

# Environment Friendly Waste Paper Processing - A Case Study

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**A Specially formulated Alkaline Fatty Oil used successfully to De-Ink ONP, Magazine trimmings etc. by PPIL, a 150 TPD News Print Mill and achieved substantial reduction of series of de-inking & Bleaching Chemicals-resulting reduction in pollution-loads and making the product highly cost-effective.**

## Background

In India, the paper industry is generally divided into three categories e.g. :

1. Large Paper Mills (Capacity 200-600 MT/Day) based on forest products i.e. Wood & Bamboo (Including Baggasse).
2. Medium Size Paper Mills (Capacity 30-120 MT/Day) based on agricultural residue i.e. Straw, Baggasse wild grass etc.
3. Medium to Large Paper Mills based on recycled fibre (capacity 10-600 MT/Day)

The forest cover in our country is only 14% against the minimum requirement of 22% for maintaining the ecological balance. Large Paper Mills are facing acute shortage of forest based raw materials e.g. Wood & Bamboo.

The agro based Paper Mills 300 Nos. appx. cooking the raw materials by Caustic Soda and bleaching by Chlorine derivatives and in absence of economically viable environmentally acceptable chemical recovery plant are finding difficulties to maintain the norms of Pollution Control as laid down by Central Pollution control Board

(CPCB), New Delhi.

It is need - less to mention that making Paper by 100% recycling i.e. from waste Paper is ECO - Friendly, which has been rightly opted by few Paper Mills. There is a steady trend to go for the 100% recycling. Few agro based Paper Units are also installing the waste paper De-inking & Processing line, as rightly directed by Corporate responsibilities Protection (CREP) Committee initiated by CPCB.

Even in this category those who are manufacturing Writing & Printing Paper are required to use some more chemicals for de-inking, bleaching & alkaline sizing etc. where are some Paper mills opted for Newsprint making out of old News Prints-consuming very less amount of chemicals & energy and thus the process becomes Environment Friendly.

The specific data are mentioned below in Table 1 :

From the above consumption figures it is obvious that such Paper Plants are Contributing in the reduction of Green House Gases.

## INTRODUCTION

M/S Pragati Papers Industries Ltd., Capacity 150 TPD at 45 GSM, News Print having Pulper, HDC, Hole - Screen, De-inking Cell, 5 stage centriclening, slotted fine

**Table 1 :**

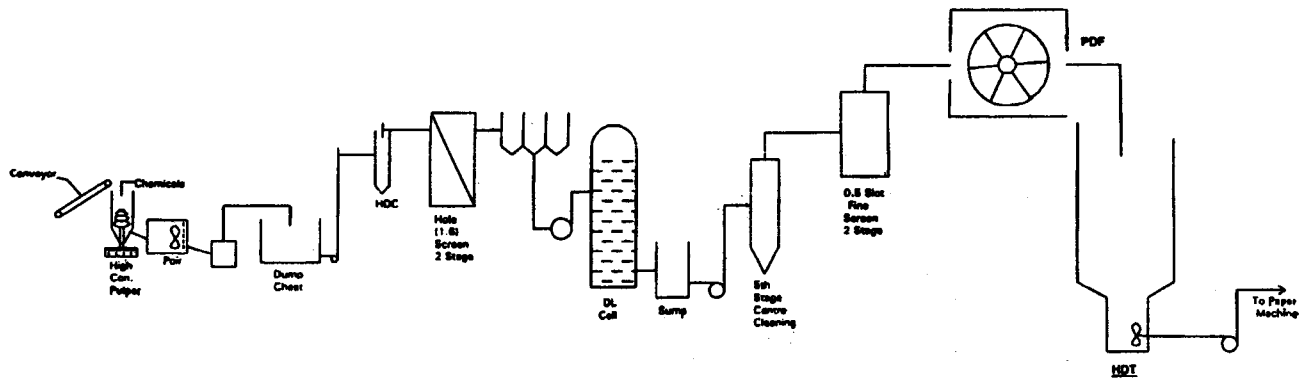
	Agro Based Paper Mills	Recycled Fibre	
		(A) For Writing , Printing	(B) For News Print
Steam, MT/T of Paper	5	2.8	2.5
Electrical Energy KWH/ T of Paper	1100	900	650

