

Education and training in pulp and paper technology

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An idea of the relative position of India amongst the paper producing countries of the world can be got from the statistics presented in Annexure I. Paper industry in India is a fast developing industry. While in 1950, there were only 17 mills with a capacity of 140,000 tonnes, at present there are 300 mills with the capacity of 2,760,000 tonnes and about 100 mills are either sick or closed for one reason or another, particularly due to power cut, raw material shortage etc. The raw materials used in the large mills are generally bamboo and/or hardwood and in small mills agricultural residues and/or waste paper. The pulping processes used are sulphate, soda, groundwood or chemi-mechanical based on the raw material.

There is a widespread feeling that our traditional technology is inadequate and obsolete in the context of rising populations, changed circumstances and depleting resources. Now the need of the hour is the best utilization of the existing raw materials especially exploitation of agricultural raw materials, improvement of quality of the paper with the use of technology, and decreasing the cost of paper as much as possible. Therefore, there is a need of professional men technically trained in pulp and paper.

Training Centres :

Looking back to the training centres we had only one Training Centre in pulp and paper, viz., Forest Research Institute, Dehra Dun till early sixties. They ran a 6 months course for graduates of Science and Engineering deputed by the paper mills.

Another centre in the early days was the Hand-made Paper Institute at Pune, which had a one year course for managers and three months course for artisans. In 1965, with the collaboration of Royal Swedish Government, the Institute of Paper Technology was established at Saharanpur. It was running a two-years post graduate diploma course and a certificate course

of 3 years after matriculation. In 1978 the Roorkee University took over the Institute of Paper Technology and started the Bachelor in Engineering (Pulp and Paper) in addition to the two other courses already offered. Later certificate course was phased out in 1980.

One more such type of course was introduced recently at Laxminarayan Institute of Technology leading to the award of B.Sc. (Tech.) (Cellulose Technology) of Nagpur University. It is a 3 year course after B. Sc. Chemistry.

In recent years polytechnic level Diploma courses in pulp and paper are offered by :

1. Seth Jay Prakash Polytechnic
Yamunanagar Haryana
2. Seshasayee Institute of
Technology, Tirichurapalli Tamil Nadu
3. Government Polytechnic
Bhadravati Karnataka

The minimum qualification for these course is X Class (S.S.L.C.)

In 1978 Bangurnagar Arts, Science, Commerce and Applied Science College, Dandeli affiliated to Karnatak University, Dharwad, started a 3½ years course in pulp and paper science. The minimum qualification was a pass in Pre-University Course (XII Class) of Pre-University Education Board, Bangalore or equivalent examination with a minimum of 50% of marks in aggregate of physics, mathematics, chemistry and biology.

The course was introduced with the intention to provide readymade manpower to the industry particularly to the post of Senior Supervisor or Shift Incharge

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The course included the knowledge of both basic science and applied science with an intensive mill training of 6 months. During the span of ten years about 120 graduates have come out and all the graduates are employed in one or another of the departments, i.e., Pulp Mill, Paper Machine and Recovery of a paper mill.

However, there is no Post-graduation course in pulp and paper in our country. Our students have to go to other countries for the continuation of their further studies. List of post graduate courses running in foreign universities is in Annexure II. The qualification for admission to this course is a 4 year undergraduate course of the Indian Universities. Considering these aspects, Karnatak University, Dharwad, has upgraded the 3½ years course of B.A.Sc. (Pulp & Paper Science) to 4 years of B.A.Sc. (Pulp & Paper Science) to keep it on par with other professional Courses in engineering and technology. The scheme of this 4 years course is given in Annexure III. The composition of present course is designed to provide the entire engineering, technological and process knowledge for the manpower for the industry. This is an urgent need of the industry and it is hoped sufficient number of students will be encouraged by the industry to join this course.

Paper industry in India still needs advance research in the field of development. When we compare the plight of the Indian Paper Industry with other countries like Japan, Finland, France, Italy, Sweden, U.S.A., etc., we are compelled to bow our heads due to our failure on this front. We will not be able to afford to make paper the way we do today. To improve our quality, production, use of resources, power etc., we need to intensify our efforts to prepare students at undergraduate level with all the essential knowledge in the field of pulp and paper technology and science, on Research and Development with determination, innovative R & D efforts. Technologists can change the face of industry. This is possible only when modernization, rebuilt programmes are taken on war footing before it is too late. One of the reasons why we have not reached the level on par with the other countries in the research and development in spite of our rich resources, is lack of technical training and knowledge at the grass roots level. We had no technical courses

in pulp and paper at schools and colleges.

Considering all these aspects Bangurnagar Degree College at Dandeli started a B.A.Sc. course in pulp and paper science.

Annexure I

The World's top 20 Producers in 1988 of Paper and Board.

