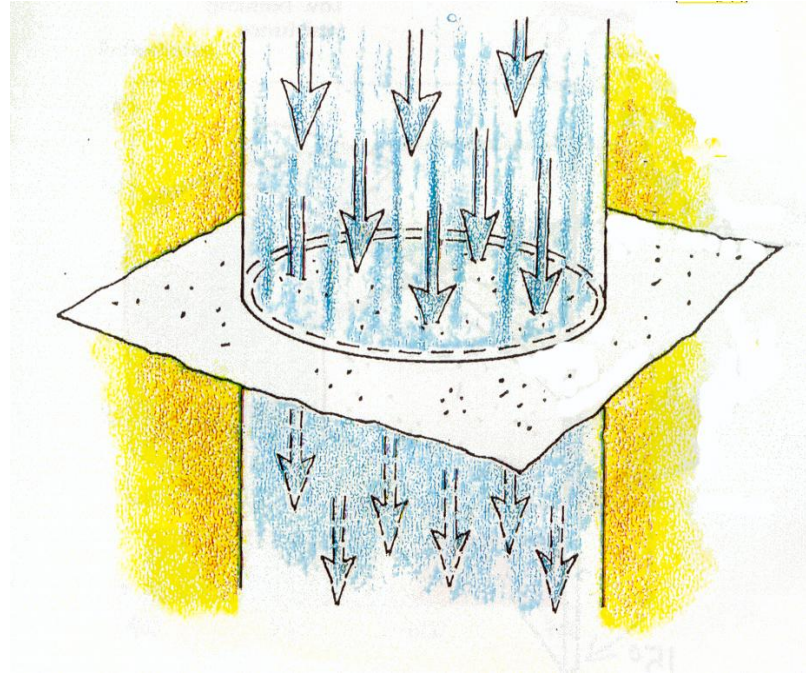
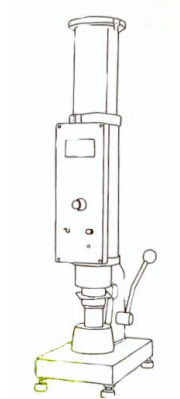


Appearance

Air Resistance - Gurley

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

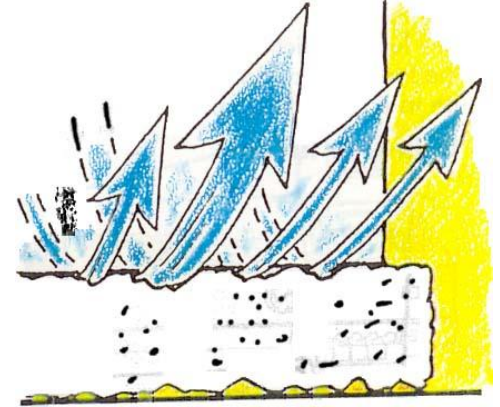
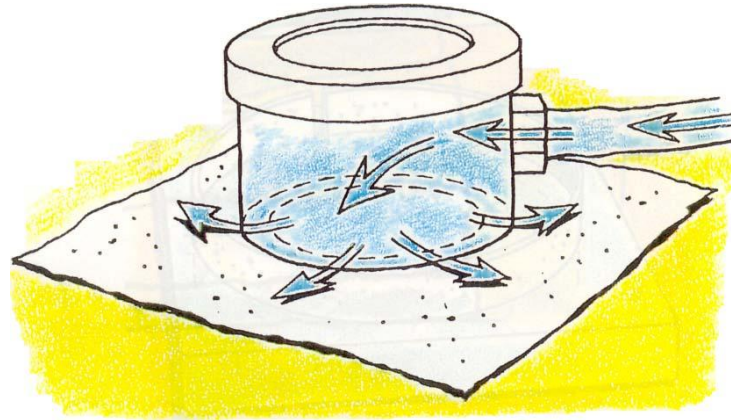
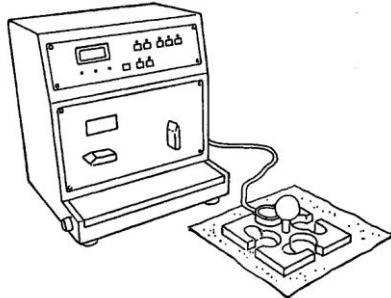
Unit: s



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

- ④ Test the filling rate for different paper bags
 - › Six different 1 kg bags
 - › Seven different 2 kg bags

