
Increasing Pulp Yield— an attempt at Total View

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Apart from the general economic advantage that Paper Mills will have through higher yield, both in process costs as well as in transportation of raw materials involved, there is also an imperative need in India for increasing yield in view of our depleting raw material resources. One estimate gives the available Bamboo resources in the country as sufficient for making 8 lakhs tonnes

of Paper per year only. Even with better afforestation methods etc., we may not be able to increase these resources very much.

CHOICE OF PAPERS

It has been routine practice for Indian Research Institutions to attempt to make writing and printing papers from almost all raw materials. The time has come in view of the scarce raw materials to suit not only the process to the raw materials but also the type of paper to the raw material. For example, if a particular raw material is more suitable for making corrugating me-

dium the best thing is to make corrugating medium and not attempt to make low yield, low strength writing papers from it.

As the paper industry expands and our general needs grow the demand for Kraft paper and news-print will be more than for other types of papers since this pattern is evident in other countries. We can expect changes in board characteristics and qualities. It is very necessary to have a general idea of the future requirements through intensive market research into prospective demand for different varieties of paper. It might be possible to

have a long range plan for Research on the basis of these statistics for assessing the raw materials to be used etc.

It is desirable to design special features in the Mills for making particular types of paper instead of trying to make various types of papers in every Paper Mill. It is preferable to make semi-bleached papers and use high yield pulps for most printing papers where the brightness is not so critical.

CHOICE OF PROCESSES

There are few possibilities in India for having the Neutral Sulphite or soluble Sulphite processes, since we do not have sufficient Sulphur resources in India and it is futile to plan on sustained import of raw materials from abroad. As far as the ground-wood process is concerned, it is almost out of the question because of scarce availability of wood in India which will be suitable for this purpose excepting in the Northern borders where the cost of haulage is expensive and we can rule it out for a foreseeable length of time to come. So the processes available are few. Cold Soda and allied group of pulping processes followed by Disc Refining to get maximum yield are likely to get popular. The Paper Machinery manufacturers should design 25 to 50 tonnes Packaged Cold Soda pulping plants with definite assurance of technical success and a little versatility for slight modifications here and there. There is bound to be demand for this type of plants. This requires imaginative planning from the Paper machinery manufacturers. It is a pity in our country that we cannot procure Packaged plants and each Paper Mill has to devise its own means of putting its equipment together. As Paper Mills have to assemble machines manufactured by various individual proprietary companies and the consequent assembly turns out to be not too productive and takes considerable time to put on the right track.

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Nitric Acid pulping processes for our raw materials need further investigation as the effluent can be sold for use in farming in view of the nitrogen content.

Even if pulp made from one type of raw material is not in itself entirely suitable for making a variety of papers it can be used in combination with other types of Pulps so that we have the advantage of more yield from our existing meager resources. So the need for making pulp even though of 2nd grade to mix up with other suitable pulps for making cheaper papers, particularly for the printing industry exists.

PAPER MARKET

The Paper Market in India, is fastidious. Where higher brightness is not necessary the consumer should not demand it. After a particular point one degree rise in brightness may give half percent less yield. In fact, Australian news-print (made from Eucalyptus) is a little Brownish which the Australians do not mind. It is also possible to make light coloured papers appear pleasant even with lower brightness. There seems to be a desire amongst many Paper Mills to resort to Chlorine Dioxide bleaching since the yield loss is negligible.

The paper consumer must rise to the occasion in the national interest by using different types of inks or through modifications in machinery to suit the printing processes to the paper.

TECHNICAL TRENDS

It is common practice in Foreign countries to blend chips from different lots even when the same raw material is used in order to achieve chip uniformity. It has been found that if there is a difference of 6% moisture in wood, permanganate number will vary by about 3 under the same conditions of cooking. Naturally, the yield will be affected. Recently considerable attention is being paid both in the Western countries and in India towards chipping. Efforts are being made to obtain thin flat chips as thick chips produce more shives. Reduction of dust loss is also being striven for.

In Sweden where pulp is manufactured for sale, considerable variation is made in cooking conditions to suit customers' demands. If pulp is made for Bond paper the cooking is at low temperature and in two stages for

uniform chip penetration and blown to individual diffusers, from batch digesters. Resin is also separated through special filters. Washing and screening is more thorough. For glassine pulp more time is given for penetration. When kraft is used high density wood is chosen, low alkali percentage, shorter cooking time. Higher temperatures are resorted to, followed by hot stock refining. This is followed by vertical pressure screens to remove shives.

By having a separate blow tank and street and by cooking at higher Permanganate numbers, and sending the higher percentage of knotted rejects to hot stock refiners, considerable increase in yield can be obtained when this pulp does not need bleaching. Hot stock refining is adaptable to high density woods at short cooking times and at higher temperatures.

Now-a-days with continuous digesters, process conditions can be modified easily and quickly.

