



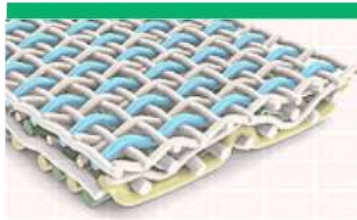
wires & fabriks

... we bring life to paper

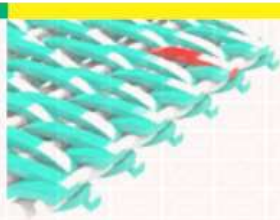
PACKAGING PAPER – NEW FORMING FABRIC DESIGN FOR OPERATIONAL EXCELLENCE

Barathi G

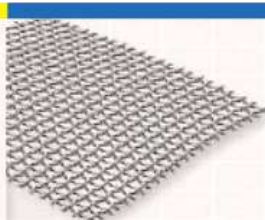
Wires & Fabriks (S.A.) Limited, Jaipur



Forming Fabrics
Conveyer Belts
Press Belts-ETP



Dryer Screens
Spiral Screens



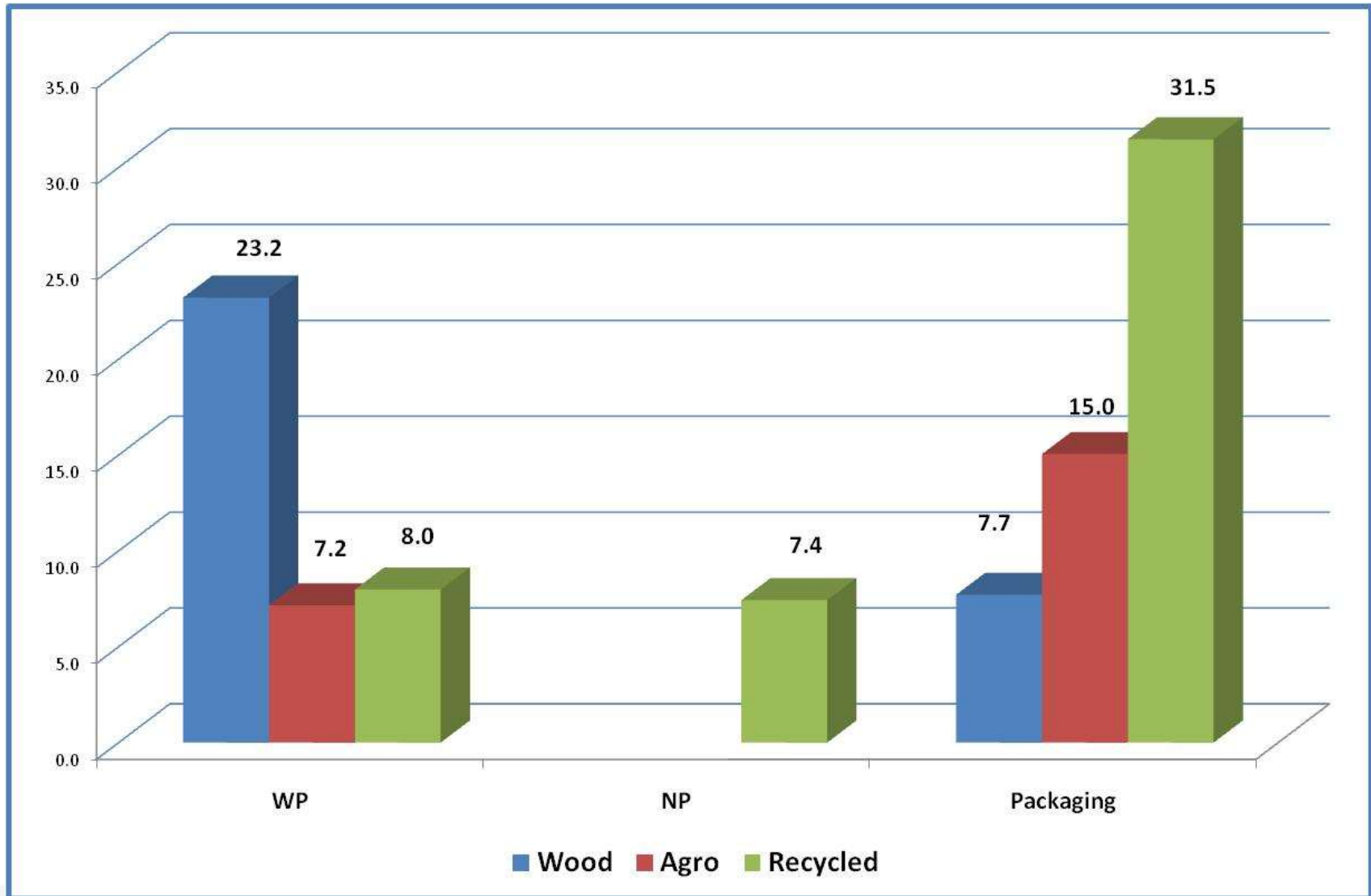
Stainless Steel Mesh
Phosphor Bronze Mesh
Pulp Fabrics



Chemicals



Accessories



% of Recycled packaging is the major group of Indian paper industry (2016)



OPPORTUNITIES:

- Economic and Income growth
- Population growth (changing demographics – Urbanization, increasing of Young population)
- Rapidly changing styles and improving living standards
- Demand for better quality packaging of FMCG products marketed through organized retails (Shopping malls)
- Rising health care spends
- Online medicines
- Increasing preference for ready-to-eat foods



CHALLENGES:

- Rapid changes in technology and automation
- Shortage and rising cost of Raw material
- Rising Energy costs
- Regulations on Environment
- Costly skilled manpower
- Increased Quality standards – for direct and high speed printing requirement

To meet the challenges need improvements in **3 Es – Energy, Environment and Efficiency**



- Forming fabrics for packaging grades must **drain well**, be **mechanically robust** and **provide long life** for economical operation.
- Forming fabrics must have **good mechanical retention** for effective usage of raw materials and fewer fines lost to back water system.
- Forming fabrics must give good dimensional stability of paper by **good formation and good sheet surface** property to feed for high speed automated printing needs.



