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HOW TO RAISE THE LEVEL OF EFFICIENCY
OF THE PULP AND PAPER MILLS
IN DEVELOPING COUNTRIES^{1/}

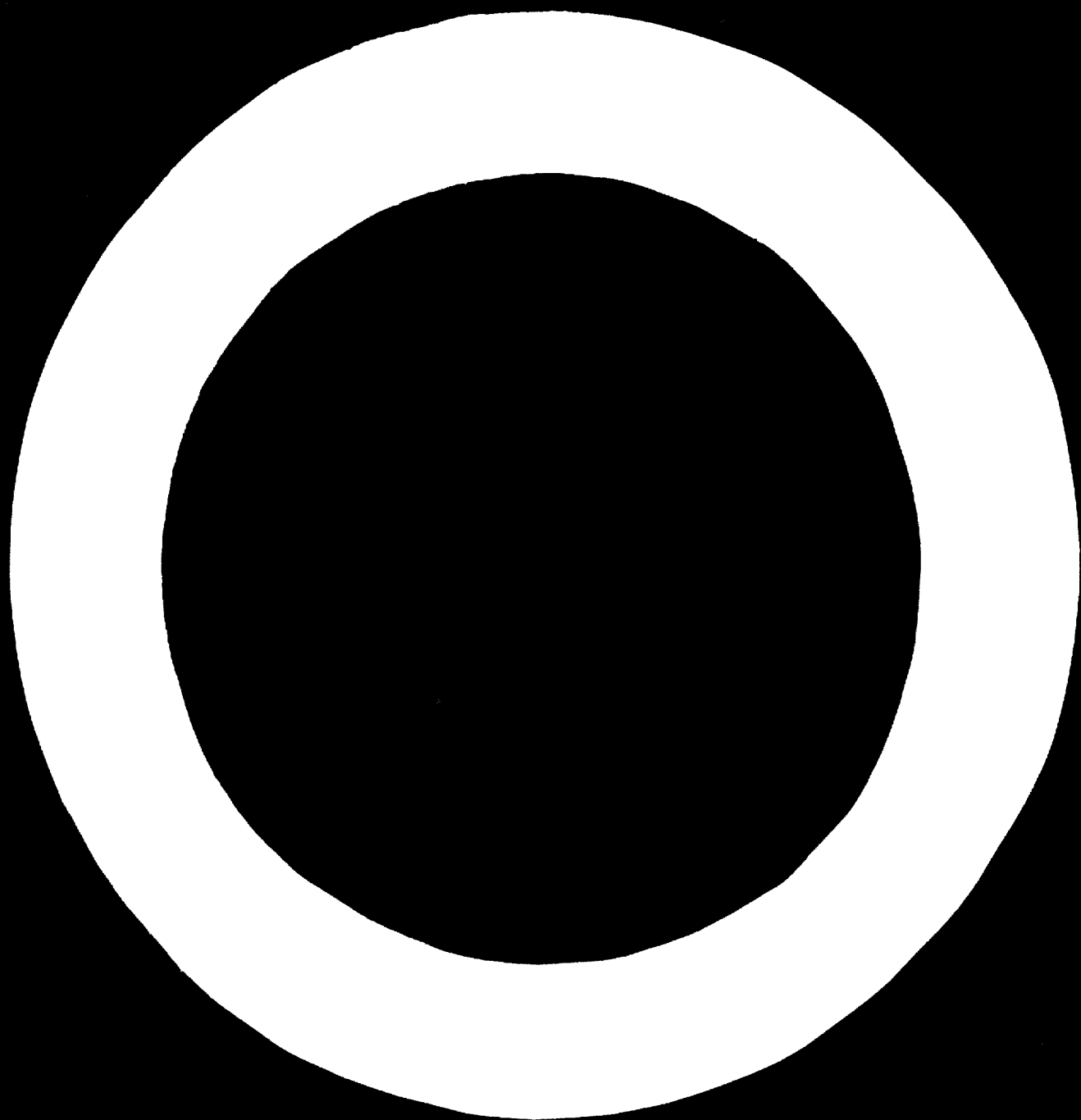
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1 INTRODUCTION