YIELD DETERMINATION

There are many problems involved in determination of pulp yield. Wood or bamboo is recorded normally on a volume basis and any change in weight due to density or moisture or type of stacking due to variation in shape will affect the figures. Now-a-days the trend is towards weighing bamboo even though moisture is a complicating factor.

In some Mills in Canada they measure the weight of pulp wood by displacement of water. Possibly that is nearest to a satisfactory measurement. Of course, weightometers have become common in most Mills. Pulp yield is generally determined by indirect methods through measurement of pulp flow and consistency. With more sensitive consistency regulators and magnetic flow meters we are able to get better figures. However, consistency regulators are not yet good enough to give more than 0.1% accuracy.

This figure is also cross checked by the finished weight of paper. However, as very few Mills use a single type of raw material or a single type of pulp this becomes complicated. Further complications involved are due to the use of fillers of which the retention varies and also the percentage of broke made for which estimation methods are not very precise. Only rarely is broke weighed, though metering is coming into vogue.

PAPER MACHINES

With increasing scarcity of raw materials and generally weak type of pulps we have in India, it is becoming necessary to suit our Paper machines to our Pulps. We should modify and design our paper machines to make the sheet with less losses and support the weaker web by better arrangements. We should have finer mesh wires, vacuum pick up systems etc. Our Instrument facilities will have to be tailored to determine fibre losses systematically at various points.

In my opinion it is advisable to have a small Board Factory attached to every Paper Mill wherein the screen and Centrifugal rejects, Chipper dust and fibre from the effluent can all be reclaimed and used for this purpose. This is desirable also from the point of view of effluent disposal. Of course different mills have different type of problems and therefore a suitable method can be designed to reclaim the fibre.

No Paper Machine in any Mill in India runs continuously for 24 hours on the same grade or grammage of paper. We normally cook to suit all types of papers instead of cooking specifically for certain grades. We have not yet realised in this country the advantages in running the same type of paper all the time. By standardising chipping conditions, cooking procedures etc., economies can be effected and the quality maintained at any desired standard.

SALES PROGRAMMING

It would appear from our experience in different paper mills in India that the long term Sales planning does not exist at all. Small orders, different sizes (Our Mill produces 700 to 800 different sizes) running the fast machines for two to three different grammages in a single day are some of the factors which are responsible for high losses or low productivity which indirectly reflect on low raw material to paper yields.

(Presented at the Seminar on 'Improvement of yield from Indian Raw-materials' of the Indian Pulp and Paper Technical Association, Madras, March 14-15, 1969).

Discussion

V. S. Krishnamurthy

Comments

It is suggested that paper manufacturers should set some standards regarding paper brightness for papers required for different purposes such as text books, periodicals, children's books, display materials, packaging etc. There is need to consult printers and other consumers and co-ordinate this work of standardisation. This will help in manufacturing fewer papers of definite brightness which in turn will help in increasing the pulp yield.

Tek Singh

The author has stated that pulp yield could be increased by bleaching to a less brightness than to what the pulp is being bleached by Indian Mills for writing and printing papers. However, delegates representing printer were of the view that this is not desirable. From the discussion that followed it appeared that the issue is somewhat confused.

It is however felt that there is some scope to improve yield from raw materials as per suggestion of the author. In other words it is perhaps possible to get away with less brightness in case of some of the writing/printing papers than what these papers are having at present. In order to know whether or not this object can possibly be achieved the best course to follow would be to draw out minimum brightness standards for different grades of writing/printing paper and compare these standards with the brightness levels which these papers are having at present.

If it is found that there is a scope to reduce the brightness in the case of some of these grades of paper, suitable steps could be taken to modify cooking/bleaching techniques to achieve the desired results.

If, however, it is found that the brightness to which the writing/printing papers are made at present can hardly meet the minimum requirement of end-use, the possibility to increase yield by bleaching the pulp to a less brightness for these papers does not arise at all.

In my opinion, reference to brightness standards as obtainable in advanced countries should be avoided while discussing the problem referred to above as we in India are difficultly placed with regard to the availability of raw materials and minimum standards which we are required to meet as demanded by the situation in which we are.

K. C. Virmani

I have got some general comments to make about this paper and these are as follows:

The improvement in yield may be had by not bleaching the pulp excessively. Many grades of paper do not warrant high degree of brightness. We have to educate the public by propaganda etc. that it is in the national interest that we should get used to using papers of less brightness. It will conserve the raw material by having more yield and the life of the paper will increase.

Most of the mills in our country are using the same kind of pulp day in and day out for all grades of papers, whether bleached or unbleached. This is a wastage of the raw material and also the loss of paper quality. Some ways and means be found out to employ different pulps for different grades.

C. T. Dathatreya

Comments:

With regard to paper sizes, I suggest that Indian Standards A-series should be adopted.

N. S. Jaspal

Comments:

When we want paper for text books that are to last for a long time, a high brightness pulp need not be used. Since high brightness paper made by conventional bleaching process is of not permanent quality. To summarise, let us not insist for high brightness when we could do without it. A brightness of 76 — 78% could be acceptable as at this level of brightness the pulp is strong and durable.