Paper making in India from 1856 with Metallic wires.

First Generation Synthetic wire (**Single layer**) started in 1950's – Single warp & single weft (4,5 & 8 shaft)

Development of **Multilayer & Shute support Triple Layer** for Cultural papers - High warp density for improve FPR & Life.

Low Density Double Layer developed for Packaging grades (**1.5 Layer**)

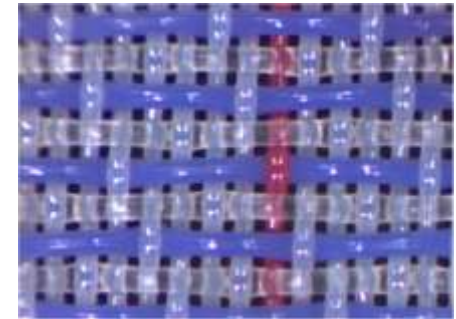
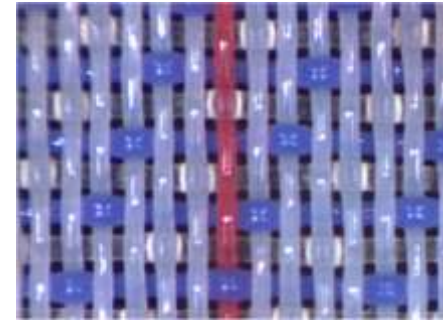
➤ Requirement for fabric for Packaging paper:

- ✓ High drainage (Efficiency improvement)
- ✓ Improved retention (Fiber to Paper cost & Less ETP load)
- ✓ Less drag load (Less Energy)
- ✓ Good sheet release (Improved Paper quality)
- ✓ High off-couch dry sheet (Less steam demand & improved speed)



Advantages:

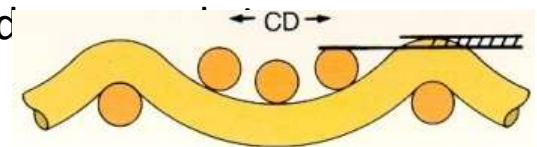
- ✓ Most versatile Design
- ✓ Easy to drain
- ✓ Easy to keep clean
- ✓ Suitable to make all types of paper



There are many designs in Single layer like 4 shed, 5 Shed and 8 shed

Limitations:

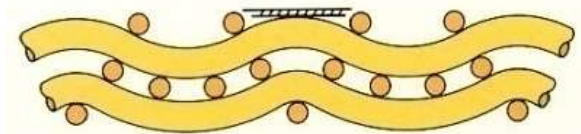
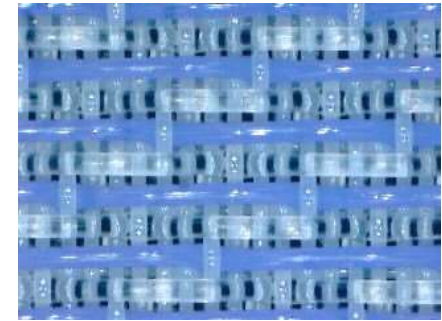
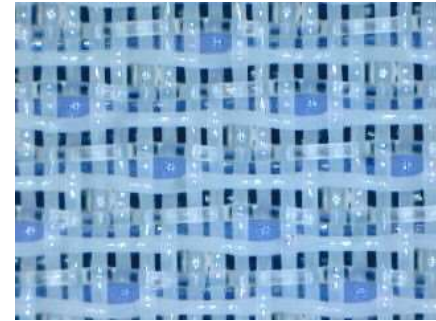
- Less Dimensional Stability on high speed and wide machines.
- Straight Through Drainage – not effective formation.
- Low Retention due to less Fiber support points
- More elongation
- Paper forming side and wearing side cannot be designed single layer fabric resulting in compromise.
- Bleeding issue





Advantages:

- The wear side can be designed with higher diameter yarn to get higher life without sacrificing the paper formation.
- For the same diameter of the strands the FSI increases from 63 to 75+
- Increase in FSI results in improved retention and formation
- These fabrics eliminates the problem of bleeding, inherent in Single Layer Fabrics
- These fabrics are suitable for slow speed machines where Double Layer Fabrics cannot be used.
- These fabrics are relatively dimensional stable on high and wide machines



Limitations:

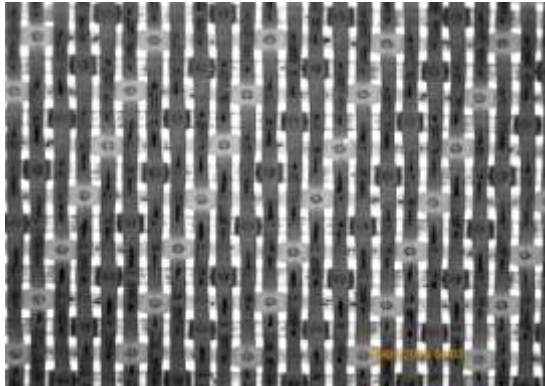
Wire marking problem due to 5 shed CD float on Top surface. This will lead for uneven drainage holes causes drainage marking also.