Paper is one of the basic needs of modern life. It plays a pivotal role in the advancement of civilization. Its importance has been fully recognized in all the countries of the world, by no means less in the developing countries. With the progress in the field of education, social services and industrial set-ups of countries, there has been a steady increase in the demand for paper. Today, with the sweeping developments having taken place in the political set-ups of developing nations, there is an awakening and earnest desire on their parts for upgrading the quality of their human resources through mass education, improved social services and industrial development. This has naturally also resulted in a considerable increase in the demand for paper.

2 DEVELOPMENT OF THE PAPER INDUSTRY IN DEVELOPING COUNTRIES

The development of indigenous industries in the developing countries was very much handicapped during the period when most of them were under foreign subjugation. These countries mostly have had to depend on the imported supply of paper from the governing nations.

The paper industry in these countries has its beginning with the import of old and out-dated machinery, which meant poor technique, and with imported raw materials without any research being done in exploiting the indigenous resources of raw materials. The capacities of these individual plants are also very small. Such small plants have lost their importance in the developed countries with regard to their production capacity, designs as well as quality of products and economical operation.

The concept of indigenous production and involvement of foreign exchange drain in imports has incensed an awakening to manufacture paper in the country itself, utilizing the raw materials as available indigenously. Unfortunately, most of the developing countries have been short of the conventional paper making raw materials like coniferous soft woods. Secondly, the consumption of paper was so small that these countries could not sustain large mills as were existing in developed countries.

The developing countries, when they became conscious of their existence, introduced to some extent tariffs on imports in order to encourage their own industry. But then the developed countries started to follow the dumping policy, whereby they would export paper at a lower price compared to the price in their own countries and thus make it look very attractive for developing countries to import. This factor is in existence even today, and is one of the important factors why capital is not being invested substantially in this industry; when a project is prepared, it is generally found that the cost of production would be quite high compared to the imported prices. The result is that the entrepreneur becomes discouraged.

3 RESEARCH

From the above it is clear that to improve the economic feasibility of indigenous manufacturers of paper in the developing countries, it is necessary not only to increase the production of paper and boards

but also to increase the level of efficiency, thereby establishing competitive conditions. The establishment of competitive conditions will necessitate :

- a/ utilizing indigenous unconventional raw materials for the manufacture of paper;
- b/ highest productivity, high efficiency with a view to lowering operational costs;
- c/ continuous improvements in the quality of products;
- d/ development of resources to reduce cost of production for products for which demand already exists; and
- e/ development of new products for which market have to be created.

Installation of modern and up-to-date machinery in functionally designed buildings and their efficient operation are not adequate in themselves for dynamic progress of the industry. To ensure such progress, the industry has continuously to be nourished on research - fundamental, applied and advanced. The level of higher efficiency in pulp and paper mills can be achieved by fostering and prosecuting applied and advanced research based on pure or fundamental research. Therefore, in order to achieve future advancement successfully in developing countries, it is essential that its roots are firmly laid on foundation of research. It is thus necessary, to establish research stations in the developing countries to study the propositions directed towards the utilization of indigenous raw materials and other resources.

