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**APPROPRIATE TECHNOLOGY IMPLEMENTATION
AND FUTUROLOGY**

M. C. Bansal, Prof. (Pulp & Paper) & Director
S.S.S. Govil, Mech. Engineer

Institute of Paper Technology,
University of Roorkee,
Saharanpur.

Abstract

Any new technology which can be implemented for the benefit of industry is appropriate. but technological development is a dynamic and continuing process. Any new technology which may be implemented today is likely to become obsolete tomorrow and thus it is imperative to plan for the future with the implementation of what is best today. There is a gap between the technology upgradation and its implementation too, which can be filled by proper interaction of industry, research institutions, academic institutions and Government agencies through suitable training programmes/workshops. These training programmes/workshops should thus form an interacting sources for implementing what is best today and for planning what could be possible tomorrow.

It is said that technology is a product of creative mind but is an appropriate technology only if it can be used for some useful purpose. Any technology developed for transferred from overseas may not necessarily take into account the specific problems, faced by our industry¹ and/or those arising due to our culture. The working in this atmosphere shall thus require that the industry must really be in a position to know, review and analyze the various technological developments taking place around us globally, and must be in a position to accept and implement what is their interest today. They should also be clear in their objectives for atleast next 20 years for better futuristic planning. If we really see around us many of the mills which were having such futuristic approach many years back are working well today.

science and technology is advancing at a very fast pace, and there has been literally an exponential growth in knowledge. It has been estimated that the amount of scientific work since the time of Newton has doubled every 15 years.² If we take the average active working like of any technologist as 45 years, it means about thrice in once lifetime. In other words, by the time one retires from active life, the knowledge which one has to contend with is eight times in volume and complexity of what one had learnt when he/she had completed his/her education. if we apply the same analogy to industry and if any industry wishes to keep pace with the technology then it must keep abreast with the various technological developments taking place around it, and must plan in advance to accept and implement it too.

The above discussion indicates that there is a need for having a Technology Management System for the benefit of paper industry. Some method may be worked out for dissemination of suitable technological developments through some source of system for the benefit of all. This shall help in expansion of knowledge and creativity on a much wider base. Any mill may have its own such system too, and as we see today, larger groups do have such THINK TANKS who are only busy in futuristic planning and implementation of energy efficient and technologically sound processes in their mills.

There are 297 paper mills in India, and their status has been shown in table-1 out of which only 18 in large sector and 184 in small sector are in running condition at present. In the year 2000 it is expected that the installed capacity is likely to rise to 4.25 Million Tonnes and average 75% capacity³. Production has been shown in fig.-1 for the last few years where it is indicated that average production has been around 60% in most of the years⁴.

All through paper industry is living in a stage of uncertainty and we see a gloomy picture all around us mainly due to the following reasons :

1. Low capacity utilizations.
2. High specific material and energy consumption.
3. Low availability of fibrous raw materials.
4. Improper/Inadequate pollution abatement and control.
5. Shortage of capital for running, renovation and modernization,
6. Labour management.
7. Shortage of coal and power.
8. Improper futuristic planning and forecasting.

Even then if we analyze the story behind the few successful units we may find that their futuristic planning for modernization of their processes and equipments, adoption of changing technologies, training of their manpower to face new challenges, reducing overheads with increased instrumentation and controls, better management techniques could have been among some of the reasons for their success over others.

The above discussion necessarily indicates, That each industry should look at the following points for their developments⁵:

1. What is the period for which they would like to plan for future? If possible this period may be around 20 years for better implementation of strategies.
2. They must decide the direction in which they would like to grow or invest. This will require an over view considering the availability of raw materials and demand of products in the market. They shall have to look for new markets for their new ventures, or better markets even for the present ventures.
3. They must look around for the various technological developments taking place and must keep themselves abreast with the same.
4. To adopt the suitable technologies, their man power should be suitably framed, so that the managers and executives can see the technology base and adopt the suitable one according to their needs, and that too in the specific context of their own products and objectives.
5. In case they have their own R&D units, they may either develop the technology themselves or check the technology, if possible, before implementation. a critical review of selected technology at this stage can save them from a lot of embarrassment in future.

6. Look around, for any agency who can act as a reliable source in the transfer of technology, and who can suitably train their technical team of face new challenges and create a confidence in them for the adoption of new technologies. Some budgetary provisions shall have to be made for such exotic ideas which may have some future possibility for implementation.
7. An analysis of their achievements and failures, of the past 10 years shall help them to plan for the future. They should try to analyse them faithfully and honestly for a better and realistic future.
8. They must try to include anticipatory management culture in their organization. They must also try to give a free hand to their junior employees and may be then they may give some new ideas for the benefit of the organization.