Rank in Production	Country	Production in 1000 tons	Per Capita Consumption in Kg.
1	U.S.A.	69,477	317.8
2	Japan	24,624	204.5
3	Canada	16,638	246.7
4	China	12,645	12.1
5	U.S.S.R.	10,750	35.3
6	West Germany	10,576	203.7
7	Finland	8,653	204.0
8	Sweden	8,161	311.3
9	France	6,313	142.2
10	Italy	5,370	108.4
11	Brazil	4,639	26.5
12	U. K.	4,295	163.5
13	S. Korea	3,659	81.7
14	Spain	3,429	100.3
15	Taiwan	2,949	153.0
16	Austria	2,650	144.5
17	Mexico	2,593	29.3
18	Netherlands	2,462	194.7
19	India	1,915	2.7
20	Australia	1,854	155.5

Annexure II

Post-graduate Pulp and Paper Courses Abroad

U. S. A.

1. Department of Chemical Engineering
Auburn University
Auburn, AL 36849
2. Forest Product Laboratory
University of California
Richmond, CA. 94804
3. Dept. of Chemical Engineering
University of Maine
Orono, ME. 04469
4. Michigan Technological University
Houghton, M.I. 49931

5. Dept. of Wood and Paper Science
School of Forest Resources
North Carolina State University
Raleigh, NC. 27695
6. Dept. of Paper Science and Engineering
College of Environmental Science and Forestry
State University of New York
Syracuse, NY. 13210
7. Dept. of Wood Science and Technology
VPI and State University
Blacksburg, VA. 24061
8. College of Forest Resources
University of Washington
Seattle, WA. 98195
9. Dept. of Forest Products
Oregon State University
Corvallis, OR. 97331
10. Dept. of Paper Science and Engineering
University of Minnesota
St. Paul, MN. 55108
11. Dept. of Paper Science and Engineering
University of Wisconsin
Stevens Point, WI. 54481
12. Dept. of Paper Science and Engineering
Miami University
Oxford, OH. 45056
13. Dept. of Paper Science and Engineering
Western Michigan University
Kalamazoo, M.I. 49008
14. Institute of Paper Chemistry
Appleton, WI. 54912
15. Dept. of Chemical Engineering
University of Lowell
Lowell, MA. 01854
16. Iowa State University
Ames Iowa 50011
17. University of Florida
Gainesville, Florida 32611
18. Dept. of Forestry
University of Madison
Madison, WI. 53706
19. School of Chemical Engineers
Georgia Institute of Technology
Atlanta, GA. 30332

20. Dept. of Forest Products
University of Idaho
Moscow, ID 83843
21. Dept. of Chemical Engineering
University of New Hampshire
Durham, NH. 03824

CANADA

1. Dept. of Chemical Engineering
McGill University
Montreal, PQ
2. Dept. of Chemical Engineering
University of British Columbia
Vancouver, BC.
3. Dept. of Forest Science
University of Alberta
Edmonton, Alberta
4. Pulp and Paper Research Institute of Canada
570 St. James Boulevard
Pointe Claire, Quebec

WEST GERMANY

1. Institute for Paper Manufacture
Technical University of Darmstadt
Darmstadt
2. Institute of Macromolecular Chemistry
Technical University of Darmstadt

AUSTRIA

Institute for Paper, Pulp and Fibre Technology
Technical University
Graz

FRANCE

French School of Papermaking
Saint Martin D'Herès 38402

NORWAY

Dept. of Pulp and Paper
Technical University
Trondheim

U.K.

Dept. of Paper Science
University of Manchester Institute of Technology
Manchester

Annexure III
Curriculum of four year B.A.Sc. (Pulp and Paper)
Course.

Subject
 Hours per week
 Theory Practicals

Ist YEAR

1. English Communication	3	...
2. Chemistry I	3	4
3. Physics	3	4
4. Mathematics	3	...
5. Engineering Drawing	3	4
6. Elements of Mechanical Engineering.	3	4

IIInd YEAR

1. Chemistry II	3	4
2. Pulp & Paper Technology I	3	4
3. Pulp & Paper Technology II (Pulping I)	3	4
4. Pulp and Paper Technology III (Papermaking I)	3	4
5. Elements of Electrical Engineering	3	...
6. Thermodynamics and Heat Transfer	3	...

IIIrd YEAR

1. Pulp and Paper Technology IV (Pulping II)	3	4
2. Pulp and Paper Technology V		

(Papermaking II)	3	4
3. Process Control and Instrumentation	3	...
4. Mass Transfer and Fluid Mechanics	3	...
5. Chemistry III	3	4
6. Mechanical Operations and Process Calculations	3	...
7. Industrial Training*

IVth YEAR

1. Pulp and Paper Technology VI (Chemical Recovery in Karff Mill)	3	4
2. Pulp and Paper Technology VII (Speciality Pulp and Paper)	3	...
3. Pulp and Paper Technology VIII (Environmental Science and Pollution Control)	3	4
4. Elective	3	...
5. Engineering Economics and Management	3	...
6. Project work	3	4
7. Industrial Training*

*The course also includes compulsory industrial training of two months each during the third and fourth years. After each such training period, the student has to submit a 100 page report which will be evaluated.