

Low productivity in small paper mills-Causes and possible remedies

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ABSTRACT

Paper is a basic need not only for the education but also for the commercial and other social purposes. In India out of total of 305 paper mills, about 250 mills fall into the small mill category upto 30 TPD. These small paper mills form a large proportion of paper making capacity in the country. Approximately 52% paper is produced from 275 small & medium sized paper units with average capacity utilization of about 57%.

The present paper discusses the various factors responsible for low productivity in small mills including scarcity and high cost of raw materials, power, coal, chemicals and non recovery of chemicals from black Liquor, and environmental constraints in particular etc. A number of small paper mills were visited and the problems discussed with the employees working there and possible remedies are suggested, adoption of which will certainly help in improving the performance of the small paper mills and will help in maintaining the eco-balance.

INTRODUCTION

Table-1 indicates the growth of Indian paper industry after independence, whereas Table-2 shows the classification of paper mills with annual installed capacity. Non-availability of forest based raw materials and lower capital investment has resulted in the growth of small paper mills using non-conventional raw materials. The raw materials used by small paper mills include agricultural residues (50%), waste paper (43%) and other non-conventional raw materials (7%) while large mills use conventional raw materials like hardwoods (65%), bamboo (30%) and others (5%).

The paper industry is facing a major problem due to the non-availability of suitable raw materials to meet increasing demand for paper and paper products. The forests, main sources of raw materials, particularly for larger mills have been denuded drastically over the last 30 years without compensatory afforestation. Unfortunately, the forest cover in India, which was around 30% in the fifties has come down to as low as 16% of the total terrestrial area. Ecological and environmental imperatives indicate that pulp and paper

industry should look for viable alternative raw materials, particularly agricultural residues and waste paper, while agri-residues form an annually replenishable source, recycled secondary fibres (waste paper) will reduce the strain on primary fibre resources.

ROLE OF SMALL PAPER MILLS

The performance of the Indian Paper industry has been far from satisfactory for the last 7-8 years. Though the small paper mills are afflicted with many problems, yet these mills will have to play a vital role in the development of the Industry because of the following reasons :

1. Continuous decline in the availability of forest based raw materials which limits the expansion of large paper mills.

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TABLE—1 GROWTH OF INDIAN PAPER INDUSTRY

Sl. No.	Year	No. of Units	Total Installed Capacity (Lakh Tons)	Actual Production (Lakh Tons)	Capacity Utilization %
1.	1950	17	1.37	1.32	96.40
2.	1960	27	4.00	3.50	86.30
3.	1970	46	7.68	7.59	98.80
4.	1980	121	16.56	11.13	67.20
5.	1985	249	23.50	15.00	63.90
6.	1988	305	30.14	17.20	57.06

TABLE—2 INSTALLED CAPACITY OF PULP AND PAPER INDUSTRY IN INDIA (AS ON 1-1-89)

Category	Capacity Range	No. of Units	Annual Installed Capacity, (Lakh Tons)
1.	Above—20,000	30	14 573
2.	10,000—20,000	24	3.791
3.	5,000—10,000	87	7.286
4.	2,000— 5,000	107	3.617
5.	Below— 2,000	57	0.875
	TOTAL	305	30.142
6.	Newsprint mills	4	3.275

TABLE—3 PAPER PRODUCTION SINCE 1980

Sl. No.	Year	Total Installed Capacity (Lakh Tons)	Actual Production (Lakh Tons)	Capacity Utilization %
1.	1980	15.38	11.12	72.30
2.	1981	16.56	12.35	74.60
3.	1982	18.17	12.38	68.10
4.	1983	19.15	11.80	61.60
5.	1984	21.65	14.00	64.70
6.	1985	23.49	15.00	63.90
7.	1986	26.55	15.67	59.00
8.	1987	27.58	16.50	59.80
9.	1988	30.14	17.20	57.06

2. Easy availability of non-conventional raw materials at economical cost.
3. Lesser gestation period.
4. Lower capital investment per annual ton of paper.
5. More direct and indirect employment opportunities.

factors responsible for low productivity in small paper mills are enumerated below and are discussed in detail with possible remedial measures with particular emphasis on pollution aspect.

