PROCESS RE-ENGINEERING FOR MEETING THE CHALLENGES IN WASTE PAPER PROCUREMENT, RECYCLING AND CONTRIBUTING TO SUSTAINABLE ENVIRONMENT

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Abstract

The upward trend in literacy rate and increase in industrial development have led to an increase in demand for paper every year. The consumption of paper and paper boards in India is estimated to be almost 13 million tons/annum at present. Almost all types of paper mills in the country are increasing their production capacity and renovating their plants. It has been estimated that the demand for paper in the country by 2025 would be close to 20 million metric tons, which is actually not a very easily achievable task to meet for the Indian paper industry. The reason for this is a continuous decrease of indigenous raw materials over the years. Considering the ill-effects of deforestation and pollution, it has become very necessary to find out ways of producing and saving paper. Recycled paper based products are becoming more popular by the day.

In India,there are more than 500 Paper and Paper Board mills manufacturing paper and paper boards with recycled paper as raw material. A part of the waste paper is collected locally, while the majority is imported from US,Europe and the Middle East. The recycle paper recovery in India is around 2.5 million tons which accounts to 25% of the total, compared to a contribution of more than 70% from US and Europe. The recovery level in India is very less giving rise to the need of importing waste paper for meeting the demand. This impacts the import bill and is not a good sign for the Indian Economy. There is a need to focus on improving the recovery of waste paper in India and have infrastructure to process it.

This paper presents an insight to ITC Ltd PSPD's approach towards waste paper procurement,processing and its contribution to environmental sustainability.

Introduction

ITC Limited, PSPD, Unit Kovai is situatedatMettupalyam, in the Coimbatore district of Tamilnadu. The Unit was taken over from Erstwhile Ballarpur Industries in the year 2004.The Plant with production capacity of 1 Lakhtons per annum manufactures coated paperboard with 100% recycledpaper.The annual requirement of Waste Paper is 1.1 lakhs tons, of which only 15% is imported.

The Unit has afull-fledged waste paper processing plant, along with a 3 line multi wire Board Machine with Machine Glaze(MG) and on-line coating.

Raw Material Requirement for Paper Board

The raw material required includes White Waste Paper, Sorted Office Paper, Coated Office Paper, Old News Paper, Duplex Board Cuttings and Mixed Waste Paper. The raw material is sourced indigenously as well as imported. In a traditional multi liner duplex board, the grey fiber contributes to 55-60% of total board structure.

Top liner – White Waste Paper
Filler - Grey Waste Paper
Back liner- Grey Waste Paper

The Mixed Waste Paper, Old News Paper (ONP) and Duplex Cuttings are part of Grey Fiber. ONP is traditionally the pure form of waste paper and has an organized collection mechanism. Duplex cuttings are basically the waste generated at printing and conversion plants; these grades of waste paper are also pure, except that they have laminates like poly/met Pet.

Mixed Waste Paper

The main issue is procurement and processing of Mixed Waste Paper which mainly contains house hold paper wastes, corrugated boxes, ONP and other paper wastes.

There has been a developing trend in Printing and Packaging Industry in order to enhance the Print Images. Thus, more products are going for Poly/met Pet laminations. Although this is good from the Printing and Packaging point of view, recycling post end use is an issue and presence of PVC/Metpet laminates make slushing during the pulping process difficult. Typical Mixed Waste Paper has following ingredients: Printed Cartons: 45 – 50%

- Laminated Cartons: 25 – 30%
- ONP: 2-3%
- Corrugated Boxes: 5- 10%
- Mill/Straw Board: 8 – 10%
- Contraries: 1-2 %

The varying level of contaminants in waste paper makes it difficult for organizations to establish a processing system for using the raw material. There is a need to procure quality waste paper with lesser contaminantsbut its feasibility is an issue as the quality of waste paper in the Indian Market is not up to the standards.

Waste Paper Collection in India

Though there is a system for collection of waste paper in India by private agencies, there are basic issues that need to be addressed. Some of these issues are:

- No effective collection mechanism for waste paper from offices and households.
- No awareness on segregation at source.
- Local Municipalities lack training and awareness in handling waste management.
- No proper coordination between the informal sector and the main supply chain of waste paper to paper industry.
- Lack of Infrastructure for storage and sorting of waste paper.

ITC'sApproach on Waste Paper Procurement

Imported Waste Paper had certain criticalities.Apart from the need to hold high inventories, the quality of the waste paper was not consistent and had varying level of contraries like plastic and metallic components which made processing very difficult.

