

SUSTAINABILITY IN COMPETITIVE MARKET THROUGH INNOVATION & CREATIVITY -QUALITY UP-GRADATION AND OPERATIONAL EXCELLENCE - “A CASE STUDY CONTRIBUTING TO ORIENT’S GROWTH JOURNEY”



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Abstract :

Sustainability is firstly defined as growing by continual contribution and delivering economic, social and environmental benefits. From the scale of monopolistic market situation to oligopolistic, success cannot be last for long, this is the impact of globalization that the performance scale is always demanding for greater achievements to remain successful. This includes updating, upgrading and creating by balancing the ecological and social responsibilities.

Paper industry has been going through challenging times especially in the Writing & Printing segment for last few years – the demand growth has been low and continuous pressure on quality and cost from imports. Apart from these-availability of water, environmental norms, cost of capital per unit of production are the challenges which any paper mill in India needs to cope up and strategically these challenges are more openly faced for old machines.

INTRODUCTION :

Orient has been known for its Note Book paper with High Bulk in the market for years. Start from year 2014, Mill starting facing the competitive heat and cost pressure mainly due to technological constraints being of aged machine. In spite of that Orient has taken bold decision to mould ourselves into the market stream.

Orient has started thinking of quality up-gradation of Writing & Printing grade and at the same time started to implement measures for getting operation excellence through

- Switch over to the use of Precipitated Calcium carbonate (PCC) in slurry form as filler replacing the use of conventional filler as Talcum powder with installation

of On-site PCC slurry plant from Gulshan Polyols.

- Switch over to ASA sizing in place of AKD.

OPM has had a strong presence in the “NOTE BOOK “market. Nearly 50,000MT of the said variety is currently being marketed by the mill and has a USP of ‘High Bulk variety. The key property was being maintained by use of higher percentage of Bamboo as the raw material and minimum of loading material like talcum powder.

This became a challenge for the organization to maintain cost effectiveness as well as the key properties like Bulk and Brightness of the paper. Moreover, due to the use of talcum powder there

was fugitive emission in the plant which was an Environment concern.

Further the challenge became formidable as the product started loosing market due to high cost and poor appeal.

At this juncture, new filler as PCC was introduced in the manufacturing of the product in slurry form which improved the product quality significantly and gained customer appreciation. Apart from Onsite PCC plant OPM convert its AKD sizing with ASA sizing application and found:

- Improved brightness & appeal
- Introduced more filler 12% which led to less consumption of fibrous raw material like.

- Maintain maximum bulk. It is a part of Clean Development Mechanism Project.
- Maintain good strength properties. The article shows various aspects of improvements in respect of:
 - ✓ Product Quality.
 - ✓ Technology up-gradation and its adoption via- onsite PCC production.
- Achieve maximum satisfaction from customers & dealer fraternity.
 - ✓ Removing product bottle neck.
 - ✓ Hazard minimizing environment.
 - ✓ New Product development.
 - ✓ Cleaner production.
 - ✓ Profitability improvement.
- Reduce fugitive pollution in the plant which improved employee morale. Pollution Status:

| S.No. | Condition | Before | After |
|-------|------------------------------|--------|-------|
| 1. | Emission of CO2 from boilers | More | Zero |
| 2. | Plant dust emission | More | Zero |
| 3. | Highway pollution | More | Zero |
| 4. | HDPE bags consumption | More | Zero |

Quality up-gradation and Operation excellence:

Precipitated calcium carbonate is found to be best suited filler, can be utilized to manage whiteness and bulk of the paper considering to the market requirement of paper appearance and feel. Bulk of paper has been one of greatest USP of Orient and there was no reason to compromise on that front.

Trials started by procuring powder form PCC from market and gradually shifted over to the use of slurry PCC effective from Dec' 15 with installation of On-site PCC plant for Cost optimization.

Positive results achieved in paper quality in terms of brightness, whiteness, Bulk as well as in print room.

