

Suitability of Secondary Fibre-White Blank News on Newsprint Manufacture-A Case Study

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ABSTRACT

Newsprint from recycled fibre has become an established process worldwide. But most of the recycled fibre is coming from deinking of the old Newspapers and magazines. For a plant, which does not have a deinking facility, the choice is limited to unprinted waste paper suitable for use in Newsprint manufacture. White Blank News (WBN) is one such Unprinted White Paper Cuttings. Depending on the quality of the WBN, the percentage usage in the Newsprint furnish can be altered. In order to have a cleaner WBN quality; the WBN received has to under go a systematic sorting process by removing the stickies and other foreign materials. Quality of WBN in comparison with Virgin home pulps was highly comparable with that of Wood mechanical pulp in terms of Strength characteristics, Optical characteristics, and fines fraction in the pulp. Quality of Newsprint with usage of WBN in the newsprint furnish composition was good. The usage of good quality WBN does not affect the quality of Newsprint and in-turn improves the quality. Usage of WBN in place of wood mechanical pulp in the Newsprint furnish may be an added advantage in the production cost of Newsprint. The usage of WBN in the Newsprint furnish can be altered with respect to the economy and the end use. Economical and Environmental benefits are the added advantages by the usage of WBN in the furnish.

INTRODUCTION

TNPL is an integrated pulp and paper mill based mainly on Bagasse having a capacity of 1,80,000 TPA of Newsprint and Writing & Printing paper. In addition to the in-house pulps viz.: Bleached chemical Bagasse pulp, Bleached chemical Hardwood pulp & Bleached mechanical Bagasse pulp TNPL also uses of secondary fibres like - Deinked pulp (DIP) and White blank News (WBN). In this

study, the suitability of white blank news (WBN) in the Newsprint furnish has been studied and the results are presented in this paper. The percentage of WBN in the Newsprint furnish can be altered depending on the quality of WBN. The present paper

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TABLE -1
QUALITY OF WBN RECEIVED FROM REGION-I

S.No.	Parameter	Units	Sample I	Sample II	Sample III	Sample IV	AVG
1.	Freeness	ml CSF	90	100	100	110	100
2.	Bulk	cm ³ /gm	2.37	2.42	2.48	2.33	2.40
3.	Breaking length	meters	4150	4350	4120	4200	4205
4.	Tear Factor		83.3	83.2	75.2	76.4	79.5
5.	Burst Factor		22.3	24.6	25.1	24.5	24.1
6.	Brightness	%ISO	55.6	56.9	54.5	54.4	55.4
7.	Opacity	%	97.0	97.3	97.6	97.5	97.4
8.	Scatter	m ² /kg	52.6	52.5	55.5	50.9	52.9
9.	pH		6.4	6.3	6.7	6.2	6.4
10.	Ash	%	1.3	1.2	1.0	1.3	1.2
11.	Alum demand	kg/t	35.0	32.0	35.0	38.0	35.0
12.	Fibre classification						
	+ 30 fraction	%	19.6	20.6	23.9	29.3	23.4
	+ 50 fraction	%	34.2	32.6	28.2	26.3	30.3
	+ 100 fraction	%	8.8	4.4	12.7	13.7	9.9
	+ 200 fraction	%	7.6	11.1	5.5	4.6	7.2
	- 200 fraction	%	29.8	31.3	29.7	26.1	29.2

furnishes the details of filler content and the fiber fines content in the WBN from two different regions. Alum demand of different WBN samples has also been studied. Comparison of Bleached chemical Bagasse pulp, Bleached chemical Hardwood pulps & Bleached mechanical Bagasse pulps with that of WBN from different region is furnished. Newsprint quality with WBN and without WBN in the furnish were studied. Alum demand for the Newsprint production by the usage of WBN in the furnish was also studied.

LITERATURE REVIEW

Ulrike Tschiner et al (1) stated that Mixed office papers (MOP) & Old newsprint (ONP) have very different fiber types. ONP & MOP generally have higher fines content. In addition mechanical action not only in refiners but also in pumps, cleaners and screens is known to generate additional fines fraction. Since fiber distribution and especially fines

content has a significant impact on paper machine performance and sheet properties, it is an important consideration in commercial recycled paper manufacture.

