

# Paper Making Machines

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Indian Manufacturers' View-point

A tendency exists today in the minds of planners of paper mill projects to prefer entirely imported equipment to the detriment of those engaged in the development of paper machinery manufacture in India. While this tendency could be justified three or five years ago, it is certainly out of place today. There are at present at least three Indian companies who are making medium and largescale paper mill machinery with the collaboration of well-known foreign companies. They have up-to-date workshop facilities and excellent design offices at their disposal. It is heartening to learn that some more Indian firms are entering this field in collaboration with foreign manufacturers.

## Foreign Collaboration

There are two aspects to be considered while building a paper mill. The first is the selection of the right kind of equipment and its proper layout so as to convert the available raw materials into desired types of paper economically. In many cases this aspect is jointly discussed and solved by the mill and the machinery manufacturer. Further, the foreign collaborators have put their experience in this regard at the disposal of their Indian counterparts. The second aspect is the design and construction of the various components of equipment, which should be such as to ensure perfect mechanical performance over a long period. Here again the foreign collaborators have placed their know-how at the disposal of their Indian partners. In certain cases some modifications become necessary to suit indigenous materials and facilities. The Licence fee payable to the foreign collaborators amounts to 5 to 7½% of the equipment price.

## Imported Content

In spite of all the manufacturing facilities and know-how available to the Indian companies, it is still necessary to import many components of equipment. This is sometimes due to the very special construction of the components. But it is largely due to the fact that the requirement of such equipment is not large enough, so that it can-

not be economically manufactured. Even in the advanced countries the large paper mill machinery manufacturers buy a considerable amount of components from various makers of special equipment. Suction couch roll and press roll shells, granite and stonite press rolls, calender rolls, M.G. cylinder and instrumentation are a few of such components. For the suction couch and press roll perforated centrifugally cast bronze shells, there are hardly three or four suppliers to cater for the total requirements of machinery manufacturers throughout the world. For the M.G. cylinder there are only two foundries for the entire paper industry of the U.K.

Indian machinery manufacturers are allowed, subject to the conditions of their Industrial Licence, to import such components of equipment. Depending on the nature of the project, the imported components may vary from 20% to 40%. In certain extreme cases like that of an M.G. tissue machine, the imported components may be as high as 50% because of the stainless steel components of the head box, the suction press and the M.G. cylinder.

## Indigenous Manufacture

In the manufacture of the indigenous portion of the equipment, the Indian companies have attained a proficiency comparable to their foreign collaborators. This statement will be explained with the help of a concrete example of a 35/45 tons per day paper machine. Such a machine would roughly cost Rs. 60 lakhs (from head box to reel).

A paper machine is an assembly of numerous components of various types, each doing a specific job. However, these components can be classified in a few groups depending on the type of construction and method of manufacture. Let us examine the main group in some detail.

### Group (i).

In the first group, we will consider rolls of all kinds. These include table rolls and underwire

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rolls for carrying the Fourdrinier wire, wet felt rolls for carrying the press felts, dry felt rolls for carrying the dryer felts and lead rolls for carrying the paper from one section to the other. Although these rolls do not play much direct part in the making of paper, their perfect mechanical functioning is most important. In a machine of the size under consideration, there may be upwards of 150 rolls of various kinds and cost-wise they may account for about 12% of the machine price. We at PMP have developed and perfected the technique of roll making. Depending on the type of roll, we use heavy wall mild steel-copper-brass-bronze tubes (these are mostly imported) for the roll body. All precautions are taken to straighten the tubes and to shrink the cast iron ends and steel journals. The anti-friction bearings are mounted according to the recommendations of bearing manufacturers. And finally the rolls are dynamically balanced where the speed warrants this refinement. We claim that our rolls are at par with the best imported rolls. A few weeks ago we despatched from our Works the 1000th roll. With our existing facilities, we can make rolls having face widths upto 220".

#### **Group (ii).**

In the second group, we may consider cast iron cylinders for paper and felt drying. For our model machine, about 34 paper and felt dryers may be required and they may cost upto 28% of the machine price. Due to the high cost, the dryer cylinders are generally made to outlast practically all the other equipment of the paper machine, so that they can be used again and again for expansion and reconstruction projects. Further, the paper dryers play a direct part in the making of paper, so that the uniformity of the casting and the trueness and finish of the dryer surface are of vital importance.