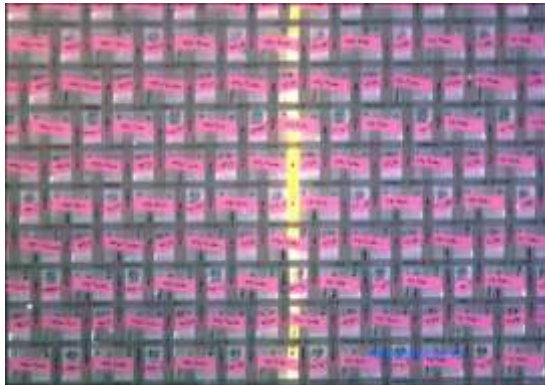
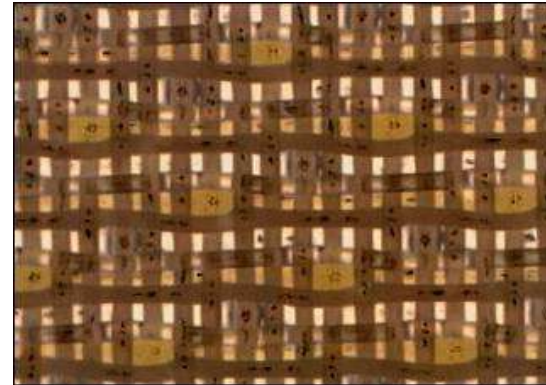
	5 Sh Single Layer	LDDL (1.5 Layer)
Paper Side	21.40 X 16.50	30.50 X 23.00
Machine Side	21.40 X 16.50	30.50 X 23.00
Paper side MD yarn	0.27 PE	0.20 PE
Machine side MD yarn	0.27 PE	0.20 PE
Paper side CD yarn	0.40 PE, PA	0.20, 0.20 PE, PA
Machine side CD yarn		0.35, 0.35 PE, PA
Drainage Area %	31.10%	40.80 %
Fiber Support Index	59	99
Air Permeability, CFM	550	450
Wear Volume. cm ³ /m ²	74	95



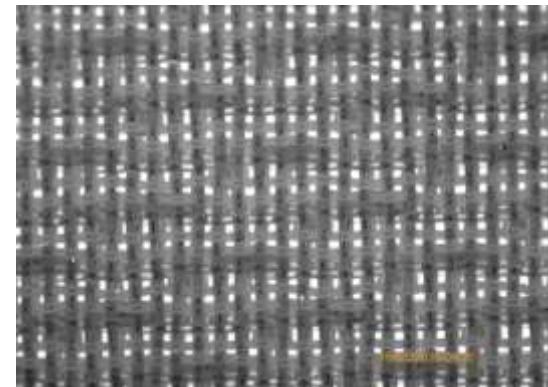
Single Layer



LDDL



Multi Layer



ULTRAPACK

More number and uniform holes – ULTRAPACK – No drainage mark & high drainage



	Single Layer	LDDL (1.5 Layer)	ULTRAPACK
Paper Side	21.40 X 16.50	30.50 X 23.00	22.50 X 23.40
Machine Side	21.40 X 16.50	30.50 X 23.00	22.50 X 11.70
Paper side MD yarn	0.27 PE	0.20 PE	0.18 PE
Machine side MD yarn	0.27 PE	0.20 PE	0.27 PE
Paper side CD yarn	0.40 PE, PA	0.20, 0.20 PE, PA	0.20, 0.20 PE, PA
Machine side CD yarn		0.35, 0.35 PE, PA	0.35 PE, PA
Fabric Caliper, mm	0.77	0.80	1.30
Drainage Area %	31.10%	40.80 %	38.50%
Fiber Support Index	59	99	117
Air Permeability, CFM	550	450	430
Wear Volume. cm ³ /m ²	74	95	131



- **Finer top surface to improve sheet release – no hills and valleys – to catch the fibers, hence no fines carry in return circuit – clean run and improved runnability of machine.**
- **Two warp design to reduce elongation problem on the machine (thicker machine side warp).**
- **Fine top weft for good paper surface properties and robust bottom weft for potential for enhanced life.**
- **Well-known straight through drainage to handle more water on the wire table – more off-couch dryness leads for less Energy consumption in drying area.**
- **Improved Fiber support points for high mechanical retention hence improved formation – less solids to back water system, thus less effluent load to ETP.**
- **Plain Top weave will not leave surface marking to make near to uniform plane on surface.**
- **Due to very even in top surface, less prone for tar or stickies get settled on valleys. Even it sticks on surface; it is easy to clean with the showers from the surface of fabric.**



Stickies:

Stickies are generally considered to be the "pitch" which derives from naturally occurring resinous byproducts in the wood or inks which is used in printing and the glue material used in used Carton materials.

Effect of stickies:

Stickies accumulate in white water systems resulting mostly in deposits on paper forming fabrics, on felt and on wet end equipment.

Consequently, quality problems such as pinholes, increased down time due to frequent break down and clean ups, additional costs for cleaning and prevention, inherent damages to fabric and drying equipment are commonly encountered in the production and use of secondary or recycled fiber furnish.