Comparative base properties of Filler (PCC Versus Talcum Powder) :

| S.No. | Properties | UOM | PCC | Talcum |
|-------|-----------------------|-----------------|-------|--------|
| 1 | pH | - | 9.5±1 | 7.5±1 |
| 2 | Brightness | ⁰ PV | 96 | 90 |
| 3 | CaCO ₃ | % | 95 | 1.0 |
| 4 | Retention on 300 mesh | % | 0.5 | 1.0 |
| 5 | Whiteness | %ISO | 96 | 75 |
| 6 | Black Particles | - | Nil | Traces |

Orient PCC basic quality specifications:

| PCC specification from Onsite PCC plant of M/s Gulshan Polyols Ltd | | |
|--|---|----------------|
| S.No. | Properties | Specifications |
| 1 | pH of Slurry | 8.5 +/- 0.3 |
| 2 | Concentration(gpl as CaCO ₃) | 170 - 175 |
| 3 | Brightness (°PV) | Min: 94 |
| 4 | Structure (Calcite) | Calcite |
| 5 | Free Lime (% CaO) | < 0.15 |
| 6 | PSD (D-50) (micron) | 3.5 +/- 0.5 |
| 7 | PSD D-97) (micron) | 12.0 +/- 1 |

Further research in this product provided the mill to install plant to manufacture precipitated calcium carbonate in site which helped the plant to tap flue gas from stacks.

Benefit accrued through On-site PCC Plant

- Reduction of CO₂ emission to the extent of 44%.
- Cost of PCC reduced by Rs 5000/t .
- Product manufactured in slurry form gave no dust emission.
- New product development – Printing grade

There by an Eco-friendly product was introduced which gained appreciation for our Product quality and led to all around improvement and innovation in business operation by adopting a strategic integration of technology, operation & economy.

Product Quality and plant performance before and after PCC conversion:

Paper Properties of Orient Paper- 57 GSM (Anchor GSM) :

| S.No. | Properties | Before | After |
|-------|-----------------------|-------------------|--|
| 1 | Quality of notebook | Normal Quality | High quality notebook printing, printing grade |
| 2 | Economics | Less price | More price |
| 3 | Customer satisfaction | Less | More |
| 4 | Brightness | 83/84 | 89+ |
| 5 | Opacity | 79 -80 | 86 - 87 |
| 6 | Whiteness | 89- - 90 | 106 - 108 |
| 7 | Shade | Dull | Bright |
| 8 | Bulk | High (1.45 min.) | High (1.45 min.) |
| 9 | Ash % | 3 – 4 | 9-10 |
| 10 | Wax Pick (No's) | 12 A | 14 A |
| 11 | Fiber saving | Less | More |
| 12 | Retention | 75-80 | 82 – 85% |

Pollution Status:

| S.No. | Condition | Before | After |
|-------|--|--------|--------------------------------|
| 1. | Emission of CO ₂ from boilers | More | Very Less (Almost negligible) |
| 2. | Plant dust emission | More | Very Less (Almost negligible) |
| 3. | Highway pollution | More | Very Less (Almost negligible) |
| 4. | HDPE bags consumption | More | Very Less (Almost negligible) |

Challenges faced on PCC conversion:

- Fugitive sizing: Quality and production losses.
- Deposits: production losses and higher machine stoppage.
- Wet end instability: higher chemical consumptions and cost.

