Case Study on Paper Recycling

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Abstract: Widespread use of a written language would not have been possible without some cheap and practical material to write on. Indian Government statistics says that paper consumption in India is 9 million tons. But as per our census it is minimum 15 Kg per capita. Thus paper recycling was invented. The paper was first invented in Lei-Yang, China. The first paper mill was placed in Spain and then paper was started being produced all over the world in mills. The fabricated plant of paper recycling in various industries consists of 3 major components that include the hydropulper, pulp stirring and settling section and pressing or rolling section. From the results of experimental analysis carried out in industries by experts, it shows that 0.1 kg of used paper fed into the hydropulper, about 100 ml of water is required to defiber it and about 0.05 kg of starch adhesive is required.

Current estimations state that the average Indian citizen produces 4.6 pounds of solid waste daily. Approximately 40% of the total waste stream is paper, which is equivalent to about 88 million tons annually. Further, current estimates show that Indian office workers throw away nearly 85% of tons, every year. Paper makes up the greatest proportion of the waste stream, therefore, presents the greatest opportunity for recycling. Recycling office paper alone can save 33% of the energy needed to make paper from trees, as well as save thousands of gallons of water.

I. INTRODUCTION

The paper is known as Past and Present Event Recorder. The primary source of raw material for production of paper is vegetable fibers, obtained mainly from plants. Recycling, which is the extraction and recovery of valuable materials from scrap or other discarded materials, is employed to supplement the production of paper.

There are three categories of paper that can be used as feedstock for using recycled paper: mill broke, pre-consumer waste and post-consumer waste. Mill broke is paper trimmings and other paper scrap from manufacture of paper and is recycled internally in the paper mill. Pre-consumer waste is the material that was discarded before it was ready for consumers use. Post-consumer is the material discarded after consumer use such as old magazines, old telephone directories and residential mixed paper.

II. PAPER RECYCLING IN ELORA BOARD MILL, TUMSAR

The paper mill is placed in Tumsar, district Bhandara. This mill has 35 to 40 tonne capacity with production of 40-70 GSM quality paper. This company also produces news print and kraft paper. The front operating office of this company is situated at 379, Pandit Jawaharlal Nehru Marg, Opposite Patwardhan High School, Sitabuldi, Nagpur, Maharashtra. Components of this plant are as follows:

1. Hydropulper:
In the process of repulping the hydropulper is consists of 1.5 tonne capacity. A specific amount of dry furnishes and water are added to the pulper, and mixed until defibering or the desired chemical reaction is complete.

2. Screening:
Then the entire contents are sent to the screening process. Pulps contain undesirable fibrous and non-fibrous materials, which should be removed before the pulp is made into paper or board.

3. Turbo-cleaner:
Cleaning involves removing small particles of dirt and grit using rotating screens and centrifugal cleaners. For the cleaning purpose turbocleaner is used in this mill.

4. Taizen:
Taizen is the pulp mixer which is used in this mill for breaking of blocks made of water and pulp so that it will be converted into the powder form. Powder making process involves removal of water particles and storage of pulp into the tube. Then the cooling is done if needed.

Fig. Flow Process Of Industry
5. Conveying system:

Then the entire material is sent to the conveyer belt for rolling process. This process is used to create shapes with the desired geometrical dimensions and material properties while maintaining the same volume of pulp.

6. Pressing system:

The pulp need to be harder for preparing paper. So pressing is done with the help of hot rollers connected in the conveying system.

7. Cutting operation:

After the paper is produced, the cutting operation is done to cut the paper to the demanded format with the help of cutters. The amount used at a time for cutting in this plant was 410 kg.

III. PAPER RECYCLING IN MALU PAPER INDUSTRY

MALU PAPER MILLS LTD is promoted by the “THE MALU FAMILY” and all the Promoters and Directors are from the family and are First Generation Entrepreneurs. The group have interests in Steam Coal Trading, Manufacturing of Welding Electrodes, Manganese Processing, Steel Castings & Exports; since last three decades. Considering the vast potential in India, they have set up Three Paper Manufacturing Units, in Nagpur, Central India. The units are having a capacity of 13500 TPA of Kraft Paper, 19800 TPA of Newsprint and 49500 MT of Quality Newsprint and Writing Printing Paper, uses State-of-the-Art Technology from Global Leaders.