Stickies:

Larger Sized stickies : >0.42 mm – can be easily removed by mechanical screen process and are not a significant problem.

Medium sized stickies : (0.075 – 0.42 mm) – cannot be effectively removed by mechanical means. They may be pliable making them difficult to remove by screening.

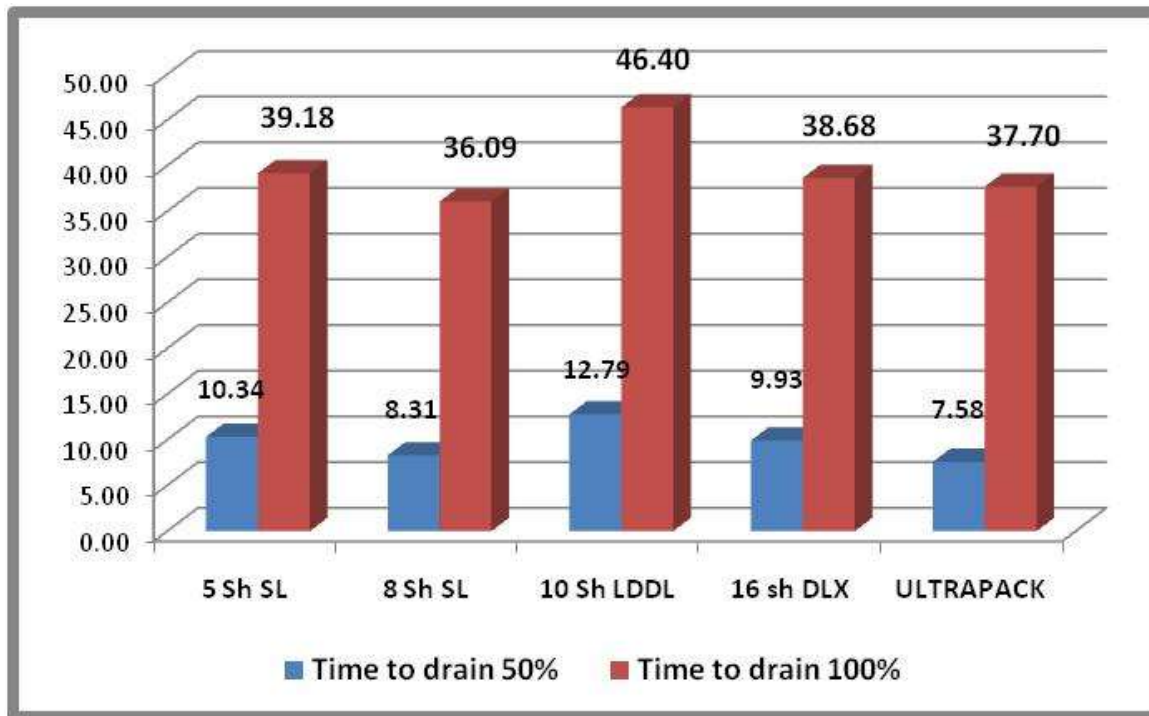
Small size stickies : (<0.075 mm) - are not a problem as long as they remain stable in the furnish. However, once they become unstable, they accumulate, agglomerate, and stick onto surfaces of the papermaking equipment.

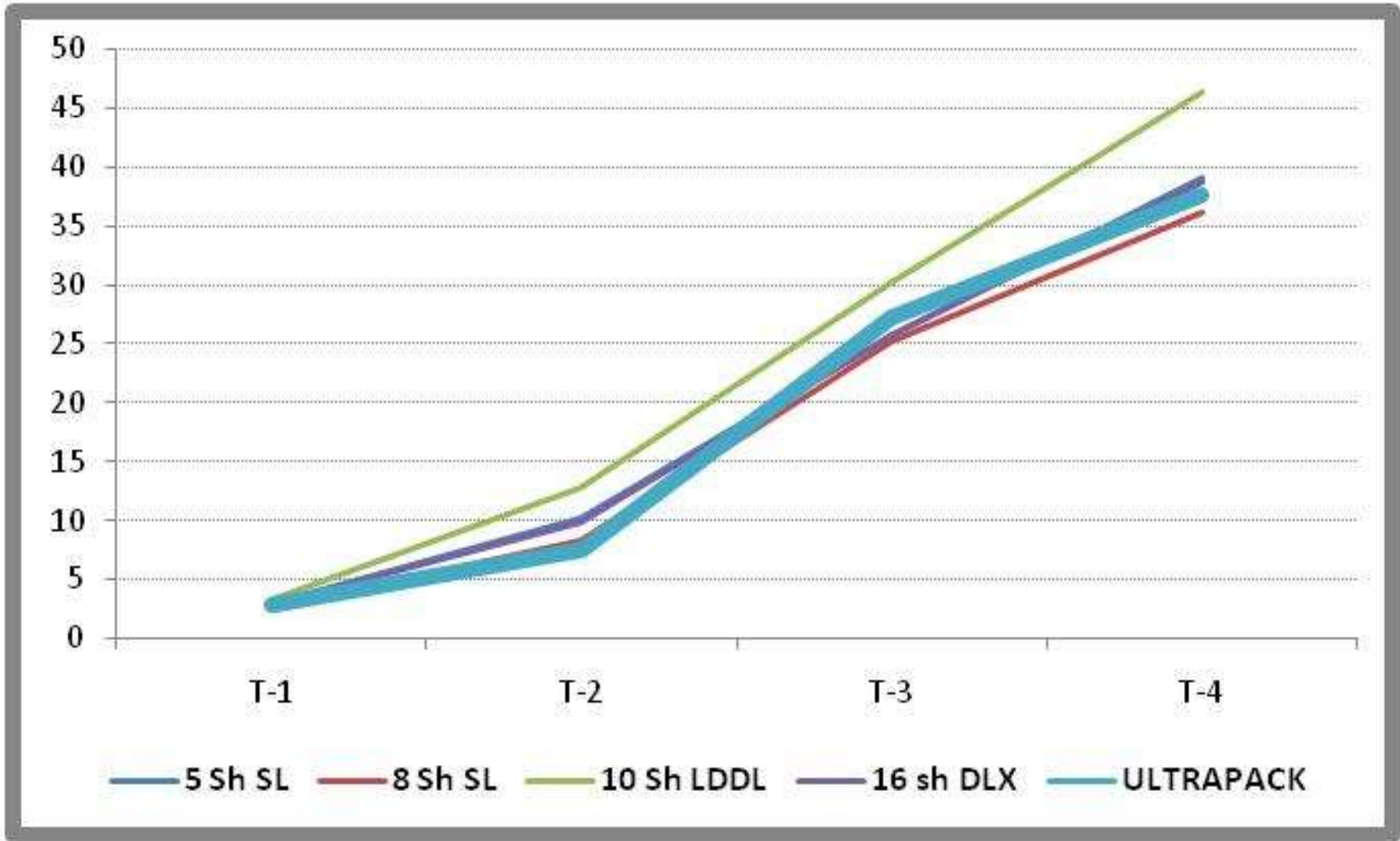
They eventually **grow larger with back water circulation** and are subsequently released into the pulp resulting in pinholes, breakages in the sheet, and poor paper quality.