PROBLEMS OF SMALL PAPER MILLS AND REMEDIAL MEASURES

Table-3 illustrates the installed capacity and actual production of paper in 1980s'. The trend of fall in capacity utilization is shown by Fig. 1. The capacity which was 70-75% a decade ago, has fallen to about 57%. This low capacity utilization has been a serious problem facing small as well as large paper mills. The

1. Use of obsolete technology.
2. Inadequate inventory of spares.
3. Improper selection of equipments.
4. Shortage of skilled manpower at various levels.
5. Improper operations.
6. Frequent power cuts and trippings.
7. Non-availability of chemical recovery systems.
8. Poor maintenance.
9. Locational Inconveniences and strained labour management relationship.
10. Non-adoption of pollution control measures.

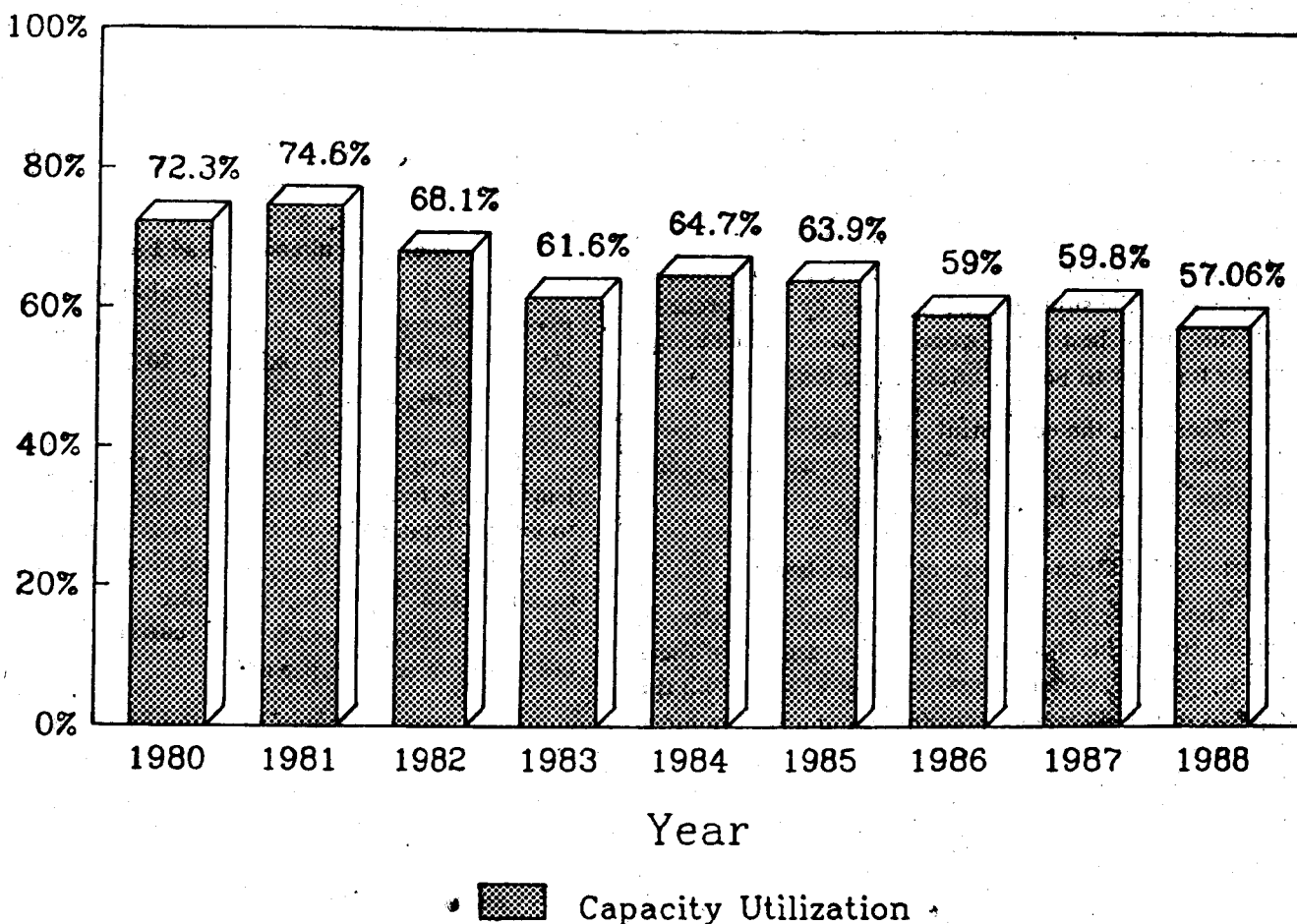


FIG.1. TREND OF CAPACITY UTILIZATION IN 1980s'