DETAILS OF PRODUCTS OF COMPANY:

MG Kraft Paper

The Kraft Plant is of 36 TPD capacity with a recycle based technology using Old Corrugated Cartons as basic raw material to manufacture Machine Glazed (MG) Kraft Paper. MG Kraft paper is used by corrugators for making Corrugated Boxes a part of the huge Packaging Industry of India. Corrugated Boxes are used for Final Packaging of many products Industrial and Consumer Products.

Newsprint

Newsprint is a basic raw material of Newspaper Media Industry. Nagpur has many publishing Houses viz. Lokmat Group, DainikBhaskar, JargarPrakashan, Navbhatar Group, Rajasthan Patrika, PrabhatKhabar, The Hitvada, PunyaNagri, Punjab Kesari, Hindustan Times, Indian Express, ‘O’ Herald, Deshonnati, Sakal, hariBhoomi, NaiDunia, Samaj, Siasat, Udayvaani and many others. Newsprint is supplied throughout India through Direct Marketing as well as Dealer based marketing.

Plant - II

The Newsprint Division started commercial production from 2001. The rated capacity of the plant is 60 TPD. This plant to manufacture Newsprint uses waste paper recycle technology. The technology involved uses the latest Deinking Technology developed by the world leader Lamort of France.

Plant - III

Plant - III is a state-of-the-art 150 TPD manufacturing site on MIDC Saoner Industrial Area with a 6 MW Captive Power Plant. The Plant uses a World Class Technology from ANDRITZ of Finland for Its Pulp Mill. Paper Machine is from Beloit and Double Calenders from Kusters. The Plant runs on a Variable Drive Controlled system from ABB.

IV. PAPER RECYCLING IN BAZARGAON PAPER INDUSTRY

The industry is placed in Bazargaon located at few kilometers out of Nagpur. The plant has capacity of 100 tonnes per day. They manufacture testliner corrugated mediumkraftliner. The company established in 22 November 1983. The components of the industry are as follows

1) COLLECTION OF PAPER:

First of all, waste paper from various parts of cities are brought here and kept in a store room. After that, they are separated and unwanted materials such as metal parts are removed and all are put in a hollow pulper. This is done manually with the help of unskilled labours.

2) PULPING AND MIXING OF PAPER:

The main function of pulper is to mix the hard waste material along with water, starch, and hydrogen peroxide so that they can be easily converted into small particles. At this stage, they are de-fibered means converted into small pieces. These are now then again send to another mixer where they are mixed thoroughly to attain a paste like structure. Now, this paste is send to a chamber via belts. Here strainers are present which purify the pulp obtained. The purified pulp is sent ahead and the left part is again send back to the pulper for further conversions.
3) **DEINKING:**

Further the pulp is sent for deinking process. Deinking is the process in which the ready to use pulp is decolorized. Now this pulp can be used to generate white paper or can be colored to a single colored paper. In the industry where we had visited it was decolorized to make it in a single colour. Certain chemicals were added to make the colour of the pulp white. After that a dye of certain colour was added so as to obtain a paper of specific colour (brown). From now the pulp of desired colour is ready to be converted into paper. Then the pulp through conveyor belt then it is sent into hot rolling process.

4) **ROLLING PROCESS:**

Pulp is now sent into the rollers so that they can be converted to thin sheets of paper. Suction vacuum are present over there so as to suck water present over there. They suck maximum amount of water. After this they were again passed through a set of 10 rollers. The diameter of the rollers were much high and they weigh in kilos. The pulp was converted into sheet of fine paper with less amount of paper. They are again sent to another rollers for drying. Hence now we had obtained paper which is completely dry. They were again send to rollers so as to make two rolls of paper.

5) **TESTING OF PRODUCT:**

After that they are rolled in sheets and then a part of it is taken for strength testing. It tells us about the strength of the desired product and what is the quality of the paper. They had made certain charts to compare the strength. The value of output i.e. paper is measured in the form of GSM. The goal of this mill is to produce the paper of 50 to 60 GSM quality.