ULTRAPACK forming fabric will carry the micro-stickies along with the paper while it is in stable stage due to high mechanical retention.



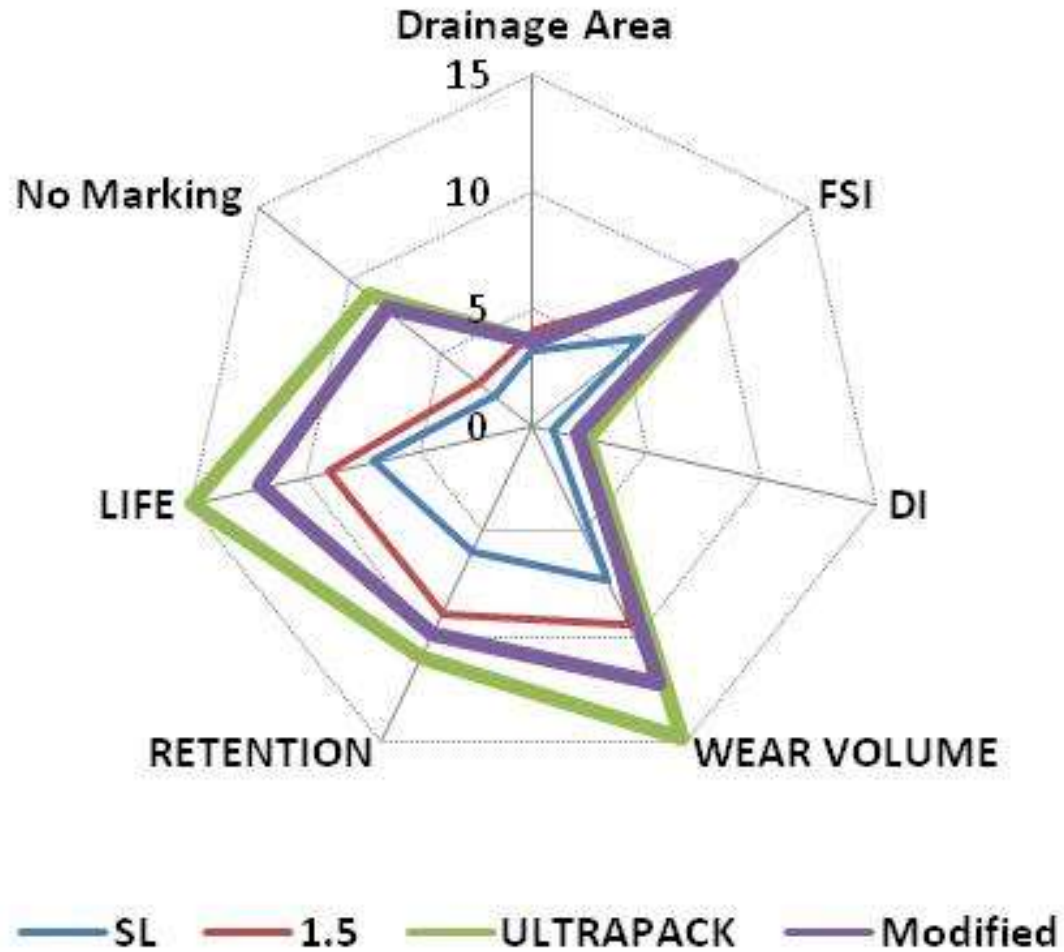
The hand sheet former used to measure the **drainage time taken** for different design of forming fabrics which is used for Packaging grade paper. 100 gsm sheet made with same consistency for measuring the time taken in seconds for different designs.





