

# Human resources in Indian paper industry-utilization, needs and developments.

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## ABSTRACT

In spite of the growth of the paper industry, the performance has been unsatisfactory due to the poor management of 3 M's. Of this the most neglected is manpower planning and training. Currently the industry on an average utilizes 78 persons per 1000 annual tonnes, the largest of which is engaged in production functions. The technically qualified manpower component is small. The skilled work force is very small, particularly in small mill sector. The industry will strive for reduction in manpower usage with associated competence rise to meet the challenges of technology upgradation and productivity improvements. It is hoped that the average manpower utilization in the country will be 35 persons per 1000 annual tonnes in paper and board sector and 15-20 persons per 1000 annual tonnes in newsprint sector in next 10-12 years. The training programmes in Pulp and Paper will be modified to fall into national pattern at degree/polytechnic diploma levels. The number of pulp and paper specialists required will be around 150/75/25 at diploma/degree/post degree levels. The entire strategy of manpower development will be training competent/skilled personnel capable of keeping obsolescence away; and running the industry at its best performance level.

## INTRODUCTION :

Indian Paper Industry has made significant progress in last 5 decades. From 45,000 tpa capacity, the paper and board capacity in 1988 stood at 30.14 lakh tonnes per annum through 305 units. The newsprint and rayon pulping capacity are 5 lakh tonnes and 3 lakh tonnes per annum<sup>1</sup>. The targets set for the turn of the century are 42.5 lakh tonnes of paper and board, and 12.5 lakh tonnes of newsprint per annum. There are plans to have large packaging paper capacity.

Against this scene, one finds the performance of paper industry is not satisfactory. The industry faces a series of external stresses which will force the industry to make many alternations. But poor management of 3 M's namely materials, money and manpower has been a major causes for the none too happy performance of the industry. For sustained performance the actions include ability to adopt appropriate technology, to conserve energy and raw materials, to outdown costs and be environmentally compatible. The challenges of times can be faced only through a competent skilled

manpower at all levels who will provide the efficient management of the 2 M's and help industry renovate, modernise and expand in a fashion that it is acceptable. Unfortunately the sector of manpower development has not received the desired attention<sup>2</sup>.

From the days of Kalpi to today's cottage sector paper industry, the paper making art is traditionally passed on from generation to generation. The training in organised sector perhaps started around 1930 at Titaghur. Hand made paper Institute of Pune was established in 1943 and the training programmes at FRI started in 1948. The industry specific Institute of Paper Technology was established in 1965 at Saharanpur. Several laboratories took up research activities and many technical institutes offered electives in Pulp and Paper. The industry specific national laboratory namely Central Pulp and Paper Research came up at Saharanpur in 1981. Some institutes came up for training personnel for paper industry at lower levels<sup>3</sup>.

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It has been a long saga of trial to establish a strong manpower training and research base for pulp and paper industry in the country. But the results are of partial success. The systematic assessment of manpower and adoption of a blue print for training manpower to this section have not been done. Before going for a discussion on the strategies of manpower development, it is essential that present level of the development of manpower in Indian Paper Industry be made.

## 2. UTILIZATION OF MANPOWER IN INDIAN PAPER INDUSTRY :

The recent years there have been a few studies<sup>4-7</sup> relating to the manpower utilization in paper industry. The average employment in paper industry in India is around 78 persons per 1000 annual tonnes. It is 121, 67 and 57 in small, medium and large sectors respectively. The number in any mill specifically depended on the nature of mill management, age and size of the mill, raw materials in furnish and type of product. The production related functions account for over 85% of total task force. Rand D functions employ 1.0% while other technical functions like stores, civil works attract 1.6% of workforce. The non-technical departments like finance, sales and personnel account for 11.7% of taskforce. Larger industrial house have this force distributed between corporate offices and the mill sites. These figures depend on how the manpower engaged namely on regular pay roll or through a contractor or as daily wage worker. The recent manpower usage figures for large mills and small mill for production functions and on regular basis are 35-40 and 40-60 respectively for 1000 annual tonnes.