4 RAW MATERIALS

Selection of raw material is one of the most important factors to effect the efficiency of pulp and paper mills. In developing countries, common raw materials available for paper making are mostly bamboo, hardwoods, grasses, and other agricultural residues. Conventional soft woods, like spruce, etc are available in limited quantities and that too at a comparatively higher cost. Thus arrangements should be made for supplies of suitable primary raw materials in requisite quantities at cheap and economic price. This can be achieved by :

- a/ scientific surveys of forest areas in the country with a view to preparation of exact up-to-date inventories of available resources of fibrous raw materials for industry;
- b/ construction of forest roads and modernization of methods for mechanised extraction and efficient and cheap transportation of pulping raw materials from the supply areas in the forests;
- c/ detailed and scientific investigations into the species of fibrous raw materials;
- d/ detailed surveys for fixing sites suitable for raising plantation by latest methods and techniques, based upon the planning of production in the country;
- e/ improving the handling and storage of raw materials in most economical ways; and
- f/ research work on selection of alternative raw materials (after pilot plant study) suitable for a particular country.

5 COST OF PRODUCTION

It is necessary for the industry to make an earnest endeavour to reduce its cost of production by :

- a/ improving the operational efficiency;
- b/ increasing the productivity, to reduce the labour costs per unit of production;
- c/ increasing the yield of pulp from basic raw materials by adoption of modern techniques or by switching over to alternative pulping processes wherever advantageous;
- d/ avoiding waste of materials; and
- e/ reducing the down-time of machinery.

The level of efficiency could be raised in the pulp and paper mills of developing countries as indicated below :

5.1 Assistance by Financial Institutions -

Assistance by International Financial Institutions is the most important factor which will continue to raise the level of efficiency as it is by renovation, modernization and rehabilitation of existing plant and machinery that we can improve efficiency. The profit available with the paper making companies is not so much as to encourage them to indulge in carrying out such developmental programmes. But the International Financial Institutions, and other agencies which are giving aid for development of countries should come forward and assist in installing modern machinery thereby helping in raising the level of efficiency. There are some countries where the internal consumption is very high, but they

still import large quantity of paper, even though non-traditional raw materials are available in their countries. No doubt financial institutions are giving help in getting research done on such raw materials and getting installed pulp and paper plants. But the quantum of help is not large and that too is mostly concentrated on new projects, while old projects are working inefficiently for want of funds. It should be clearly understood that even if the indigenous production cost is high compared to the imported cost, it would always be advisable for any independent country to be self-reliant and to produce its own product than to import.

5.2 Plant and Machinery -

Old and unsuitable plant and machinery are working in many mills with heavy maintenance cost and producing a low-grade product. It can be very well established what equipment would be required to raise the level of efficiency and what additional equipment need be installed at different places. This cannot be generalised, as each mill would have its own problem regarding its plant and machinery. This has to be looked into on individual merits. For example, tremendous strides have been made during the past two decades in advancing the operational efficiency of the paper machines. Normally, all the paper machines are designed for a specific speed but are generally rated for much lower speeds so far production is concerned. It is not convenient to the paper machinery manufacturers to change their designs and structures for various speeds. As such careful evaluation of the existing machines should be made so as to speed them up

by a minimum capital investment. It has been observed that the production can be increased by installing some balancing equipment. Controlling factors are the speed and the drying capacity of the machine.

Following pertinent parts of the machine can be checked up for any replacement or modification, for achieving higher production and efficiency :

- a/ Driving arrangement Changing the main motor or certain gear boxes, it would be possible to raise the working speed of the machine considerably.

- b/ Head Box and Approach Flow System Generally the headbox supplied with the machine is designed for a limited increase in speed of the machine and in some cases they may have to be replaced by latest design headboxes.

- c/ Four-drier Wire Plant There have been many improvements in the wirepart. For example, hydrofoils and wet suction boxes have been introduced to partially replace the table rolls. With development of plastic foils, these create very low friction and also help in decreasing the two sidedness, higher

retention of filler,
smaller fibres and better
formation.

a/ Press Part

This section has undergone
radical changes. The
existing presses can be
replaced by Suction and
Fabric presses. This change
will decrease the dry content
of the paper sheet ahead of
drier section. It may be
noted that for each one
percent decrease in paper dry
content, 4 to 5 percent
saving in steam is achieved
and at the same time the
production can be boosted
proportionately in the drier
section.