ULTRAPACK drains same like Single Layer fabric

Comparison of SL, LDDL & ULTRAPACK





Paper made with Single Layer –
Surface marking



Paper made with **ULTRAPACK** –
No marking

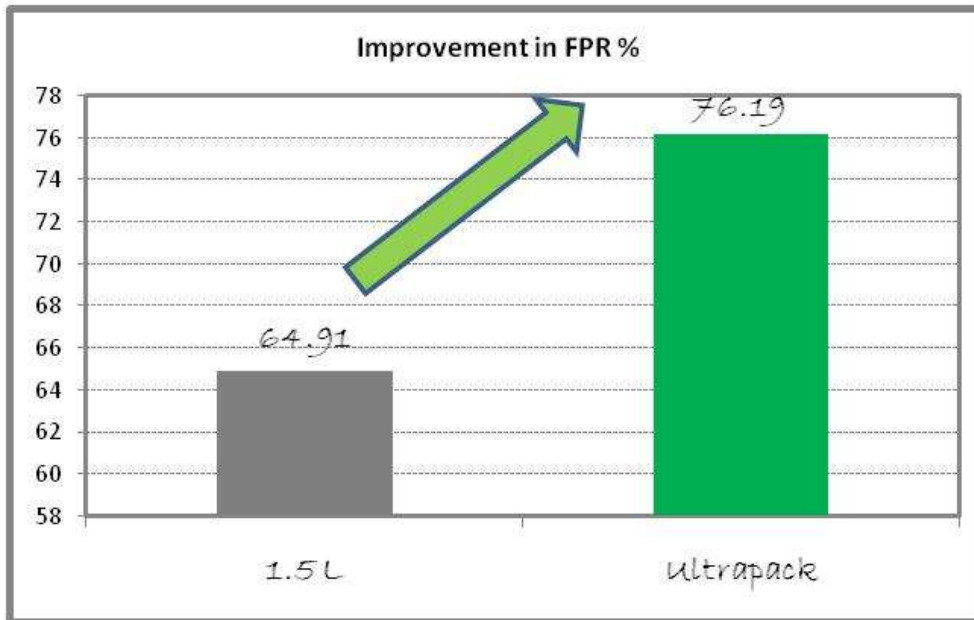




Customer A:

Multilayer Kraft machine making 140 to 230 GSM with 340 m/min speed with 100% Indigenous recycled furnish.

Objective: To improve First pass retention



First Pass Retention improvement

Results:

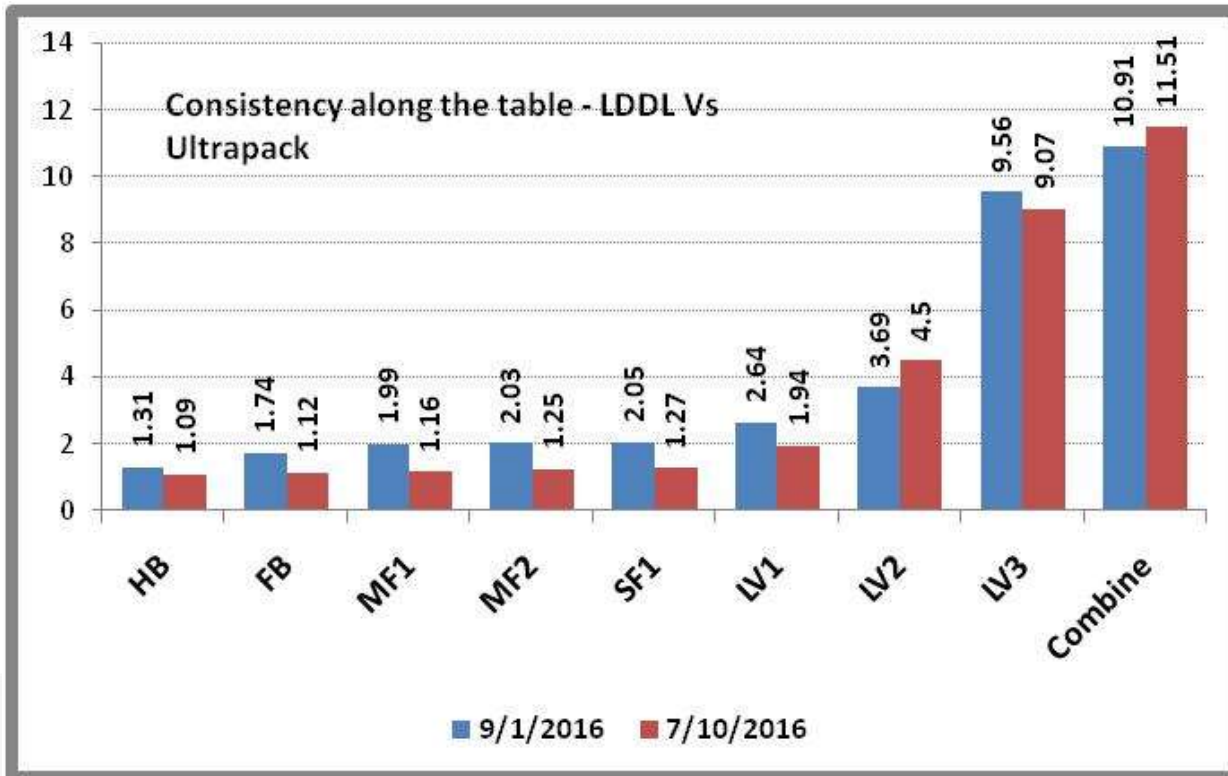
- Higher First Pass Retention from 64.91 % to 76.61%.
- Higher FPR yields less cost of fibre, high couch solids and thus less steam consumption.
- Improvement in FPR with same dosage of Retention aid chemicals.
- Drag load reduction by 4%.