Use of obsolete technology

The Pulp and Paper Industry in India has not updated its technology with the passage of time. Many small as well as large paper mills are using old/second hand machines and equipments that have become obsolete. Also, it has not been able to make substantial investment in renovation or modernization of the plant mainly because of poor financial conditions of the paper industry. So, in the time to come the Pulp & Paper Industry will have to manage to augment funds and go for latest modern technologies.

Inadequate availability of spares

It is very important for a process plant to keep the requisite spares to meet the regular wear and tear and emergency situations. The introduction of perpetual inventory control on spares could reduce the downtime in the plant and hence can increase capacity utilization to a great extent.

Improper selection of equipments

Many small paper mills do not select the equipments properly. A mill follows the same practice as the other units have and such mills generally prefer to purchase equipments of low costs irrespective of whether the designs and specifications are properly met or not. Often the suppliers are selected by entrepreneurs on the basis best understood by them. Such equipments turn out to be liabilities in the long run.

Therefore, the equipment and procurement should be done strictly as per specifications so that the process requirements may be met properly.

Shortage of skilled manpower at various levels

There has been shortage of skilled manpower in small paper mills because of the fast growth of these mills, which has been completely out of tune with the growth of skilled manpower generation. In the paper industry, the proper manpower planning and training has been neglected over the years. In the small paper mills the persons are engaged mostly in direct production, maintenance and running of the mills. So, there is a great need to develop and emphasize training programmes in the fields related to: Production and Engineering Technology, Stores, Raw Materials and Inventory Controls, Unconventional fibrous raw material development and other related aspects, Marketing and

sales promotion aspects, Pollution control and efficient utilization of wastes generated in the process etc.

Improper operations

Small paper mills, because of their lack of instrumentation and other controls needs the services of experienced persons to take care of various operations. The problem of improper operations can be understood by following two main factors :

- (a) Non conventional raw materials behave in a different fashion and call for specific experience in their utilization. But in the small paper mills, which are primarily based on non-conventional raw materials, the persons are hired from large mills and they have experience in the processing of conventional raw materials. The various operational areas suffer due to this difference.
- (b) Many small paper mills generally do not pay any attention to consultants, recommendations concerning water reuse, material handling and processing. This results in poor productivity and product quality as well. These are the few directions where a mill personnel should look carefully.

Very high energy requirements and Frequent Power cuts

Energy is an important and critical input for the paper industry as energy costs constitute a relatively higher proportion (approximately 20-25%) of the total manufacturing cost.

Small paper mills have been facing serious problems due to frequent power cuts and trippings. Due to every tripping of power, there is at least a production loss for one hour on paper machine in view of its cleaning and restarting procedure. Frequent power cuts and trippings have heavily curtailed the capacity utilization in small paper units.

It has now become essential to have a captive power plant to meet certain demands of essential uninterrupted power supply and great efforts are required to find out energy saving technologies.

Non—availability of chemical recovery systems

The chemicals used in small paper mills are not recovered from black liquor because of high cost involved in the chemical recovery systems and black liquor is drained off with the waste water without any

treatment resulting in loss of valuable chemicals and other byproducts. This is a major hurdle towards the overall profitability of such paper mills.

So, there is an urgent need to develop an economical method to recover precious chemicals from the spent liquors and more research work is required towards the alternate utilization of black liquor containing mainly lignin. Various useful commercially applicable lignin derivatives can be prepared but economics involved in manufacturing processes and high cost of products restrict the adoptability of such techniques.

Poor maintenance

Today, many small paper mills are suffering from the problem of increased downtime due to mechanical failure of various equipments. The attention is paid only when the breakdown occurs. Sometimes the breakdown results in complete closure of the plant for longer periods which leads to serious setbacks. The preventive maintenance could be the best solution to such problem but hardly any mill bothers about it unless it becomes a necessity.

Preventive maintenance implies forethought and includes routine replacement of machinery parts which have more or less constant rate of wear, routine inspection, lubrication and surface protection and servicing of equipments at scheduled intervals. It minimises unforeseen breakdown. To overcome the problem of poor maintenance the management will have to play a vital role. The preventive maintenance can go a long way in stabilizing the high cost of paper production by increasing life cycle and productivity of equipments.