Educational qualification wise 8.3% of manpower are technical degree holders, 5.8% are non-technical degree holders, 5.6% are diploma holders, 1.7% are IIT's and 78.7% are High School and below with experience. In the technical degree and diploma category manpower chemical/pulp and paper engineering personnel are 1/5th and 3/4th respectively. Persons with formal education and training in Pulp and Paper is very little. The result has been a neglect of these sectors requiring analytical ability planning and trouble shooting.

In the Indian Paper Industry as a whole 13.1% are professional/technical on related workers like chemists, chemical engineers, technologists, engineers

supervisors, technicians including medical doctors. 2.3% manpower are administrative/executives and managerial personnel. 11.6% constitute the clerical or related work force, and 7% are service workers, 66% are production related workers in paper and board, Chemicals and process production besides engineering and related functions. Only 25% of these are educated.

The paper industry for technical functions essentially recruited persons with general science or general engineering qualifications at different datums and trained them with 'ON JOB' or 'Orientation programmes' to keep the wheels running. A large component of persons recruited come from high school or near by qualifications and the skills were picked up in certain areas of operation by virtue of their experience. The total result of such training programmes was lack of knowledge and skill in areas which were beyond the realms of normal production. The aspects of technology upgradation, efficient equipment selection were neglected. Instead of gaining strength from manpower, this industry deteriorated steadily in its levels of performance. Productivity fell, energy and material consumptions were high. To a large measure these indicate a neglect of human resource development in the specialised sector.

In a recent study on agro-paper mills upto 30 TPD, the man days needed per tonne of production was found to be 25 to 35 for unbleached and bleached grades. This works out to be 100 to 140 persons per 1000 annual tonnes. The raw material handling section has a large manpower usage (nearly 10%). Excessive manual handling is the cause for high usage of manpower alongwith loss of raw materials to the extent of 3-9%. Partial mechanisation of material handling, feeding and cleaning stages will decrease the manpower deployment, increase the skills and more important by decrease the raw material loss to 3-4% level.

In early 1980's the manpower deployment including casuals and contractual labour was 0.029-0.091 and 0.043-0.111 per tonne of installed capacity in large and small mills (29.91 and 43.111 per 1000 annual tonnes). The contractual and casual components ranged between 20-25% and 25-35% of total task force in large and small mills respectively. The mill to mill variation in manpower deployment is very noticeable on such factors like productmix, process, plant size and

age: Management attitudes has a major influence on the size of manpower. In the typical 9000 TPA mills the manpower deployed varied from 450 in one (with 60 casual/contract labourers) to 275 in the second (with 140 casual/contract labourers).

The R and D components received little attention in terms of manpower and expenditure. Small mills have practically no R and D and often depend on outside agencies or published literature. The inhouse R and D expenditure in Pulp and Paper industry varies from 0.01% to 0.5% of annual turnover compared to a figure of 1% in process/Chemical industries in the country. This is a clear index of why development has been weak in the Indian Pulp and Paper Industry.

In large units managerial staff account for 3-3.7%, supervisory staff for 5.8-6.2%, clerical staff for 5.7-5.8% permanent workers for 58-61.5% and casuals for 23.28%. The corresponding figures for small mills are 2.4-2.9%, 7.5-9%, 7.5-8.1%, 51-59% and 23-30%. These figures do not include persons engaged in such functions as raw material procurement or marketing. The distribution of permanent workers in the categories of highly skilled/skilled, semi skilled and unskilled categories are 34-35%, 28-31% and 34-36% in large mills. The corresponding figures in small mills are 14-19%, 31-33% and 48-53%. Skill levels depend largely on the degree of instrumentation and automation in the industry.

The nature of labour unions and level of professionalism in management in paper industry to a large measure indicated the industrial relations. While 2/3 of the mills have external labour unions, the labour relations are cordial in internal controlled union mills. Nearly one third of the mills faced major strikes/Lockouts in early eighties are on such issues like removal of workers, transportation of lime sludge, leadership rivalry or unjustifiable financial demands.

At mill levels about half the mills take attitudinal development of employees and nearly a quarter of the mills initiate measures for skill development. These are through on job training, sponsoring for outside training courses, worker education programmes, arranging management development programmes by outside agencies or by inside mill staff.