- ④ 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

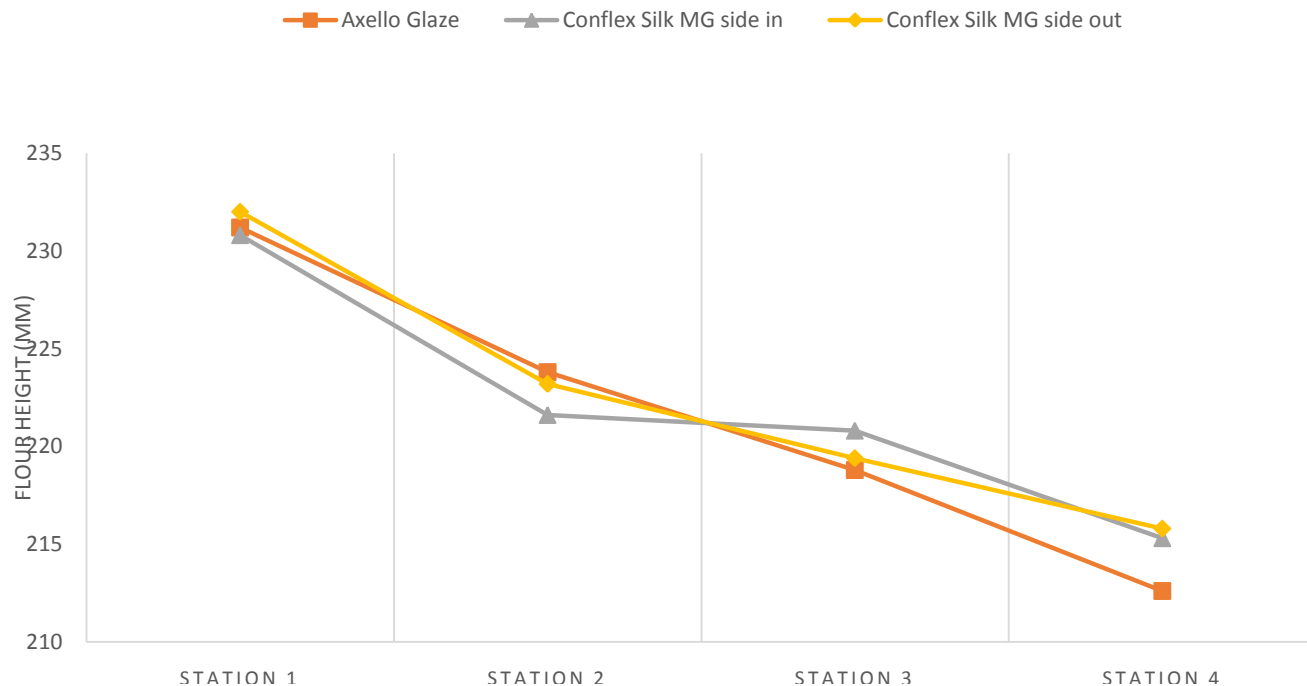


Settling (compacting) rate

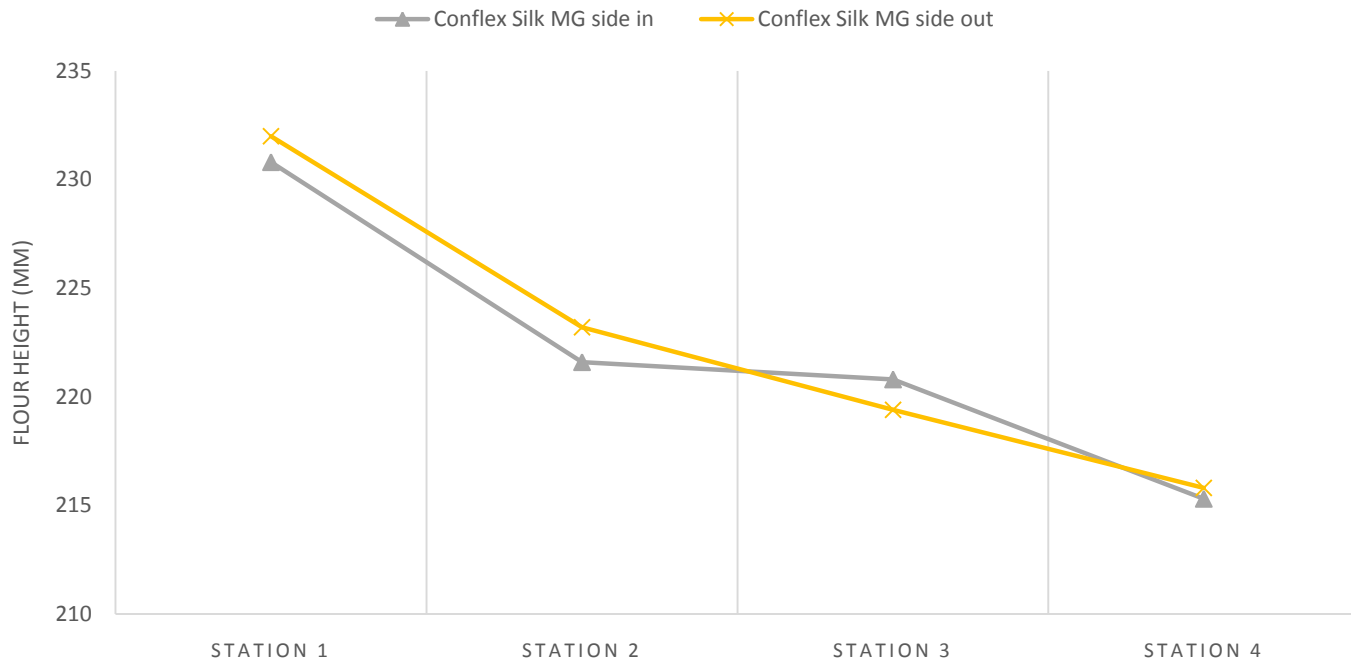
- ④ Measure the flour height every second "settling station"
- ④ Stop the machine every 25th second
 - Enough time to get new "untouched" bags on the stands
 - Five measurements at each station/bag
- ④ Using a metal ruler to measure the height
 - The height was measured at 6 different stations
- ④ Analyze and compare the results