Strained labour management relationship

Many important aspects like transportation costs, basic infrastructure like roads, public transport, proximity to residential areas are not given proper consideration when the site is selected. Due to lack of such basic facilities, many competent personnel do not like to join small paper mills or leave the mill before making any substantial contribution.

Apart from these factors responsible for low productivity, environmental conditions in and around the industry also play very important role. The paper

industry is highly polluting industry, leaving various obnoxious and hazardous compounds in the form of solid, liquid and gaseous. The problem of pollution in paper mills particularly in small scale sector having chemical pulping unit is of liquid effluent disposal. The magnitude of pollution loads are very high. Thus a total approach considering all the influencing factors should be taken when selecting site for the mill.

Non-adoption of pollution control measures

There is hardly any pollution control in small paper mills. Very few small and medium sized mills are having full fledged/partial effluent treatment systems. Air pollution control has not been conceived by even large mills, not to speak of small mills.

The Indian paper industry in general, and the small paper mills with pulping units in particular, are highly water polluting, primarily due to :

- non recovery of chemicals from black liquor,
- partial/non-treatment of effluents, and
- use of un-conventional materials.

To reduce the pollution level to Minimum National Standards (MINAS) and to make the discharge fit for irrigation purposes, the small paper mills are presently not in a position to treat the effluents because of high capital investment requirement and operating expenses.

The treatment systems suggested by Central Pollution Board are capital intensive and a mill of the order of 10-15 TPD capacity can not afford it. Therefore, there is a strong need to find out some suitable techno-economic effluent treatment system. In order to boost up the entrepreneurs, the Central Pollution Board should provide subsidies in installation of treatment plants, so that the small mill can reduce the pollution load upto certain extent.

Another efficient approach towards water pollution reduction may be the increased use of secondary fibres in place of virgin pulp. But this will depend on the quality of waste paper as well as the quality of end product desired.

At this preliminary stage, it is suggested to collect black liquor from poucher washer in separate tanks/

ponds, leave it open for sun drying for few days and then spray the concentrated liquor onto the rice husk being used in the boiler. This will give two fold advantages: significant reduction in pollution loads, and increased calorific value of rice husk. Prior to this the suspended solids in black liquor can be checked by mounting finer wire mesh onto the washing drum. This will enhance pulp production and at the same time will result in significant reduction in pollution load.

The main source of air pollution in small paper mill includes boiler house, raw material chopping section and the pulping section when digester is blown after cooking. Usually small paper mills use low capacity boilers in the range of 4—6 tons/hr steam generation capacity being operated at coal or rice husk. The major air pollutant is Suspended Particulate Matter, which can be controlled by employing a suitable equipment either a cyclone or U—bend scrubbing system or a dust collector. But this has to be worked out on the basis of gas emission characteristics. Installation of such equipment will certainly result in significant air pollution reduction and will help in maintaining the environment cleaner.

CONCLUSIONS AND RECOMMENDATIONS

No doubt the cost of various input materials like fibrous raw materials, chemicals, coal, power, labour etc. has gone very high as compared to the rise in the price of paper. The net profit of the mill has reduced

significantly but these are such factors that can not be prevented or checked by a mill personnel and moreover this will not increase capacity utilization or productivity. Therefore, to get maximum output from a plant, the mill personnel will have to look for other infrastructure dimensions of the plant.

To improve the productivity the mill entrepreneurs and the management will have to look into some basic factors which include, plant layout, locations of various sections within the mill, their interrelationship and ease of communication, time to time modernization of plant and sufficient inventory of spares, good quality of hardware i. e. plant equipment and machinery to ensure smooth production and least accidental risks, proper and periodic maintenance facility, proper placement of employees within the organization, proper weightage to subordinates and necessary facilities to the employees and of course good quality of people within the organization is a must. Besides these, the mill should look at the possibilities of improvement in various processes.

To raise the overall capacity utilization/productivity to a higher level there is great need to enhance the proper utilization of 3 R'S (Resource-Recovery-Reuse) and 3 M's (Material-Money-Manpower) strategies. The mill should look for all possible recovery even from the waste products like black liquor instead of its reckless discharge. Only then it will be possible for a mill to get improved performance.