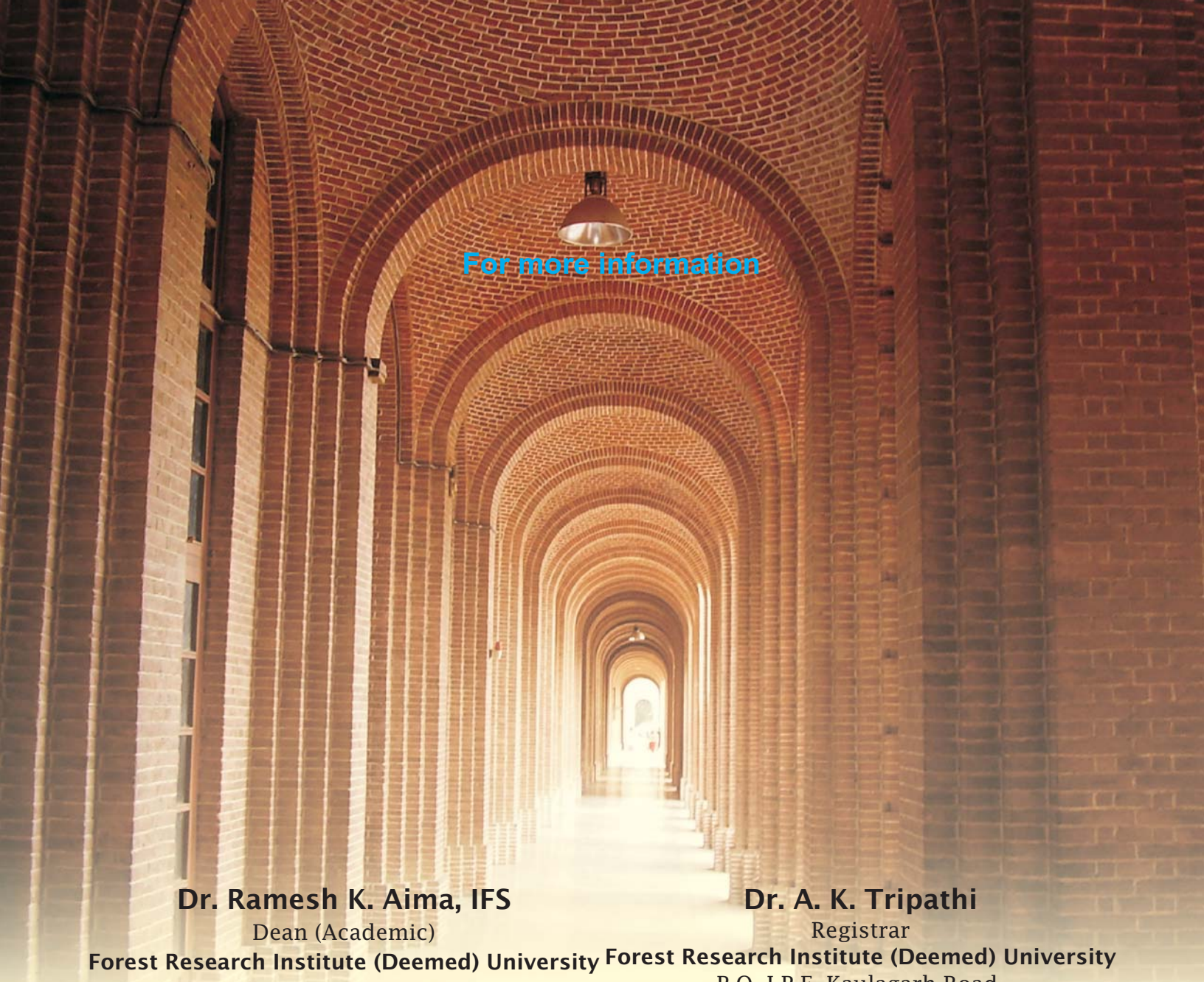


*Forest Research Institute
(Deemed) University
Dehradun*

M. Sc. WOOD SCIENCE AND TECHNOLOGY

Brochure



For more information

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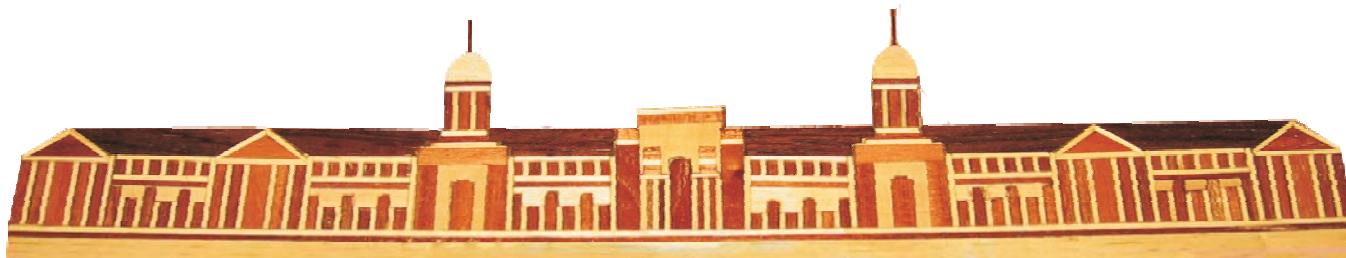
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From the Director's Desk

The Forest Research Institute established in 1906, is a pioneer institution in the field of forestry education and research. It has launched a two year M. Sc. Course in Wood Science and Technology from the academic year 1996. The course deals with wood as a material, besides covering the processing and manufacturing technologies for wood and wood based products.

The intake of students is based on their performance in an All India Entrance Examination conducted by the Forest Research Institute (Deemed) University every year. Excellent infrastructure, state of the art laboratories, highly qualified, motivated and committed faculty members go a long way in ensuring the all round development of the professionals emerging from this University. The curriculum and syllabi are regularly upgraded with the help of experts. The students use the vast knowledge and expertise of FRJ, a name synonymous with the development of forestry, wood science and technology in South Asia. The course, thus, prepares professional leaders to fulfill the demands in wood based industries and research organizations. It is therefore, no wonder that all of our students are part of some of the leading wood based industries and research organizations within our country and abroad.

On behalf of the Institute, I invite corporates, business organizations and other employers to organize Campus Recruitment Programmes in our University and assess the caliber of our budding wood technologists who are amongst the best in Asia. I am confident that a visit to our Institute will be mutually beneficial.

