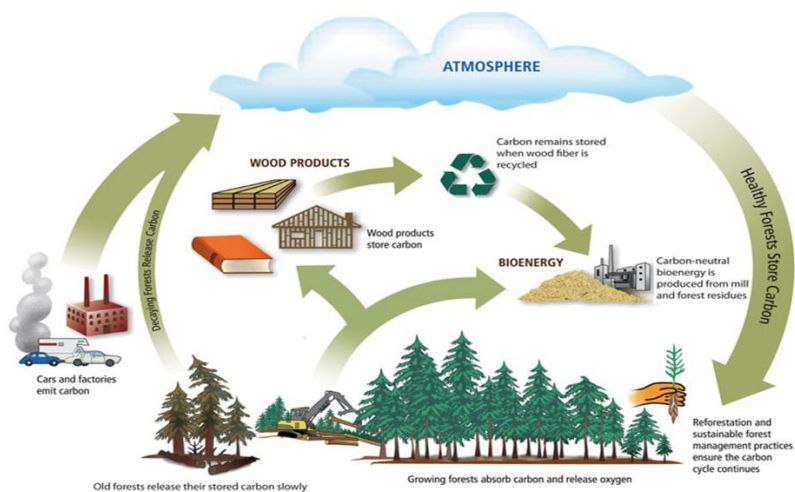




THE SUSTAINABLE FOREST CYCLE



PAPER SACKS ARE USED ALL AROUND THE WORLD!





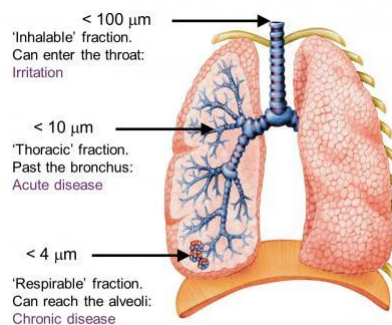
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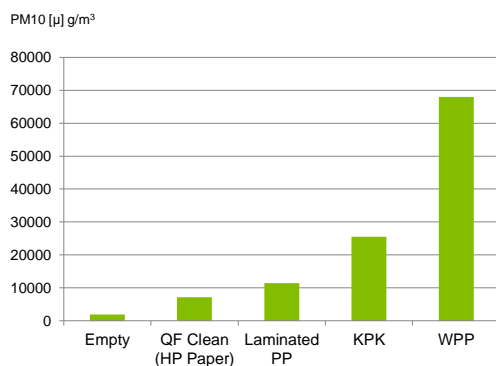
EXCESSIVE EXPOSURE TO CEMENT DUST IS BAD FOR HEALTH

- Nose and throat irritation
- Occupational asthma
- Silicosis or scarring of lungs - loss of lung function, severe shortness of breath
- High concentration can lead to death
- Regular Portland cement
 - > 10wt% < 2µm



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PACKAGING HAS HIGH IMPACT ON DUSTING

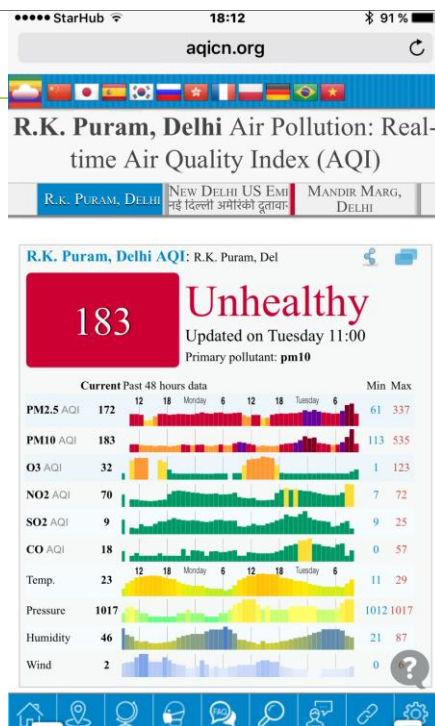


WHO Air quality standards
 PM_{2,5} - 10 $\mu\text{g}/\text{m}^3$ and 25 $\mu\text{g}/\text{m}^3$
 PM₁₀ - 20 $\mu\text{g}/\text{m}^3$ and 50 $\mu\text{g}/\text{m}^3$