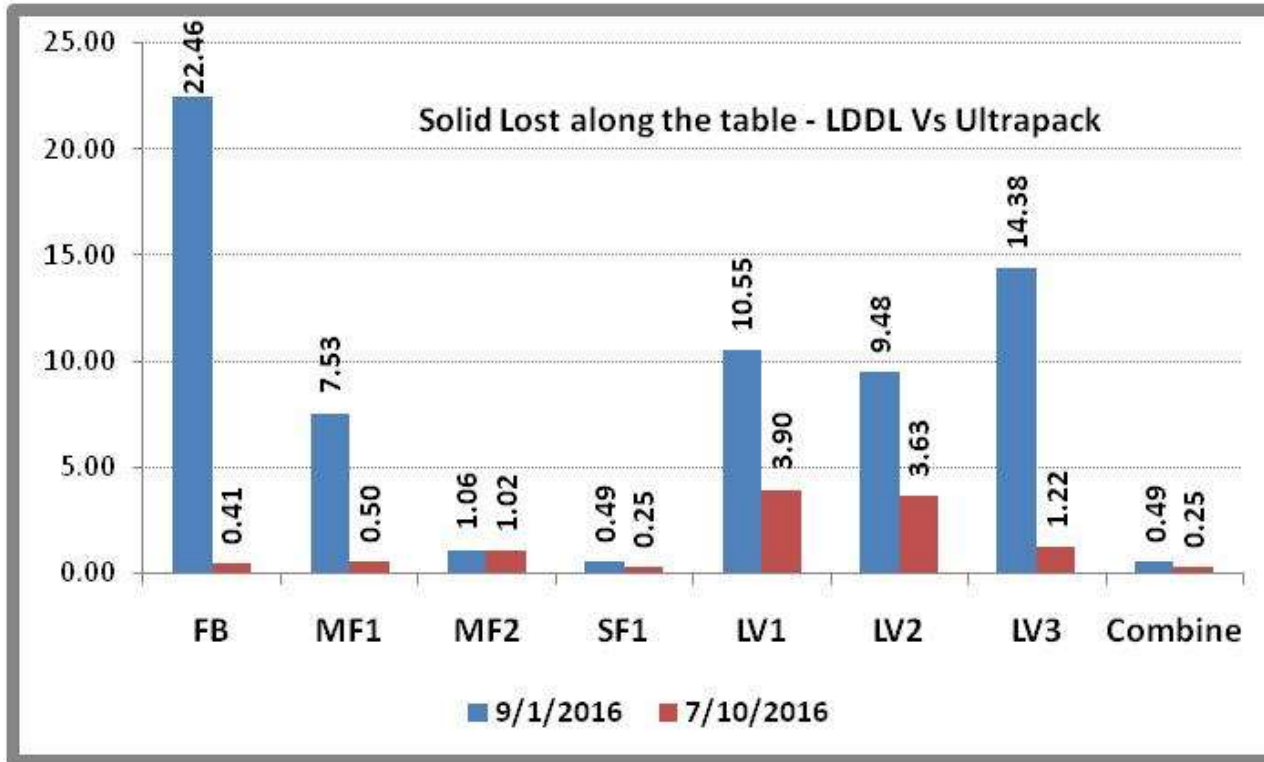
Customer B:

Multilayer Kraft machine making 140 to 230 GSM with 345 m/min speed with 100% recycled furnish.

Objective: To improve First Pass retention, Off-couch dryness & reduce Solid Lost.



**Improved Off-couch
dryness of sheet**



Results :

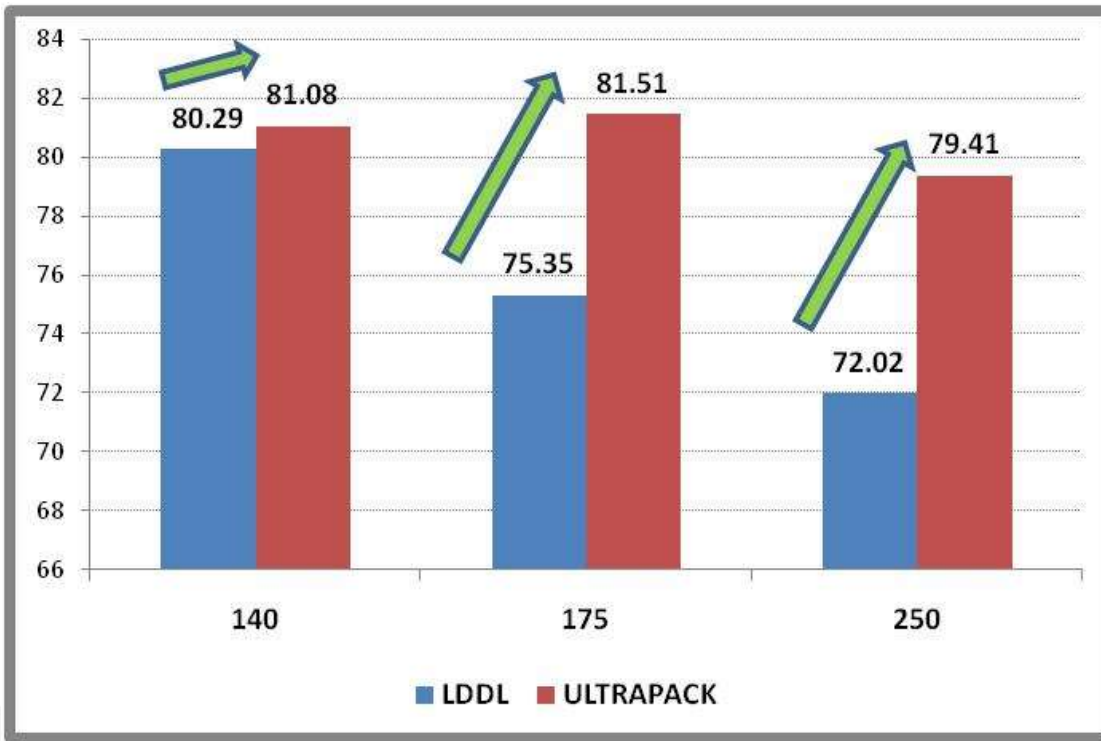
- ✓ Off-couch dryness increased
- ✓ Wire part drive load reduced in all basis weight
- ✓ Solid lost reduced due to controlled initial solid lost.