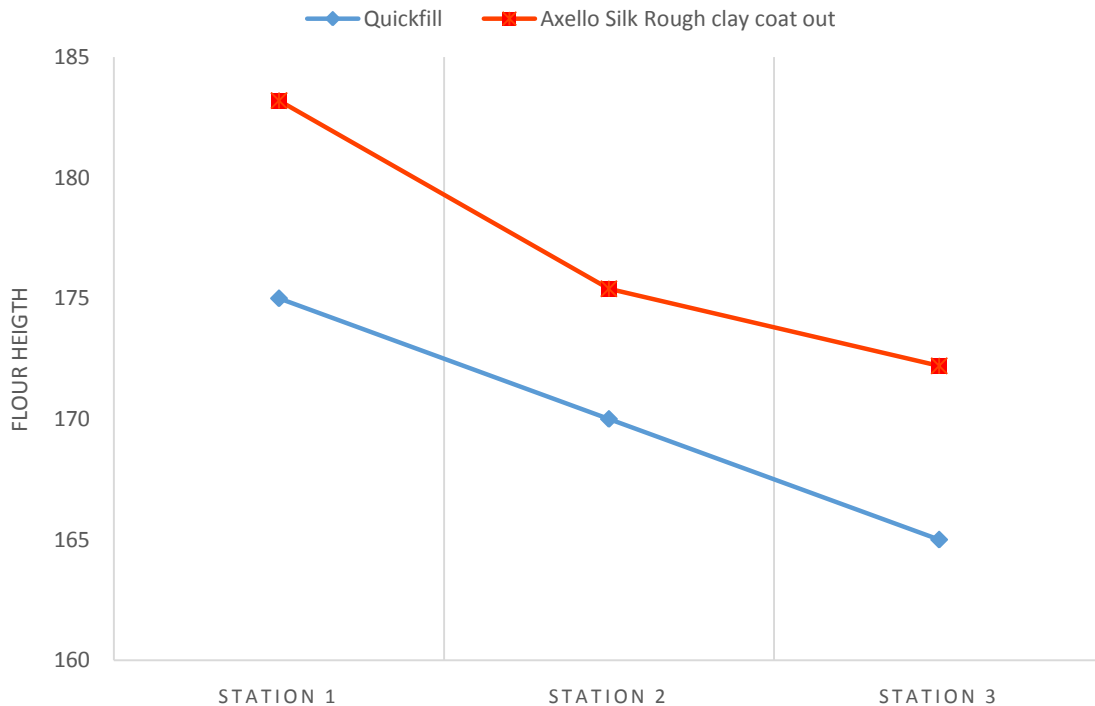
2 kg – "same" air resistance but different roughness of the bag inside