I wish all the students of M. Sc. Wood Science and Technology the very best in their career. I am sure that they will make significant progress in their profession.


(Dr. S. S. Negi), D.F.S.

Forest Research Institute, Dehradun



About the University

Genesis

Forest Research Institute (FRI), Dehradun has its roots in the erstwhile Imperial Forest Research Institute established in 1906 to organize and lead forestry research activities in the country. The Institute also administered training to forest officers and forest rangers in the country and after Independence it was aptly renamed Forest Research Institute and Colleges. In 1986, forestry research set up in the country was reorganized. The FRI and its research centers were brought under the administrative umbrella of newly created Indian Council of Forestry Research & Education (ICFRE) under the Ministry of Environment and Forests, Government of India. Forest Research Institute was conferred the status of Deemed University in 1991. Since 2006, it is known as Forest Research Institute (Deemed) University (Under section 3 of U.G.C. Act 1956 vide notification no.F.9-25/89-U.3 dated 6-12-1991)



Academic Block

Objectives

- To impart education in different branches of forestry and environment
- To provide facilities for research and development and dissemination of knowledge in the field of forestry and environment
- To create consciousness about forest and environment among people through forestry extension programs
- To carry out such other activities as may be necessary and desirable to further safeguarding of environment and protection of forests and wildlife