e/ Vacuum Arrangement

Proper vacuum at different
places is a must for higher
speeds. A well planned
vacuum system can improve
the working of the paper
machine to a reasonable
extent.

f/ Drying

Drying process is of very
great economic importance
as one-third of the
investment of the paper
machine is in drier section,
and the operating costs are

also very high. In addition to contact drying, 'convection drying' should also be introduced. The third way whereby drying capacity could be increased is by 'Free Drying', that is, drying in the free draw of the paper between the drying cylinders. Sometimes high velocity hoods are also provided on one or more drying cylinders to increase further the drying capacity.

c/ Steam and Condensate System

Thorough check should be made on this system and this could affect the efficiency substantially.

5.3 Operation -

Raw materials are becoming more and more expensive and pulp yield from them is an important factor. If the process is properly controlled in respect of size of raw materials fed, proper cleaning devices, control of chemicals, cooking and bleaching, it can make a large difference in the consumption of raw materials and chemicals.

5.4 Chemical Recovery -

Previously there have been no recovery plants in many mills, one of the reasons being that such plants were not available in smaller sizes. It may be true to some extent, but it is not wholly correct. A small-size

plant working with the recovery unit quite successfully has come to the notice of the author. In the world today, medium size operation could be carried out with chemical recovery, more or less as efficiently as a large unit.

5.5 Quality of Products -

More attention should be paid to production of quality products so that they can fetch better price which would automatically bring profits to the manufacturers. This would partly depend on the quality of pulp supply and also on the machinery used in manufacturing such paper.

5.6 Maintenance -

Proper maintenance is one of the most important factors for achieving efficiency of any production unit. The same is applicable to pulp and paper industry.

- a/ History sheet of individual equipment should be prepared and record of regular maintenance should be made;
- b/ Spares and other parts should be easily available as it has been observed that lot of time is wasted due to non-availability of spare parts;
- c/ A proper maintenance schedule should be maintained. There should be a planned shut-down of paper machines so that down-time could be kept to the minimum; and
- d/ Above all the engineering personnel should be trained as "COST MINDED".

5.7 Utilities - Steam and Power -

Attention has to be paid with regard to the consumption of water, steam and power. Non-availability at times, and higher consumption due to poor maintenance conditions of the equipment, lead to lower efficiency. It should be carefully studied that

- a/ Power is available at a cheaper rate and there is no voltage fluctuations and trippings;
- b/ Steam leakages are removed and pipelines are properly lagged and the condensate is fully returned; and
- c/ Clean water is easily available at all times.

5.8 Manpower -

The pulp, paper and allied industries at present provide direct employment to a large number of workers. In addition, the industry also provides the indirect employment to a very large number of persons engaged in the collection of raw materials, distribution of paper etc.