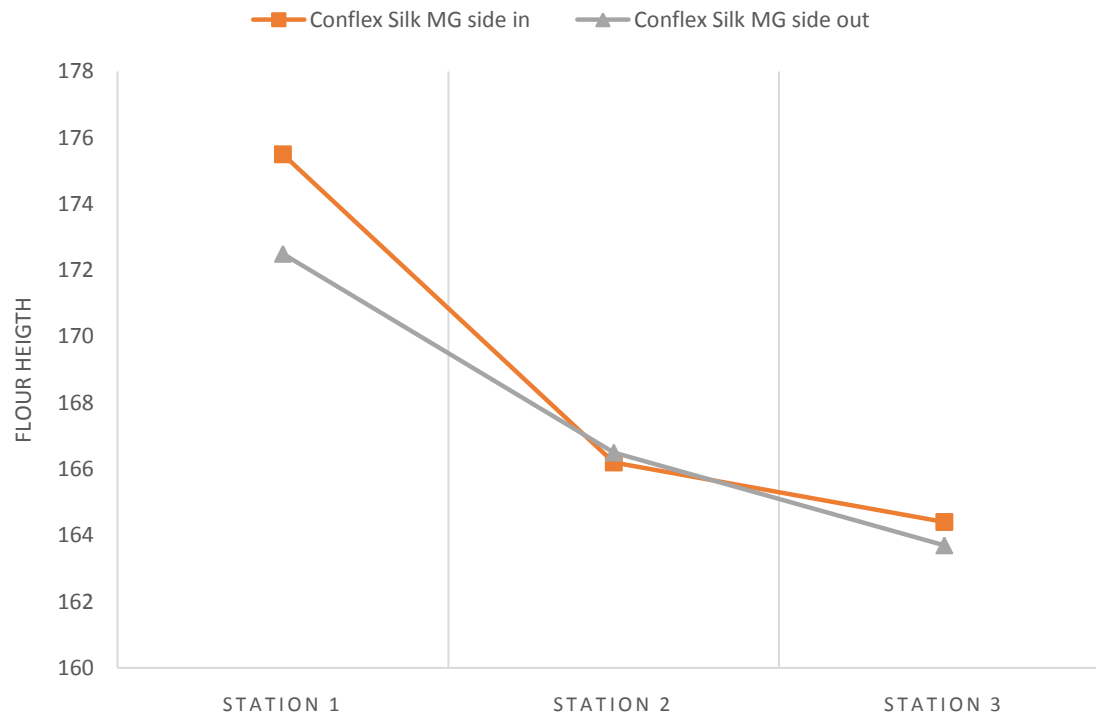
2 kg, Same paper, changed smooth/rough side on bag inside



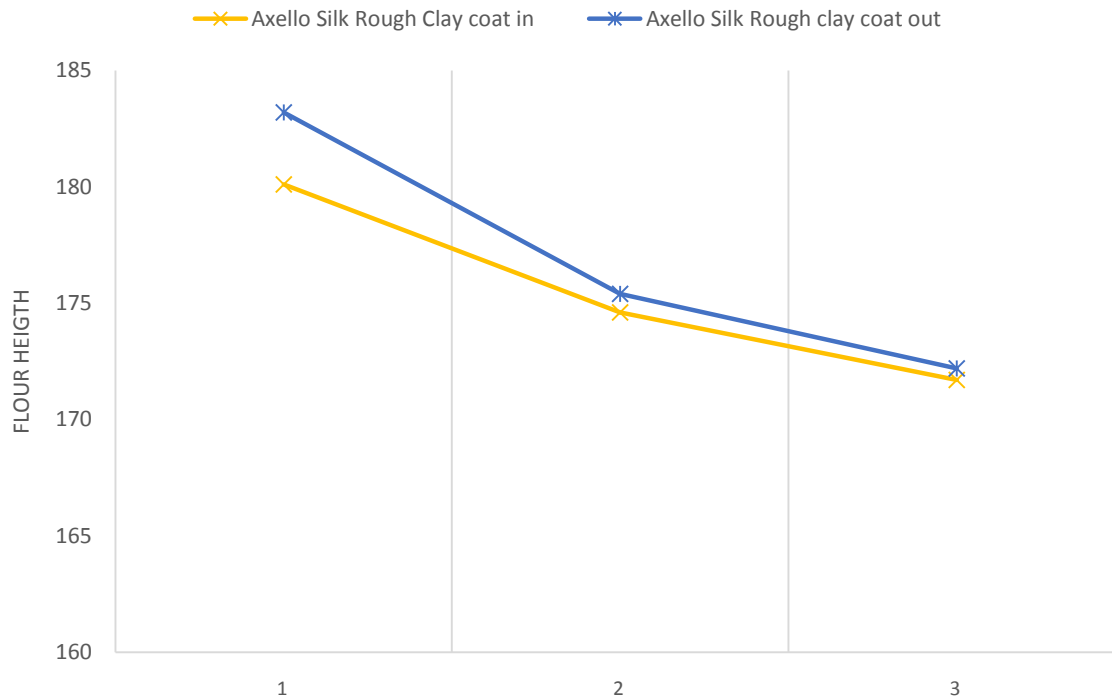
1 kg, “Same” roughness but different air resistance



1 kg, Same paper, changed smooth/rough side on bag inside



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