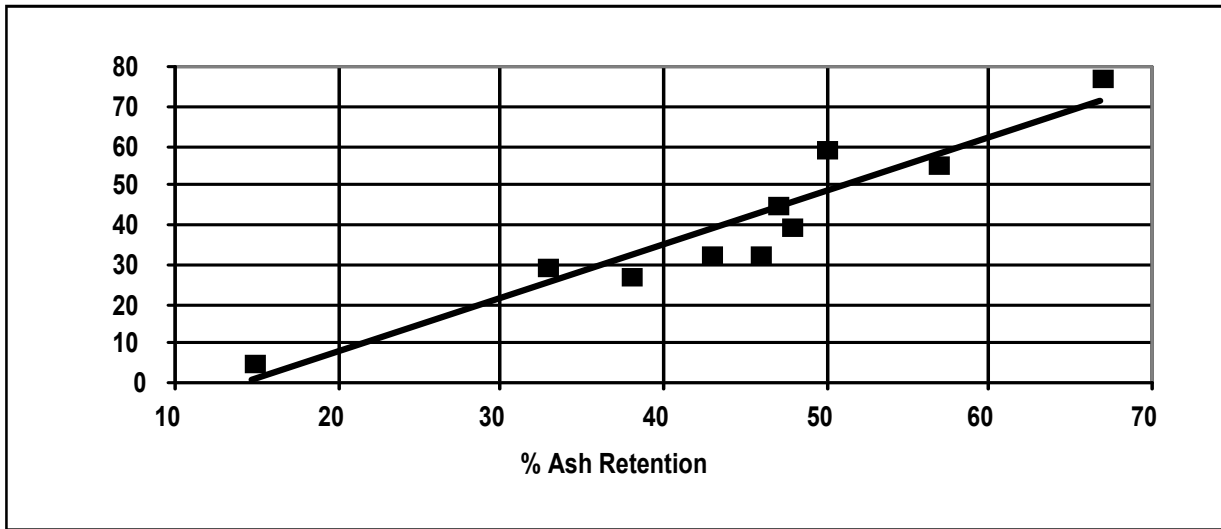
All three issues are interconnected as on introducing and running PCC on continuous way, the colloidal retention came on lower side, PAC consumption increased for maintaining required alkalinity and AKD consumptions are went up to 20-30% higher than earlier.

All issues become concerns for mill to get the actual projected quality and productivity benefits of PCC intake into the paper.

OPM has decided to shift from AKD sizing to ASA sizing:

Alkenyl Succinic Anhydride is proven technology to protect sizing efficiency in presence of PCC as filler. Though running ASA in old type of machines where short loop containing/ handling much higher back water volume then newer machines, rough inside pipelines creating overall higher probability of deposition.

Relationship between first pass ash retention and ASA size retention; from a commercial alkaline fine paper manufacturer. Maximizing first pass fines and ash retention will provide additional efficiency by minimizing ASA recirculation through the whitewater system.



Wet End Optimization:

Best practices adopted in Orient for achieving maximum efficiency and stability by optimizing wet end chemicals -

- Optimize RDA and fixative dosages to get FPAR above 50% - Chemicals increased.
- Optimize PAC consumption to maintain alkalinity around <200 ppm – Reduced.
- Gradually wet end starch stopped, only continued through ASA emulsification – Ratio maintained 1:3.

- Natural gum stopped – Stopped.
- Close monitoring of starch preparation, its solids, pH adjustment, Temperature adjustments and ASA emulsification.

OPM did complete analysis and took preventive measures, put efforts in most of the areas prior to starting of the program and since startup (first reel) of the program OPM achieved Zero losses on account of sizing issues.

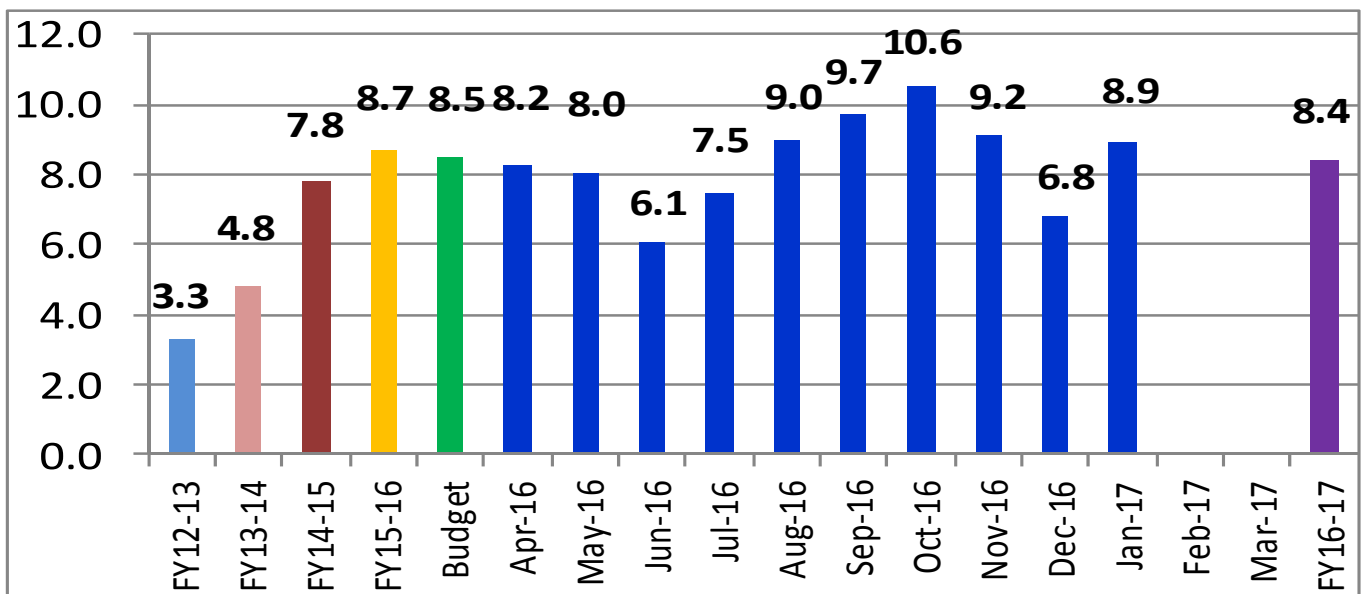
Cost benefit and Quality improvement :