All the above thoughts may be applicable for most of the large and some medium scale units but may look too crazy for many small scale units. A close analysis may reveal that in fact even in small scale sectors some of the units who are doing well are following some of the above points for their success, in some way or the other.

A workshop was organized by IPPTA, CPPRI and UNIDO in the year 1985 on Energy Conservation in Pulp & Paper Industry in India and other developing Nations of South-East Asian Region to discuss this vital topic in detail. The aim of this workshop was to study in depth the problems of the paper industry, for all the matters related to energy conservation in the pulp & paper industry. It has been emphasized that a well-balanced energy programme should include sound administrative policies alongwith good process operations and maintenance schedules. Energy conservation and suitable process technology application are thus inter-related, and need continuous monitoring and management with the changing technological scenario around us. Their first recommendation⁶ was as below :

"It is recommended that at the Regional level and also at the National level in each country, Industrial Energy Auditing and Reporting Systems should be created to establish a comprehensive energy conservation data, and to educate, train and arrange exchange of information at Managerial and operational levels, for the man power engaged in the paper industry."

I. AT ACADEMIC LEVEL :

By providing suitable diploma, degree or higher degree level courses in pulp & paper technology, the level of inputs in all the programmes shall be different. The diploma level courses should have more inputs from operational point of view with suitable theoretical inputs.

The Degree level course should have adequate theoretical operational and design inputs. They should have the knowledge of recent developments in the field. The students must have sufficient exposure to mills before they leave universities.

The M.E. (Pulp & Paper) courses should have enough research base in their final thesis. The work should be such that it may help in implementation of process technologies and may also help in indentifying the gaps.

The Ph.D. programme in Pulp and Paper field in the areas of already identified gaps should be taken up more vigorously.

The Institute of Paper Technology, located at Saharanpur, is doing its might for providing the suitable manpower to the industry but still it needs a lot of support from different sources for filling the gaps in its own short comings. The health of industry effects in the absorption of our products and their acceptability as well.

II. AT INDUSTRY LEVEL :

Proper and efficient utilization of raw materials and energy, man, and money, is possible only by using appropriate technologies. This is further possible by suitable futuristic planning and by imparting proper training to senior executives, engineers, supervisors and operators. With the advancement of diversified and intricate technology, suitable training programmes shall have to be planned separately for each category to achieve the desired objectives.

Such appropriate technology implementation programmes can thus find any favour only with the proper interest of top management; proper interaction, analysis and review by mill managers; and proper presentation, knowledge and hard work by engineers and supervisors. The implementation of any programme shall require the co-operation of all concerned including operators.

The ministry of power, Government of India, is having an energy cell and this cell under the guidance of Mr. K. L. Puri, Advisor, Energy, Government of India is encourging such training programmes. Institute of Paper Technology, Saharanpur has been given the task to run such courses for the benefit of pulp and paper industry. Partial but major support for such programmes shall come from Ministry of Power, and some from the participant of these courses, which are likely to be from the pulp and paper field and related industries. Presently we feel that we are quite weak in equipment design and fabrication, not because of any other reasons but because we lack confidence in the application of technology developed by us, and even when some times borrowed from outside. The participation of equipment manufacturers shall help them too, to

understand the new problems well and suggest the new designs. This shall also help to implement the 'Lab to Land' policy of the Government. This shall provide opportunities for across the table discussions by the participants with the experts which shall benefit all concerned. This may help in implementation of appropriate technologies which might not have found their way due to many reasons already discussed. The success of these programmes shall thus necessarily depend upon the interest taken by the participants in problem solving sessions, case studies and analysis of problems existing in their mills. Considering our resources, the faculty shall be necessarily drawn from academic institutions, research institutions, industries and Government agencies. After attending such programmes the concerned mills may be able to evolve their future programmes and priorities.

References

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3. Dr. N.J. Rao, Status of Indian Paper Industry and strategies to Bridge the Gaps, Futurology of Pulp, Paper and Board Products Workshop, RRL, Jammu, Nov., 15 & 16, 1988.
4. Dr. Ing.A.Panda, The Future of Cultural Papers in India. Futurology of Pulp, Paper and Board Products Workshop, RRL, Jammu, Nov. 15 & 16,1988.
5. Dr. S.C. Seth, Future Related Quiz, Indian Review of Management and Future, 84 (1988).
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TABLE - 1**INSTALLED CAPACITY OF PULP AND PAPER INDUSTRY IN INDIA
(as on 1.1.1988)**

Category	capacity Range tpa	No. of units	Annual Installed capacity Lakh tonnes
1.	20 000	29	13.57
2.	10,000-20,000	24	3.79
3.	5,000-10,000	83	6.94
4.	2,000-5,000	103	3.49
5.	5,000	58	0.88
	Total	297	28.67