Table 2

Particulars	Brightness 60%						Brightness 65%								
	I	II	III	IV	A	B	C	D	E	Nov 2004	Dec 2004	Feb-Mar 2005	Apr 2005	May 2005	June 2005
	Nov-04	Dec-04	Feb05	IV-March-2005 to June-2005											
	Green														
	Timted														
Furnish %	35.0	35.0	35.0	40.0	40.0	40.0	45.0	35.0	45.0	45.0	45.0	50.0	55.0	60.0	55.0
O.N.P.	55.0	40.0	50.0	50.0	45.0	50.0	45.0	55.0	40.0	40.0	35.0	50.0	35.0	35.0	35.0
M.T.	10.0	20.0	15.0	10.0	15.0	10.0	10.0	10.0	15.0	15.0	20.0		10.0	5.0	10.0
I.C.															
C.B.S. %															
Chemicals (Kg/T.R.M.)															
Caustic	5.00	6.00	5.33	2.67	2.67	2.67	2.67	5.00	2.85	6.00	2.60	2.60	2.67	5.33	3.33
Sodium Silicate	15.00	10.00	13.33	13.33	13.33	13.33	13.33	13.33	10.00	12.00	13.33	13.33	13.33	13.33	13.33
Sodium Hydrosulphite	10.00								8.57						
Surfax D. B. E.	0.80	0.60				0.60				0.83	0.33			0.40	
Tellabs 3033			0.40		0.40						0.40				
Surfax L 175				7.33	4.00	4.00	4.00	5.00			3.30			4.00	5.00
Foad				7.00	6.00	5.00	7.00	7.00		7.00			6.00	7.00	7.00
Hydrogen Peroxide								0.28							
Washing Powder							1.00								
MZI															
D.I. Brightness Gain (%)	3.8	3.1	3.2	4.7	3.3	4.9	4.0	4.0	3.9	2.2	4.3	4.4	4.1	4.1	4.0
Cost (Rs.) / tonne of Pulp															
Furnish	10888	10913	10825	10675	10612	10675	10543	10888	10400	10337	10246	10037	9827	9827	10037
Chemical	884.5	548.75	603.47	471.77	513	287.37	540.64	626	644.23	585.25	247.5	495	663.57	663.57	560
Total	11772	11462	11428	11147	11125	10962	11084	11514	11044	10922	1049.5	10532	10491	10491	10597
Paper Properties															
Breaking Length (Mtrs.) M.D.	4274	4072	4400	4350	4200	4320	4210	4100	4200	4115	4215	4220	4672	4672	4500
C. D.	1856	1750	1750	1684	1470	1540	1630	1480	1850	1750	1530	1650	1850	1850	1650
Smoothness Gurley (Seconds)	35	37	32	27	31	28	29	28	28	47	2	927	29	29	27
Bulk cc/gm	1.74	1.6	1.75	1.65	1.67	1.72	1.7	1.7	1.65	1.65	1.75	1.8	1.78	1.78	1.8

**Table 4 : Raw Material & Chemical Price**

	Rs./T		Rs. /kg.
Old Newsprint (O.N.P.)	6600.00	Hydrogen Peroxide	26.90
Magzine Trirring (M.T.)	10000.00	Sodium Hydrosulphite	46.00
Indian Culting (I.C.)	9000.00	Sodium Silicate	4.60
		Caustic Soda	25.00
		Deink 3033	250.00
		Surfax D.B.E.	90.00
		Surfax L 175	170.00
		Foad	12.00
		M-21	60.00



**Figure 1 : The Process Description**

screen, PDF & HD Tower, Series of De-inking Chemicals have been consumed but faced following constraints :

1. Excessive Cost of Chemicals.
2. Foam generation non-uniform.
3. INK - Separation in effective.
4. DI - Gain 2-3 only.
5. Back water dirty & black, reuse restricted.

Experiements/Trials Carried out :

The Process description (ref. Figure 1)

The waste paper duly weighed & transported through the slat Conveyor to the High Density pulper to slush the Raw material at 15% 15% Consistency. For 8-10 units at 65 Degree Centrigrade Water temperature, all De-inking & bleaching chemicals are added in the pulper.

The slushed pulp is processed through 1.6mm dia poir & pumped to the dump chest.

It is passed through high density cleaner, 1.6mm dia hole screen & then enters into the Five stage de-inking cell. The ink loaded foam is separated out continuously by maintaining the foam level.

The accepted pulp further processed through Five stage centri cleaning system & 0.15mm slotted screen. The Stored in the high density tower (HDT) where - from the pulp is supplied to the paper machine section.

The quality & proportion of waste papers and series of chemicals consumed during Nov. 04, Dec. 04 & Feb. 05 are tabulated in Tables 2 & 3.

The Prices of various waste paper and chemicals are mentioned in Table 4.

#### OBSERVATION

It may be observed that in both cases of 60% & 55% brightness the FOAD increased the DI gain, reduced the chemical Cost and also the over all cost.

#### CONCLUSION

It may be concluded that for de-inking the waste paper, FOAD has been established to be a uniques cost effective chemical.

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