In developed countries it is a practice to have a technical person for every 500 tonnes of pulp installed capacity per annum. For paper making for every 500 tonnes of annual paper capacity the technical manpower deployed is 1-2. The supporting staff to supervisory staff ratio is 2:1. This means the number of persons per 1000 annual tonnes is between 10-15. It may be recalled that the plant sizes are 500 TPD to 2500 TPD with single paper machines and usually a single product from a standardized raw material.

### 3. THE EMERGING TREND :

The Indian industry is witnessing major changes. The industry has realised that the industry productivity as well as labour productivity are low and should be improved. The skill levels are poor and there will be attempt to raise it. Similarly the level of education will rise and personnel with below high school qualifications will get faded. Similarly the aspiration of employees will rise.

The industry has not kept pace with technology. The dependence on forest based materials will reduce and more agriresidues will be used alongwith greater use of recycled fibers. The efficient energy environment management concepts will be tried. In general the consistencies will go up alongwith use of single machines of higher speeds. Fibers blending alongwith larger use of fillers will be tried. In process controls will increase. Process parameters will be optimised and closely monitored simulation, process modelling and trouble shooting will be attempted. Degree of instrumentation and process control with micro-processors and computer will go up. The competitiveness will be for environmentally compatible process with lower energy and raw material usage. All these functions will demand persons with greater skills and stronger technical and managerial backgrounds. These men and women should have strong engineering and process background with adequate exposure to plant and equipment design.

Two other sectors will seek persons with adequate backgrounds. One is in raw material science where persons with knowledge in forest management farm land practices, raw material growth, collection, storage and transportation will be needed. The other will be in the area of marketing. The change from seller's market

to a buyer's market will demand greater marketing skills. Demands for quality products which are environmentally friendly at competitive prices will go up. Thus market research and product diversification functions will grow with men having these backgrounds.

Mills will go from centralised management of maintenance functions to greater integrated maintenance practices. The production personnel will increasingly be asked to perform the maintenance functions well. This will require a greater degree of training in maintenance and service functions for people with process background<sup>9</sup>.

On the other hand jobs from certain sectors will go out of the mill and will be performed on a contractual basis. These are high manpower usage areas like transportation, material handling like sludge disposal and finishing house operations, and security and sanitation. Every mill will try to establish energy and environmental cells for monitoring these key areas. All major mills will establish R&D groups for engineering design and development wings. These require manpower with proper specialised training.

The industry will establish norms of human resources productivity measurement. Human resources accounting procedure will help in acquisition of human resources and maintenance of human resource<sup>10</sup>.

#### 4. LEVELS OF MANPOWER NEEDED :

The future manpower distribution in mills will be based on two basic factors.

- i) Decreased number of persons per unit of production with greater skills/educational competence.
- ii) More people will go to functions not directly related to production.

Accordingly the technical/skilled manpower distribution on academic levels will be essentially as under :

- Skilled operational and maintenance crew for a shop floor operation, maintenance and service functions with high school ITI/skills.
- Middle level supervisory staff in production/maintenance and service sectors with diplomas/BSc's with experience.

- Degree level engineers for middle level management functions in production and related sectors
- Personnel for R & D, design, planning, erection, trouble shooting with higher technical qualifications.

A good number of qualified persons will enter auxiliary sections like raw material generation, chemicals/spares sector like Wire and Felts particularly in technical sales and in paper related product marketing sectors.

Greater stress will be laid on R&D, technology upgradation including renovation and modernisation, trouble shooting for productivity improvements besides planning. 3-5% of task force will be devoted to these functions. The increased automation and complexities in production will be demanding personnel in small number with greater technical content. They are likely to represent 15-20% in terms of technical degree holders. About 55-60% of the task force will be in production/technical functions consisting of diploma/ITI/B.Sc. levels and skilled workmen. Non-technical functions will account for 15% of manpower in form of clerks, finance, purchase, marketing assistants. The professionals and managers will account for 3-5% of task force. Qualification wise the ITI's/B Scs/Matriculate with skills will be about 50% while non-technical degree holders will be in areas like general administration, labour relations, personnel, finance etc. The degree engineers and technical diploma holders will be 10-15% and 15-20%. The management specialists and higher qualified technical personnel will be 3-5% each<sup>11 12</sup>.