- Substantial reduction of cost of sizing of paper.

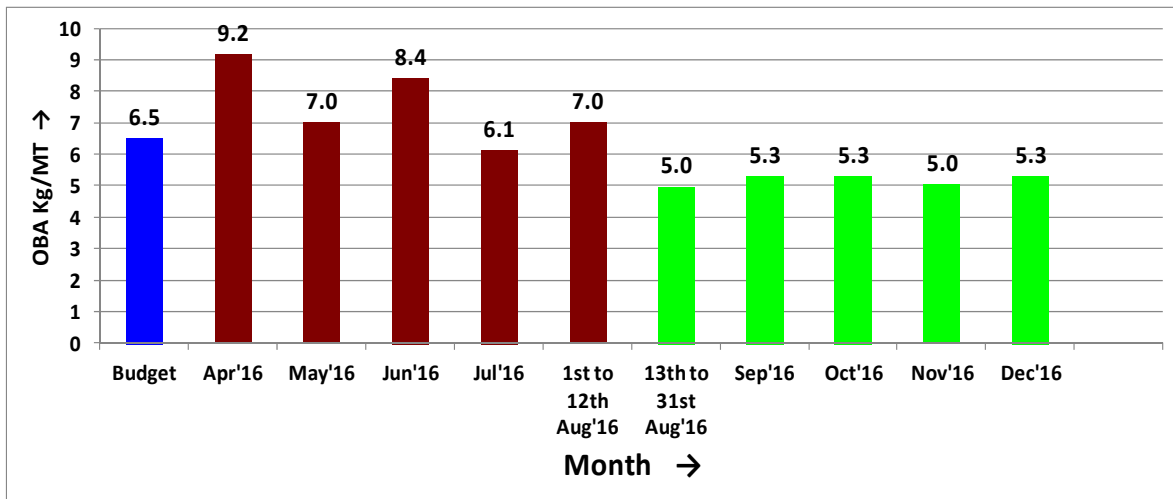
- No fugitive sizing in paper after ASA sizing application.
- Paper appearance improved.
- Reduced Optical Whitening Agent consumption .
- Cleaner production.
- Reduction in no’s of paper breaks.
- Feeding time of paper reduced.
- More filler loading resulted high retained ash in paper.