Hostel

Courses

- ★ M. Sc. Wood Science & Technology
- ★ M. Sc. Forestry
- ★ M. Sc. Environment Management
- ★ Post-Graduate Diploma in Aroma Technology
- ★ Post-Masters Diploma in Natural Resource Management
- ★ Post-Graduate Diploma in Pulp & Paper Technology

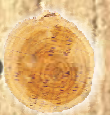
M. Sc. Wood Science And Technology



M. Sc. Wood Science & Technology At a Glance

The Forest Research Institute (Deemed) University offers a two-year M. Sc. course in Wood Science and Technology. This prestigious course is the only one of its kind in India and easily compares with best courses in related fields in the world. It deals with wood in a material science approach as is being done for metals, plastics and other materials, besides covering the processing and manufacturing technology of various wood products along with a course on wood adhesives. Besides providing basic knowledge on Physics, Chemistry, Mechanics and Engineering of wood, it provides detailed exposure on wood ultra structure and its effect on wood properties; basics of wood bio-degradation and its prevention; special processing techniques for satisfactory utilization of fast growing plantation wood, both as direct sawn solid wood and as reconstituted engineered structural timber and products such as structural particle board; utilization of ligno-celluloses and agro-residues for reconstituted products, laminated wood, laminated veneer lumber, panel strand lumber, etc. which have been recently proved efficacious substitutes for traditional forest products.

The classroom exposure is adequately supplemented by laboratory work including practicals in various technologies on pilot plants, with which the Institute is uniquely equipped. Excursions to important wood based industrial units in India are conducted to provide onsite exposure to the students. The students are also given a chance to take up short duration industrial attachments and dissertation projects of industrial interest in F.R.I. laboratories and pilot plants.



Infrastructure

Forest Research Institute is the pioneer, premier and largest institute in forestry research & development in South Asia famous for its historical main building, its lush green campus with various world class laboratories and pilot plants. It is synonymous with the development of the Wood Science and Technology in India Following are the disciplines related to Wood Science and Technology course:

Wood Seasoning

- Solar kiln
- Vacuum kiln
- Dehumidification kiln
- Steam heated kiln
- Electrically heated automated kiln
- Testing laboratory
- Wood plasticization pilot plant
- Wood plasticization (bending) unit

Wood Working And Finishing

- Wood workshop with planers, sanders
- Finishing unit with spray gun, gloss meter
- Ammonia fumigation pilot plant

Saw Milling & Saw Doctoring

- Log yard, sawmill
- Saw doctoring machinery

Wood Preservation

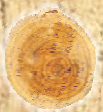
- Preservative development and testing laboratory
- Pressure treatment plants
- Non-pressure treatment plants
- Creosote treatment plants
- Boucherie plant for bamboo and poles treatment

Botany

- Xylarium and botanical garden with 450 wood yielding species
- Arboretum and nearly 20,000 authentic wood samples from India and abroad
- Wood identification labs for anatomical studies
- Herbarium with 3,30,000 specimens
- Tissue culture and mass multiplication infrastructure

Wood Composite

- Pilot plants for manufacturing of resin, plywood, particle board, MDF and wood polymer composites
- Reconstituted engineered structural lumbers (LVL, OSB, PSL), Flush doors
- Testing laboratory for composite wood products and resin



Infrastructure

Timber Engineering

Timber engineering museum
Wood building structure and construction workshop
Fabrication, design and testing laboratory



Timber Mechanics

Destructive testing laboratory and non-destructive testing laboratory
Wooden products testing laboratory for Indian Standards
Data bank of strength properties of different wood species including foreign species

Wood Chemistry

Chemical properties of wood, pulping and essential oil extraction

Entomology

Timber entomology laboratory and insectory
Entomology museum

Pathology

Timber pathology laboratory, Pathology museum

Statistics

Statistical quality control, Sampling techniques



Computer Section

The Institute has state-of-the-art computer facilities equipped with high speed LAN in distributed Windows 2000 server environment. The center has Internet connectivity through a high speed leased line connection. Internet connectivity is available to faculty members and students in the university as well as in hostels.