WASTE PAPER COLLECTION PROBLEMS

Recovered paper collection and sorting are highly labor-intensive process. In paper recycling, one of the challenges is to obtain consistent quality raw material. One of the biggest challenges to our creativity is to look for alternatives to solve our solid waste problem. Recycling is only a partial solution. For paper mills, which we don't have the facility of deinking, it is the unprinted waste that matter. In the case Newsprint, the waste paper needed is White Blank News. This is collected from Newspaper publishing houses from the left overs and the tear offs. Therefore WBN unprinted from the developed countries, which is long fibre softwood, as raw

material will give the best paper. Currently, 90 percent of the world's paper is manufactured from wood pulp. Every day our forests are disappearing to make more paper. Newsprint manufacturing from the deinking pulp finds only from a fraction of the Newsprint manufacturers. Through 2003 use of ONP is projected to increase at an average of 3.5 percent per year.

Ken Mc Entee et al (2) stated the benefits of recycling. Global recovered paper consumption grew by 49.4 million tons (58%) between 1990 and 1998 reaching 135 million tons in 1998. The global paper utilization rate increased from 35.8% to 44.9%. In 2005, it is forecast that 174 million tons of recovered paper will be used globally, a 1998-2005 rate of increase of 3.6% annually.

Ken Mc Entee et al (3) stated about the recycling in Asia. The growth of recycling in Asia, as well as the financial crisis affecting the region was reviewed. Possible effects of the financial crisis on

recycling in Asia were examined. As there is no alternative fiber supply, recovered paper will continue to be the most important fiber source in Asia. Higher dollar costs for imports will supply the incentive needed to increase domestic scrap paper recovery. Higher recovery rates would reduce the need for imports, and it was predicted that the recovery rates would increase in Asia.

STICKIES - A PROBLEM IN WASTE PAPER PROCESSING

A significant quantity of information has been presented related to methods used by the paper industry and researchers to quantify the amount of sticky contamination in recycled fiber pulp. The particle size and rheology of the stickies produced during pulping govern their behavior in the stock preparation system. If the adhesives can be formulated to be durable and withstand the rigors of repulping, they could be readily removable by

TABLE -2
QUALITY OF WBN RECEIVED FROM REGION-2

S. No.	Parameter	Units	Sample I	Sample II	Sample III	Sample IV	Sample V	Sample VI	Sample VII	AVG
1.	Freeness	ml CSF	100	100	110	120	130	130	160	121
2.	Bulk	cm ³ /gm	2.42	2.38	2.63	2.46	2.64	2.56	2.09	2.45
3.	Breaking length	meters	3680	3970	3940	3560	4060	4160	4560	3.99
4.	Tear Factor		81.6	81.6	81.2	77.0	78.3	78.4	85.1	80.5
5.	Burst Factor		22.8	23.6	22.4	19.5	20.7	21.3	26.2	22.4
6.	Brightness	%ISO	51.2	52.6	57.7	55.3	57.2	56.8	55.6	55.
7.	Opacity	%	98.5	97.6	96.6	97.2	96.9	95.8	97.9	97.
8.	Scatter	m ² /kg	54.6	52.7	51.2	53.0	50.9	49.8	59.1	53.
9.	pH		6.7	7.1	7.8	6.6	8.0	6.9	6.8	7.1
10.	Ash	%	2.2	2.0	0.8	1.4	1.0	1.2	1.4	1.4
11.	Alum demand	kg/t	45.0	43.0	30.0	35.0	35.0	32.0	40.0	37.
12.	Fibre classification									
	+ 30 fraction	%	7.6	6.8	22.0	13.6	20.8	19.6	26.5	16.
	+ 50 fraction	%	44.3	44.3	35.0	31.2	35.5	37.5	26.6	36.
	+ 100 fraction	%	12.9	13.4	12.2	14.1	11.3	14.1	10.2	12.
	+ 200 fraction	%	2.9	1.7	3.2	5.7	3.9	3.5	3.3	3.5
	- 200 fraction	%	32.3	33.8	27.6	36.4	28.5	25.3	30.4	30.

TABLE -4
NEWSPRINT QUALITY WITH WBN AND WITHOUT WBN

S. NO.	PARAMETER	UNITS	NEWSPRINT WITH WBN	NEWSPRINT WITHOUT WBN
1.	WBN in pulp furnish	%	10.0	Nil
2.	Bulk	cm ³ /gm	1.48	1.44
3.	Breaking length MD	metres	5420	5120
	CD	metres	1870	1880
4.	Tear Factor MD		37.3	32.2
	CD		49.0	47.4
5.	Burst Factor		17.8	16.1
6.	Brightness	% ISO	61.4	56.7
7.	Opacity	%	91.2	89.6
8.	Scatter	m ² /kg	41.6	39.0
9.	Ash	%	4.6	4.1
10.	Alum demand	kg/t	30.0	30.0

range of 60.0 to 85.0. With respect to Optical characteristics, Brightness was in the range of 51.0 to 58.0 % ISO & Light scattering coefficient was in the range of 50.0 to 60 m²/kg. On fiber classification, the fines fraction (-200 fraction by Baur-mcnett) was in the range of 25.0 to 37.0%. Alum demand was within the limit of 45 kg/t.