Paper properties like bulk, opacity, and strength properties improved

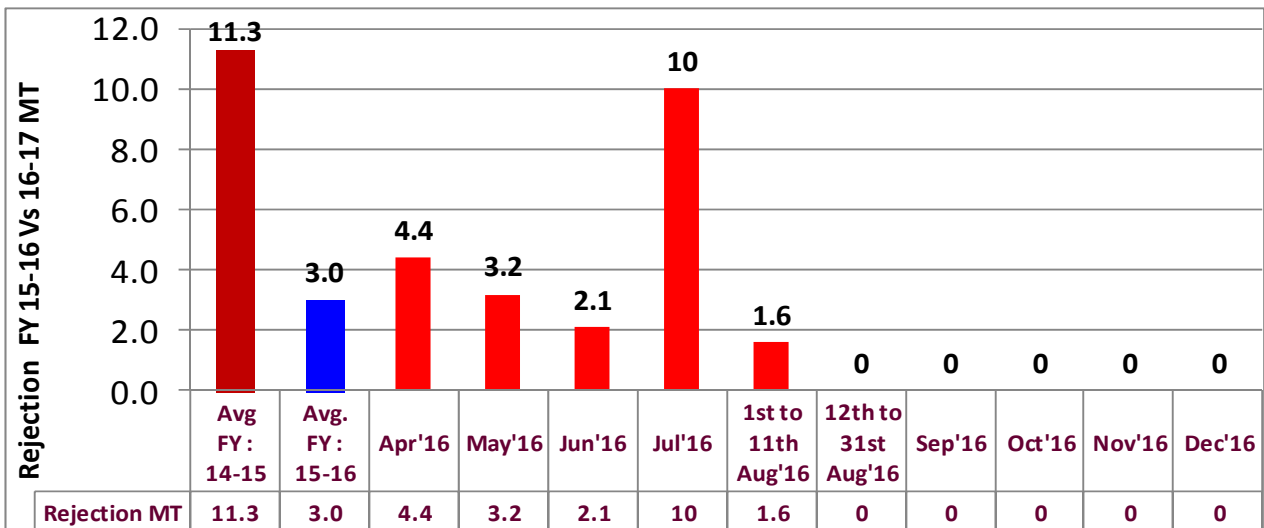
Trend- Paper Ash (%) - FY : 16-17:



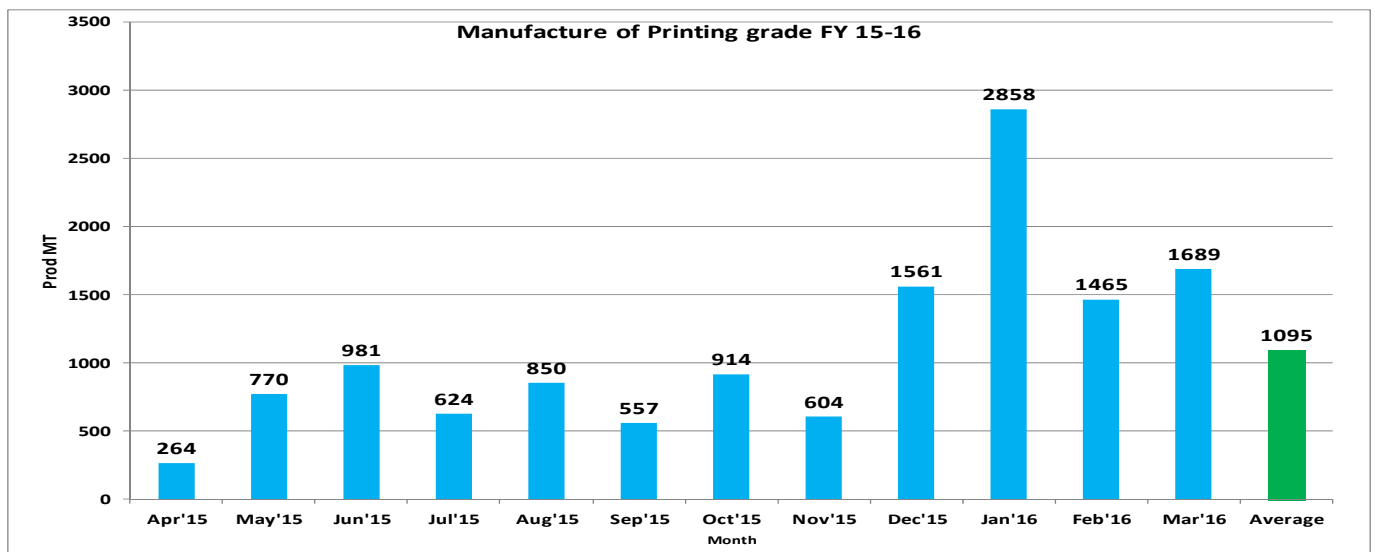
Trend Chart of OBA consumption:

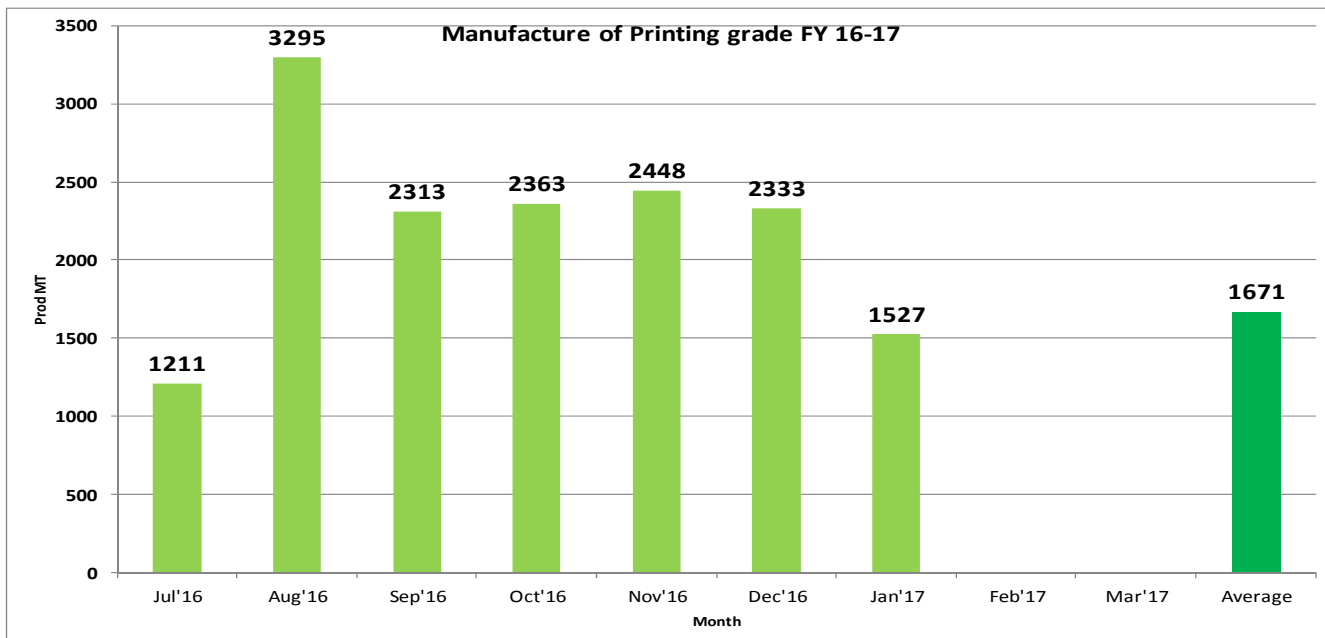


Rejection trend chart of paper due to high cobb:



Trend chart for Printing Paper mfd. in OPM:





ASA Sizing Unit

ON Site PCC Plant



Conclusion:

Conversion from AKD sizing to ASA sizing, with PCC filler that too without surface sizing machine is completely attuned for producing good quality of high bulk writing printing paper with cleaner production mechanism.

Major advantage of ASA application in place of AKD sizing :

1. Over all paper quality improved like Brightness, whiteness, opacity , smoothness of paper.

2. No fugitive sizing in paper.

3. Increased ash% 3-4 % by maintaining the bulk of the paper.

4. Productivity of conventional cutter improved due to non-slipperiness of ASA sized paper.

5. Productivity increased due to on machine sizing.

6. New avenue opened for OPM for Printing segment apart from Notebook segment.

7. Substantial reduction in sizing cost of the paper.

8. Profitability of the OPM increased after transforming AKD sizing to ASA sizing due to increment in production rate, zero rejection for fugitive sizing, Ash% increased and OBA consumption reduced.