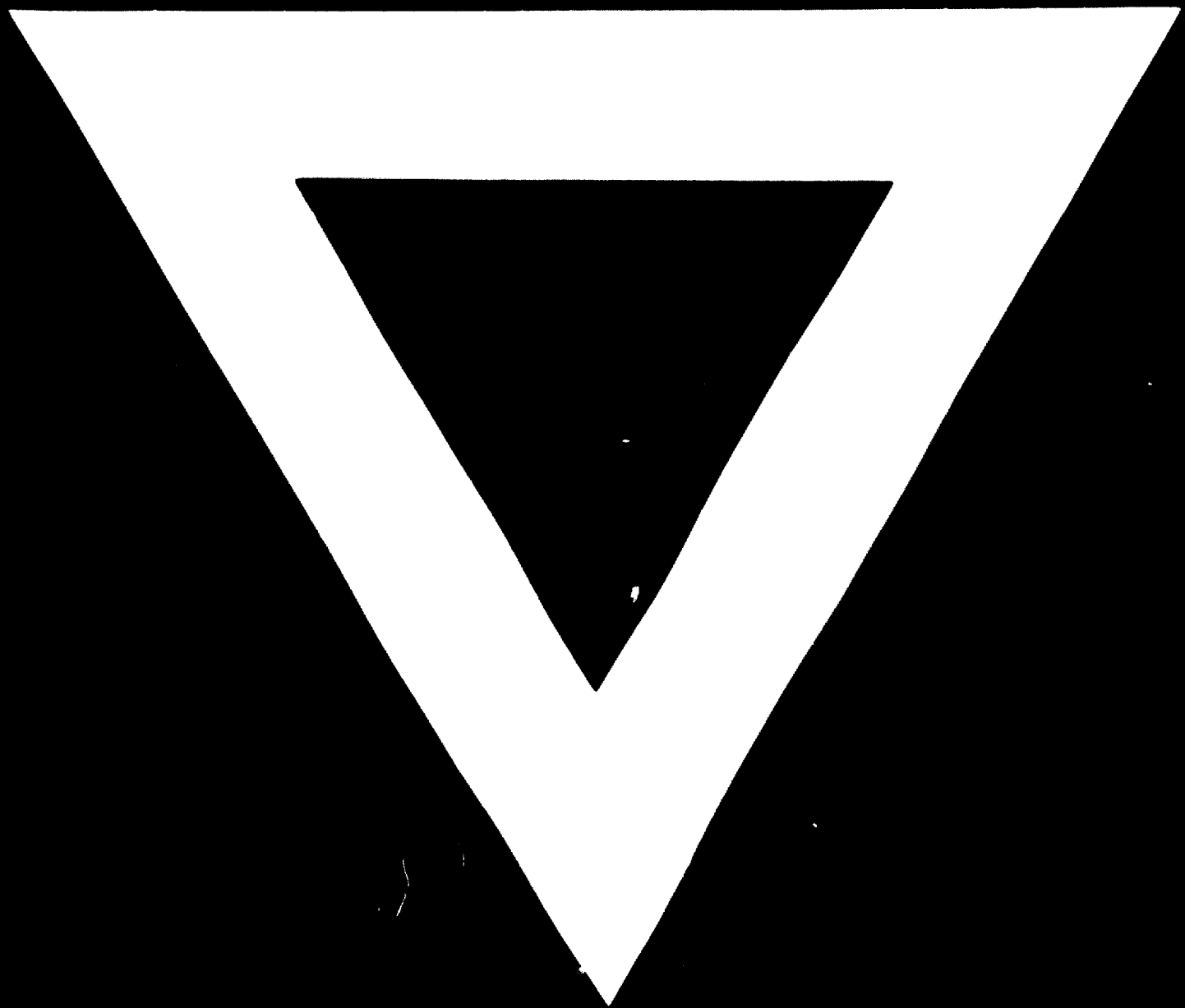
Paper is, in fact, not a highly labour intensive industry. With the installation of high speed paper machines, introduction of continuous pulping processes and instrumentation, the man-hour requirement should be low. In developing countries, the industry is employing much more workers than its counterparts in other industrially advanced countries. Although the wages are low, the incidence of labour and supervision in the developing countries per tonne is about 3 to 4 times that in the advanced countries.

If the industry has to absorb increases in the cost of production, it will be necessary for it to lay emphasis on increasing productivity of workers already employed and reduce the incidence of labour and supervision charges. Various categories of workers should be trained and some should be sent abroad for advanced training in developed countries.

Unless a sense of "Production Mindedness" is inculcated in the minds of workers, it is difficult to increase the efficiency with other resources. Therefore, the workers should be given proper training and guidance and should be encouraged for giving constructive suggestions.

6 CONCLUSION

It can be inferred from the above that it is very imperative that the level of efficiency in the existing paper manufacturing units in developing countries are raised on a war footing. Unless the various methods suggested in this direction are given effect to urgently, it would be hard to set the paper industry on the road to proper progress.



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