All the personnel working in pulp and paper industry irrespective of their basic background need orientation in the industry specific inputs. However, in technical functions like the production, marketing, R&D, design etc. atleast 50% of the task force should be in pulp and paper area. Further, persons in the industry must have opportunities to periodically get "Updated" in selected areas of Pulp and Paper industry. Thus the programmes in pulp and paper areas will be of following levels :

- Post-Graduates/Ph. D's in Pulp and Paper.
- Bachelors of Engineering degree holders.
- Diploma holders.

The B.Sc./diploma holders/ITI's from general backgrounds, after some mill exposure should be given well prepared 6 months class room inputs in pulp and paper.

The future levels of manpower utilization will be significantly reduced compared to present levels. The figures will be based on plant sizes, level of modernisation and automation and size of the plant. While small mills will exist, large mill also grow particularly in newsprint sector. Accordingly the manpower usage pattern will be as under :

Table 1 : MANPOWER USAGE PATTERN :

Size of Plant	Number per 1000 annual tonnes of Installed capacity.	
	New Units	Old modernised Units.
> 150 TPD	12-15	15-20
100-150 TPD	20-25	25-30
30-100 TPD	30-40	40-50
< 30 TPD	45-55	50-60

The figures include contractual and casual labour components to the tune of 10-25%. It does not include the personnel engaged in Plantation/Farm sectors for raw material generation/procurement. The above figure will indicate the average manpower utilization in the country to be 35 persons/1000 annual tonnes capacity in paper and board sector and about 15-20/1000. Annual tonnes in newsprint sector in next 10-12 years.

#### 5. STRATEGY FOR HUMAN RESOURCE DEVELOPMENT IN THE SPECIALISED AREA OF PULP AND PAPER :

The above analysis clearly shows that the industries would be needing a competent task force which is skilled and motivated. The training programmes should concentrate in pulp and paper inputs with varying depths depending on the backgrounds. The requirement of Pulp and paper specialists including chemical engineers or M Sc. level (pulp and paper degrees) will be 7.5-10% while Polytechnic diploma, ITI's should receive the orientation through short term well conceived programmes. On this basis the human resource development strategy for pulp and paper industry should address itself to the following basic questions :

- (i) Should the specialist programmes in pulp and paper technology be at lower levels or at higher levels or both i.e. ITI's/Polytechnic Diplomas/Degree Engineers/M.Sc.'s/ME's/Ph. Ds.
- (ii) Should the courses be planned in well established centres of excellence only at very high levels? Should such institutes be required to prepare short duration specific programmes for sponsored candidates?
- (iii) What role can bodies like IPPTA/Industry associations play in this venture?

The approaches for manpower development based on present experiences could be on the following model so that the academic training fits into the national pattern of technical education and the trained manpower has enough job opportunities, their job aspirations are met and there is no sense of exploitation. Further excellence should be the watch word in resource building. Thus the manpower development strategy be based on the following<sup>14,17</sup>:

- Specialist pulp and paper technologists/engineers be trained in specialised institutes with good infra structure.
- Polytechnic diploma holders can be trained in Pulp & Paper area through a plan of 1 year (specialization) in 3 years chemical/process engineering based diplomas.
- General engineers/diploma holders from professional institutions are given well formulated training programmes in mills and in selected pulp/paper institutes.
- A well chalked out Master of engineering/Ph. D. programmes be run in Pulp and Paper field/based on a dialogue between academic institutions/Industries and planners.
- Continuing education/refresher courses/workshops should become an integral part of human resources development programme. These well organised programmes with specialist faculty should form a new line of approach for updating the thinking process.
- Every major unit must prepare a blue print of its own in house manpower development programme

technical/managerial skills with close co-ordination of specialist institution.