Air Quality Index (AQI) Values	Levels of Health Concern	Colors
When the AQI is in this range:	...air quality conditions are:	...as symbolized by this color:
0 to 50	Good	Green
51 to 100	Moderate	Yellow
101 to 150	Unhealthy for Sensitive Groups	Orange
151 to 200	Unhealthy	Red
201 to 300	Very Unhealthy	Purple
301 to 500	Hazardous	Maroon



DELHI AIR QUALITY



CEMENT WASTE

Cement loss in plant (per WPP sack)

	Minimum	Maximum	Average
Losses	400g	1,200g	800g
Recovered (80%)	320g	960g	640g
Lost cement	80g	240g	160g



Cement loss during transport to consumer

	QuickFill Clean	KPK	WPP
Cement loss per handling	2 g	30 g	50 g*
Number of handlings (average)	7	7	7
Total losses per 50 kg sack	14 g	210 g	350 g

*losses through hook damage not measured¹⁰

PLASTIC CEMENT SACKS IN INDIA CAUSE IMMENSE WASTE

- ❖ Indian cement industry 2014 consumption = 265m tons
 - > 80% in 50kg sacks
 - > 4 240 000 000 sacks

Financial Waste	USD millions
Lost revenue - cement waste	185,5
Material Waste	Tons
Cement	2 162 400
CO ₂	1 946 160



- ❖ Global Studies and Estimations 2013 to 2016 – BillerudKorsnäs, Haver and Boecker

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OUR SUSTAINABLE TECHNOLOGY CAN SOLVE THIS PROBLEM

- ❖ **Dust free** and **healthy** due to
 - > High porous paper which filters cement
 - > Pasted, not sewn
- ❖ **Saves money**
- ❖ **Compostable**
- ❖ **50kg** exactly
- ❖ Operationally **similar** to other sack packaging
- ❖ Requires different **handling**

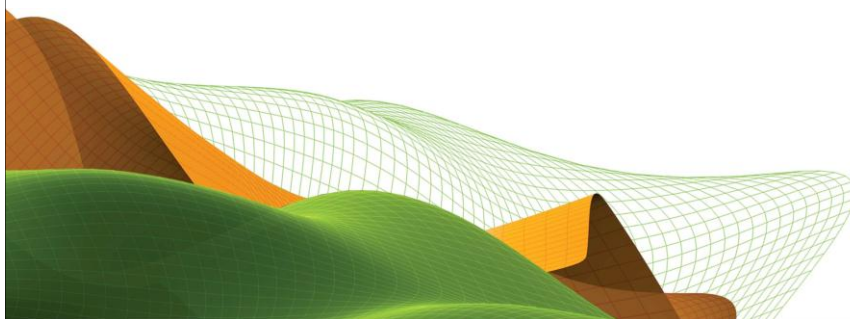


TO MAKE PAPER SACKS WORK IN INDIA...

- Change the way the sacks are handled
- Change the mind-set
- Works on normal filling equipment



BILLERUDKORSNÄS



PLASTIC CEMENT SACKS IN INDIA CAUSE IMMENSE WASTE

- 1 million ton cement plant (100% 50kg WPP sack, USD4,29 per 50kg sack (INR291))

Financial Waste	USD
Lost revenue - cement waste	880 000
Lost revenue – cleaning time (5min/shift)	877 000
Cost of higher maintenance in packing plant	33 000
Cost of PPE (personal protective equipment)	9 200
Cost of damage to environment	130 000
Social cost of CO ₂ of cement waste	367 200
Total	2 297 400
Material Waste	Tons
Cement	10 200
CO ₂	9 180



Global Studies and Estimations 2013 to 2016 – BillerudKorsnäs, Haver and Boecker