III. SORTING PROCESS OF WBN BEFORE THE ADDITION IN THE FURNISH

In order to have a cleaner WBN quality; the WBN received has to undergo a systematic sorting process to remove the stickies and other foreign materials.

IV. QUALITY OF WBN IN COMPARISON WITH VIRGIN HOME PULPS

Results of the Pulp quality of WBN in comparison with Virgin home pulps like Bleached

Hardwood Kraft pulp, Bleached Bagasse Kraft pulp, Bagasse mechanical pulp and wood mechanical pulp from table-3 indicated that WBN pulp was highly comparable with wood mechanical pulp in terms of Strength characteristics (Tensile strength, Tearing strength, Bursting strength), Optical characteristics (Opacity, Light Scattering coefficient and Fines fraction in the pulp (-200 fraction)

V QUALITY OF NEWSPRINT WITH WBN IN THE PULP FURNISH

Newsprint quality results from the table-4 indicated that the newsprint furnish composition with the addition of 10.0% of WBN and without the addition of WBN had similar strength and optical characteristics. With the addition of 10.0% WBN in the Newsprint furnish, the tear factor has increased by 5.0 points and the optical properties (opacity & light scattering coefficient) are improved. This indicated that usage of good quality WBN would not affect the quality of Newsprint and in fact would improve the quality.

VI. COST EFFECTIVENESS

The landed cost of WBN is slightly lower than the cost of Wood mechanical pulp. Normally WBN is being replaced for Wood mechanical pulp in the Newsprint production. So by using of WBN in place of wood mechanical pulp in the Newsprint furnish may be an added advantage in the production cost of Newsprint as the cost of WBN is always cheaper than Chemi Thermo Mechanical Pulp. The usage of WBN in the Newsprint furnish can be altered with respect to the economy and the end use.

VII. ENVIRONMENTAL BENEFITS

Besides the economic benefits, the added environmental advantages by the replacement of WBN with that of Mechanical pulps are 1. Forest resources are protected thereby maintaining the ecology. 2. By the supplementation of WBN with that of in-house Mechanical pulp the two benefits achieved are, the consumption of water for the process is much reduced and the load on effluent treatment plant because of the low consumption of water is also correspondingly reduced.

CONCLUSIONS

Presently the availability of WBN is limited and efforts are to be made to have a proper collection system from Newspaper publishers in India as well as from abroad. However the use of Indian WBN will have lower effect as compared with imported WBN as the Newsprint has almost with long fibred pulp in the furnish. Addition of WBN in the Newsprint furnish will improve the quality of Newsprint especially tear and optical properties. Depending on the availability of WBN, the usage of WBN in the Newsprint furnish can be altered with respect to the economy and the end use. The filler content in the WBN has to be evaluated. Alum demand may not increase when the percentage of WBN increases in the furnish. However WBN should be totally uncoated unprinted and no coloured paper.

EXPERIMENTAL

From the consignment received, Eleven samples of White Blank News were collected from two Regions. Laboratory studies were carried out to find out the quality variations with respect to Initial Freeness, Brightness, strength (Tear, Tensile & Burst), Ash content, Alum demand and Percentage of fiber fines by Baur - mcnett fiber classifier. WBN was soaked for 10 minutes at 60°C and then disintegrated for 90000 revolutions at 1.5% consistency in a standard L&W disintegrator. Hand made sheet testing was carried out as per ISO-187. Testing condition: Temperature at $27 \pm 1^\circ\text{C}$ and Relative Humidity at $65 \pm 2\%$. All the results are expressed on O.D. basis. The results of Two regions are given in Table 1 & 2. The quality of WBN was compared with the virgin home pulp like Bleached Kraft Hardwood pulp, Bleached Bagasse Kraft pulp, Bagasse mechanical pulp and Wood Mechanical pulp. Normally WBN is being replaced for Wood mechanical pulps in the Newsprint furnish. The pulp characteristics comparison was given in table-3. Newsprint quality with WBN in comparison with the Newsprint without WBN in the furnish was given table-4.

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