The above strategy then would mean a ratio of 1 : 1 specialist Pulp Paper engineers with other engineers. Similarly the engineer to diploma ratio is 1 : 2 with 50% of diploma holders having training in Pulp and Paper. The post graduates in Pulp and paper and Ph. D's should be around 25-30% of degree Pulp and Paper engineers. Thus in a large modern 300 TPD mill, the total taskforce will be around 1500 of which the total engineering degree and diploma holders will be around 150 and 250 respectively. The Pulp and Paper specialists at degree and diploma levels will be about 75 and 100 respectively in all the areas put together the figures are likely to be smaller in larger mills and newsprint mills with high expectations from each individual. For the nation as a whole, taking about 50% as replacement factors the rest as manpower for new green field units, the anticipated specialists demand in Pulp and Paper at diploma/degree and Post degree level are likely to be of the order of 150-200/75/25-30 by respectively, per year by the turn of the century. The demand for specialist in other sectors like R & D, teaching, consultancy and continuing education will be more particularly at degree and post degree level.

The formal teaching programme in Pulp and Paper should be conducted in academic institutions with strong faculty, infra structure and pursuing excellence. The programmes must be tailor made for specific target groups. These should be a blend of fundamental sciences, applied sciences, practicals and mill exposure. The courses should be properly evaluated with dynamic system of user industry academia interaction. Weakness in teaching inputs, teacher obsolescence, weak industry interaction and lack of facilities in academic institutions can make the courses ineffective. The degree and post-graduate courses can be so made to offer a student specialisation in chemistry (organic/analytical)/Fibre and polymer science/Pulp and Paper engineering or environmental science. In each group the inter disciplinary approach should be adopted with emphasis on energy efficiency, environmental management, technoeconomic analysis and management input. The faculty should be of top class with excellent communication skills and expertise in the chosen field. The flow of faculty between industry

and academy and Vice-Versa should be a continuous one.

On the above basis the country should plan & have a total manpower development strategy in pulp and paper area in the following manner:—

- (1) Three years post high school polytechnic diploma with pulp and paper specialisation of one year. The process/mechanical engineering background in analysis, process flow calculations, workshop practice should be of 2 years. Strong mill training should be a necessary input.
- (2) 3-4 years degree engineering or MSc. programmes in Pulp and paper with bias in analytical chemistry/polymer fibre chemistry/engineering in Pulp and Paper or environment sciences. The modular courses should have inter disciplinary approach with a orientation towards process analysis/Simulation and design. The Technoeconomic analysis and management sciences should form strong input. The Pulp and Paper courses, should be strong and relevant in such areas like high yield pulping, non wood fibres, fibre properties, modern sheet making concepts, drying and finishing, washing and bleaching, printing and packaging, Newsprint and speciality papers. The energy environment and engineering concept should be well integrated into the programmes.
- (3) The ME/PhD, programmes with inter disciplinary bias should be available for MSc/BE/ B. Tech students in Pulp and Paper Technology, Chemical/Mechanical engineering and chemistry. The courses should lead to generation of man power for R & D, teaching, design and analytical functions. Computer programming optimisation process simulation, engineering sciences should be taught along with advances in pulping, paper making, speciality papers and environment management. Greater stress should be in problem solving, data generation and scientific reasoning through thesis/design/projects.

All the programmes should concentrate on the importance of inter disciplinary approach of problem solving. Aspects of equipment selections, maintenance, layout, safety should not be lost sight of. Thus the

responsibility of academic Institutions through faculty is challenging and difficult. The teachers/Teaching methods must be upto date and relevant. Plant practices must enter class rooms. The process of tomorrow should be developed and discussed in research labs and academic corridors today.

For this to happen the teacher must be a part of continuing education himself. This will be through his involvement in research/seminars and conduct of short term specific programmes.

Institutions like IPT can play a key role in turning these dreams to reality with proper support of industry, Government and professional bodies. The Institute have to prepare performance norms for themselves.

The process of human resources development is a dynamic game. The manpower needs, teaching and training methodologies must be continuously updated. Professionalism, must enter academic institutions with a strong industry/interface. Obsolescence must be removed and latest must enter class rooms in an effective manner. Excellence should be the watch word. Our academia should be well supported by policy makers, industry and business houses to be modern and updated, capable of turning out the best of the "work-honies", "go getters" and "Think Tanks" of tomorrow. They should be first rate, capable and motivated on whose shoulders the industry performance is as sured.

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