We know of at least three Indian foundries who have successfully cast medium size cast iron dryer cylinders. A foreign manager of an Indian Paper Mill remarked after a visit to one of these foundries, that their castings were better than those he had seen in U.S. foundries. Apart from these, there are at least four other Indian foundries who possess the necessary equipment to successfully cast dryer cylinders. Only some specialised training of their staff would be required. The dryer castings need careful machining and grinding on large and accurate lathes and grinders and these

facilities are available with the major Indian paper machinery manufacturers.

What has been said about dryer castings, also applies to press roll castings. For rubber covering of these rolls and ebonite covering of felt rolls, table rolls, etc., there are three major Indian firms doing excellent work. One of these firms is planning to introduce stonite covering of press rolls in the near future.

#### **Group (iii).**

In the third group, we may include all the other cast iron parts like supporting frames for dryers, calenders, presses, reel, wire part, etc., bearing housings for dryers, cylinder driving gear blanks, sole plates, cone pulleys, etc. These together may cost about 15% of the machine price. Since these parts do not take any direct part in paper making, the only important thing about them is the strong construction and trueness of form. However, there are certain of these components which are required to be manufactured from special types of cast iron including spheroidal graphite and nickel chrome grades, all of which have recently become available indigenously.

#### **Group (iv).**

In the last group, costing about 10% of the machine price, can be included the miscellaneous equipment for wire part (e.g. head box and slice, side bars, shake equipment, vacuum boxes, etc.) and for the paper machine drive. Although the material content for these parts is not large, the high engineering charges and complicated machining and fabrication boost the price. These parts play a direct part in paper making so that sound design and good workmanship are essential.

The type of workmanship involved in Groups (iii) and (iv) is quite similar to that connected with many other Indian engineering industries and it has already attained a high standard.

The indigenous components covered under Groups (i) to (iv) amount to about 65% value of our model paper machine. The imported components and Licence fee of foreign collaborators constitute the remaining 35%.

#### **Expansion of Existing Machines**

Setting up a new paper machine is an expensive project and is not within the means of many mills.

However, many of the old machines can be modernised and expanded at relatively moderate cost. Considering the capital investment, Rupee for Rupee, the increase in production is in many cases more for an expansion project than for a new machine. With proper planning, the expansion can be carried out with minimum stoppage of the existing unit. We at PMP are executing our second such reconstruction project and are confident that tremendous possibilities exist in this field. In the U.K., there are certain firms which exist only for reconstruction and expansion projects. It is the considered opinion of many experts in India that there are many paper machines operating today at well below their potential capacities which could be remedied by minor capital expenditure on additional equipment. It would therefore be in the national interest to exploit these possibilities. The Indian paper machine manufacturers will be pleased to investigate the expansion potentialities of existing machines.

#### **Prices and Credit Financing**

The Indian manufacturers of paper mill machinery are at certain disadvantages as compared to their foreign counterparts. Raw materials in India are expensive and difficult to obtain. This is the main reason why prices quoted by Indian manufacturers are higher. Secondly, certain foreign firms offer very easy long term credit facilities which cannot be offered by Indian firms. The facilities offered by Finance Corporations in cer-

tain advanced countries are highly beneficial to machinery manufacturers and exporters. This problem requires the urgent consideration of the Financial Institutions of this country in collaboration with the Government and the Industry, in order to ensure the rapid development of indigenous machinery manufacturing.

#### **Standardization**

The design and engineering charges for a paper machine are of great magnitude. As such, when a manufacturer is asked to quote for a machine of a non-standard width (for the manufacturer), the price becomes considerably higher. Even for a difference of a few inches in width, the manufacturer has to prepare dozens of new workshop drawings and patterns. It is therefore in the interest of mills as well as manufacturers to investigate this matter and come to an understanding on standardization of a range of widths.

#### **The Future and Exports**

It is to be hoped that the close co-operation now existing between the Indian paper mills and the machinery manufacturers will continue to grow, and that the manufacturers will be given opportunities to build modern paper machines at home, not only to be of service to the Indian Paper Industry but also to enable them to enter the export market in the shortest possible time in the greater interest of our country.