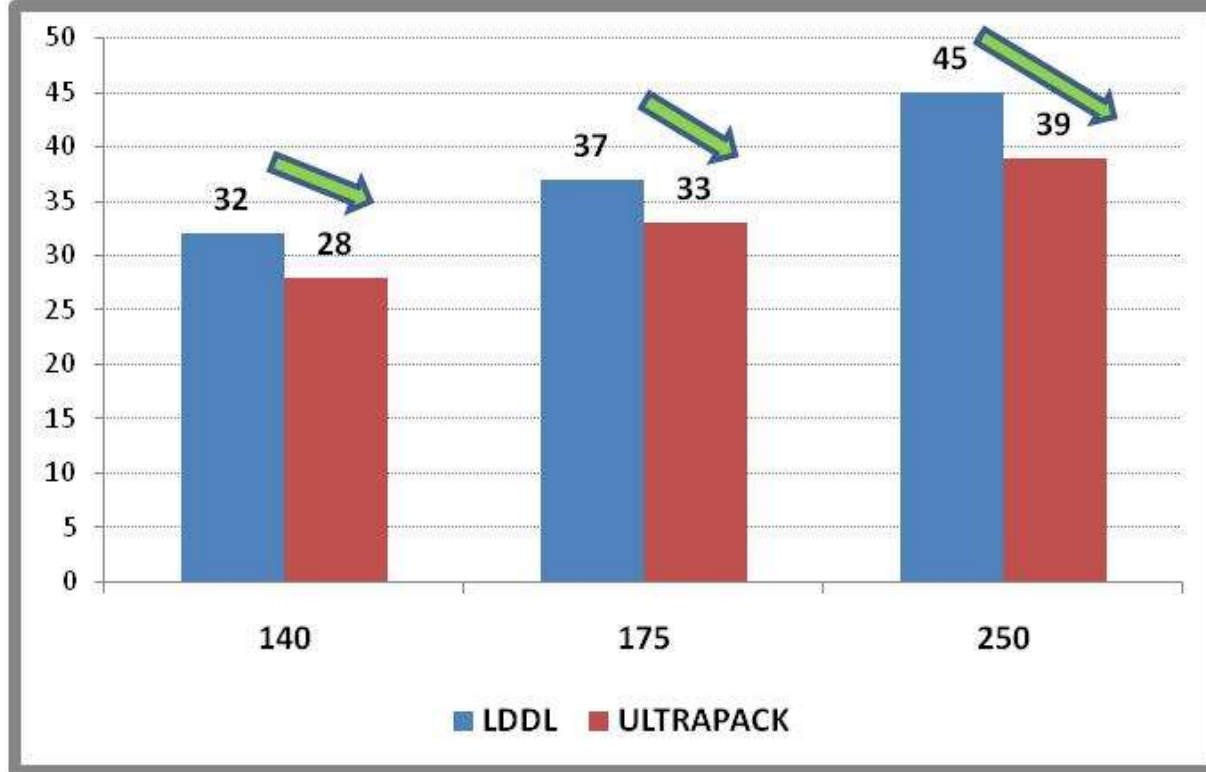
Customer C:

Multilayer Kraft machine making 100 to 250 GSM with 300 m/min speed with 100% Recycled furnish.

Objective: To Improve First pass retention & Reduce drive load & improve Life



Improvement in FPR



Reduced Drive load

Results:

Higher First Pass Retention 2.0 % to 6.0 % in all basis weight range.
Higher FPR yields less cost of fibre, high couch solids and thus less steam consumption.

Improvement in FPR with same dosage of Retention aid chemicals.
Drive load reduction by 10 to 12% in 140, 175 & 250 GSM



- Paper makers can reduce cost of Operation and Quality improvement in the final paper with the help of improvement in technology through 3 E's – Efficiency, Environment and Energy.
- The ULTRAPACK will help in **high mechanical retention** for improve paper finish and reduce the fiber cost.
- **Reduce Energy cost by reduced drive load & steam cost** by increasing off-couch solids
- Improvement in **machine runnability by reduced stickies** with required drainage capacity to match with Single Layer or LDDL forming fabric
- Reduce solid lost in forming section to **reduce ETP load** and clean back water system
- Necessity has come to improve quality and reduce cost of operation for success in competitive way to fulfill the demand of growth of Quality Packaging paper in India in coming days.



Thank you
For your Attention