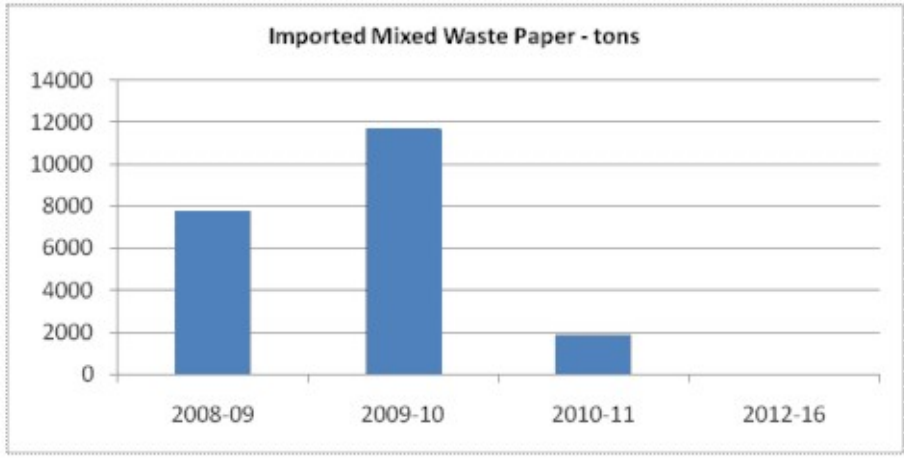
The Unit was looking for solutions to overcome these issues andto explore the opportunity of improving the waste paper recovery system indigenously. This gave rise to the"WOW" initiative.

The "**WOW**" or "**Well-being out of Waste"** program discourages recyclable waste from going into landfills or getting burnt which pollutes the environment. WOW has been designed to manage waste from individual households and civic bodies' level. As per a study conducted by ITC, an Indian city, on an average, generates around 2,500 tons of waste every day. Since there is hardly any recycling, the waste is used as a landfill, causing large scale air and water pollution. We can recover at least 40% of this valuable material which includes paper, plastic and metal.

In the WOW Initiative, the collection of recyclables is predominantly from households, commercial, corporate offices and educational institutions. There are over 300 corporates supporting WOW and a participation of more than ten lakh households across South India.

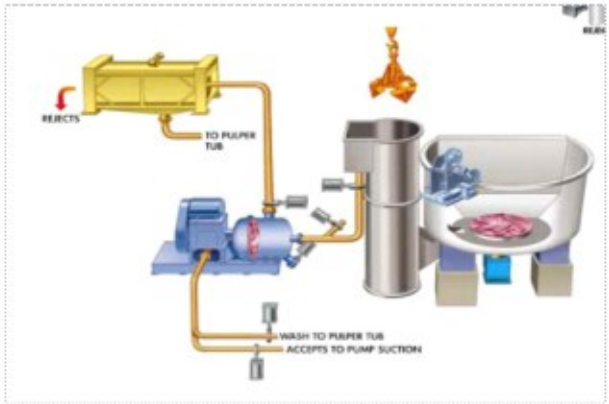
ITC has also invested in people training by the way of imparting knowledge on waste paper quality and its impact on quality of products.

Today, ITC PSPD is sourcing around 2000MT/month of Waste Paper through this initiative. Importing of Mixed Waste has been stopped from the year 2012.



Processing of Mixed Waste Paper – ITC Ltd PSPD Unit Kovai :

Prior to the year 2010, the Filler Liner Waste Paper, including the Mixed Waste Grade of Waste Paper was processed through traditional Hydra Pulper.



Challenges in Processing Mixed Waste through Hydra Pulper

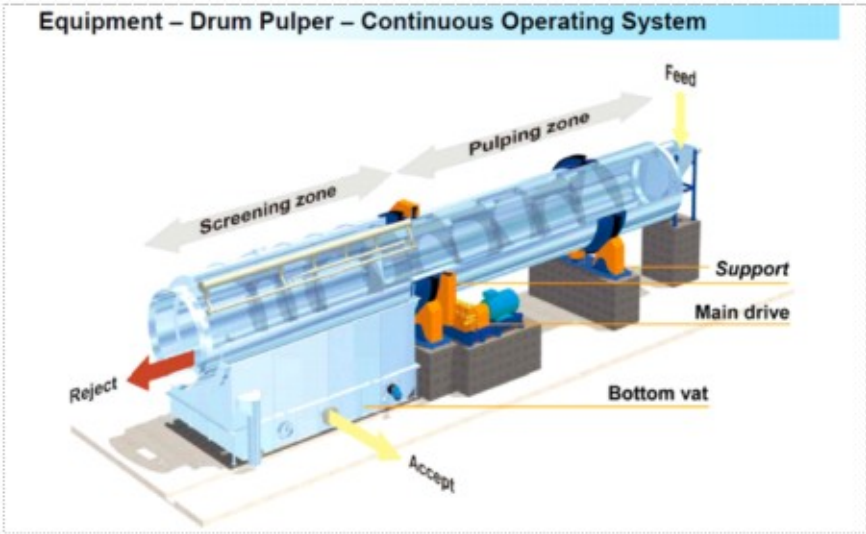
There were limitations in using mixed waste in overall furnish; the mill was able to process only 25% of the total furnish that is processed in the Pulper. The major issues faced were:

- Higher slushing time
- Frequent jamming of strainers due to contaminants
- Fragmentation of plastic material in pulping
- Damage and jamming of impeller
- Low yield and high fibre loss

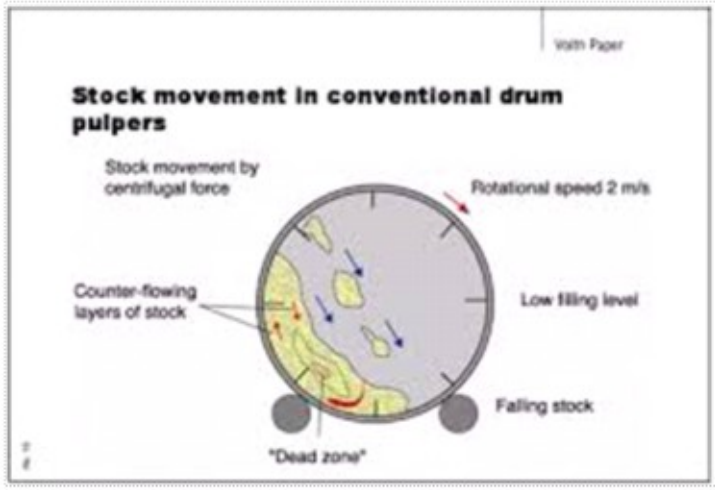
In view of the above problem, the mill had to rely on expensive waste paper like ONP as filler grade. Moreover, the cost and the availability of the ONP raw material were also a constraint.

Way Ahead

In the year 2010, the Unit invested in modernization of the Waste Paper Processing plant and installed a 150 TPD Drum Pulper to overcome the issues faced in the usage of Mixed Waste Paper.



Drum Pulper Operation Principle



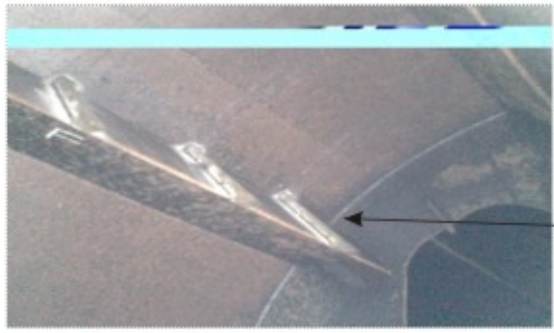
The Pulper's unique design and operation make fibre separation easy without much damage to the fibre length. There iscontinuous rotation and turbulence in the presence of water induced fibre separation. The fiber moves from Pulping Zone to Screening Zone. In Screening Zone, the fibre passes through perforated screen plates and rejects are ejected out continuously in reject zone.

The investment was fruitful as the Unit was able to increase the Mixed Waste Paper in furnish from 25% to 50%.

Through the DrumPulper,the Unit was able to process more mixed waste and were able to replace high cost ONP material. However, there were certain bottlenecks;the Unit was facing high rejects due to improper slushing of Poly/Met Pet Sheets andthe pulp yield was at 70% indicating more fibre loss in the rejects.

The team internally deliberated to find a solution to the problem and came up with the idea of fixing spikes in the Pulper to induce separation of Poly Laminated Sheets.

This resulted in an increase in yield level from 70 to 75%.



Post modification, the rejects separation is very effective and only plastics are rejected in Reject Zone with near minimum fiber loss.

Handling of Pulper Rejects:

With the modification in Pulper,the reject removal was very effective; the rejects containingmainly plastics. The rejected plastic material was very bulky and more volume had to be handled. For this, the Unit installed a compacter at the reject collecting section and all loose plastic material was compacted in to bales.

Disposal of Plastic Waste:

The Unit had explored various avenues for disposing of the Plastic Waste generated, some of them being

- Pyrolysis for generation of Oil and Carbon
- Manufacture of Recycled Plastic hard boards for pallets tops
- Fuel for Cement Plant

Each experiment had positive results along with some shortcomings; the disposal to Cement Plant as fuel was an effective option to adopt.

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Conclusion

The Unit Strategy of investing in improved technology and taking the lead in improving the Waste Paper Collection has influenced the following dimensions:

- More usage of indigenous raw material and reduction of imports contributing to cost and Green Supply Chain.
- Quality of Processed Pulp is better, providing improved fiber strength.
- Ability to slush varying grades of Waste Paper.
- Contribution to Environment Management by creating awareness on Source Segregation and avoiding land fill.
- Effective management of Waste Disposal and contributing to Environmental Sustainability.
- Partnering Industry to improve their Carbon Foot Print.

Reference

- CRISIL Report on Pulp and Paper Industry.
- Unit Internal Data.