National Forest Library And Information Center

National Forest Library and Information Center is richest in document collection on forestry and allied sciences in South and South-East Asia, having more than 1,65,000 books and other publications, more than 7,000 ledger files containing research articles, etc. on different forest species, wood science subjects, and almost all Indian and foreign journals on forestry and allied sciences.



Course Content

Wood Anatomy : Wood structure and identification. Anatomy of angiosperms, gymnosperms and bamboo. Wood quality assessment, wood defects, juvenile and mature wood. Various types of microscopes, their working and utility.

Saw Milling and Saw Doctoring : Log yard management. Saw milling equipment , their capacities and specifications. Log scanners and computerized BOF system. Saw blade geometry, quality, choice of metal and maintenance.

Wood Physics : Wood-liquid relations, thermal, dimensional, electrical, dielectric and piezo-electric properties of wood. Growth stresses in timber, sound transmission and acoustics in buildings.

Wood Preservation : Wood preservatives and testing of efficacy of preservatives. Treatment methods and various preservative plants. Qualitative and quantitative analysis of preservatives. Economics of preservatives and fire protection of timber.

Wood Chemistry : Chemical properties of wood and pulping. Essential oils, gums and adhesives extraction. Techniques of dimensional stabilization of wood by chemical modification.

Product Design and Fabrication : Product performance in use and tolerances, design aspects in furniture and joinery, workmanship in furniture and joinery, joints and finishing. Laminated finger jointed timber, design of pallets, load and section calculations.

Specialized Uses of Wood : Industrial and engineering uses, uses of specialized machines, suitable timber species and special processing requirements of timber.

Timber Mechanics : Strength properties of different wood species (destructive and non destructive testing). Testing for Indian standards. Identification, measurement and evaluation of defects in wood. Principles, importance and grading rule in assessment of quality of logs and sawn timber.

Timber Engineering and Construction : Design, constructions, shear strength and analysis of linear structural timber components: beam, ties, purlins, columns. Low cost structures, trusses and arches configuration.

Wood Working and Finishing : Wood working operations, planing, thicknessing, mortising, tenoning, rebating, grooving, moulding, shaping, turning, drilling, carving and

sanding. Working defects and remedies. Methods of

assessment, working quality index for the species. Specifications and design of machines; planer, thicknesser, mortiser, tenoner, moulder, router, turning lathe, drill. Four-side planer cum moulder, CNC router, dowel making, oscillatory 3-drum sander and gloss meter.

Wood Seasoning : Air seasoning and kiln seasoning. Solar kiln, kiln design and specifications. Seasoning defects. Special sawing methods like BTS for *Eucalyptus* spp. and SDR for Poplar spp. Wood plasticization by ammonia treatment.

Wood Composite and Adhesives : Adhesives, plywood, particle and fibre boards, block boards, flush doors, modified woods, laminated wood, laminated veneer lumber, lumber from reconstituted destructured lignocellulosic materials. Testing for Indian standards.

Timber Protection : Study of fungal degradation of wood and its control. Quarantine regulations for import of timber. Insect attack on wood and its control. Use of pesticides and insecticides. Phytosanitary certification.

Botany : Classification, characteristics, external morphology, identification of barks, stems, leaves, flowers, fruits, seeds of gymnosperms and angiosperms.

Statistics : Statistical quality control techniques, sampling techniques, design principles and analysis of experiments.

Computer Applications : Introduction to MS-Word, MS-DOS, MS-Excel, MS-Powerpoint, internet and Auto Cad.

Human Resource Management : Nature and scope of management, principles and functions of a manager, manpower planning, work motivation, leadership qualities, organizational behaviour. Industrial relations, transactional analysis at work, values and ethics. Concepts, practices, new trends, HRD mechanisms and various instruments. Training, job rotation and job enrichment.

Term Paper : Literature review and analysis of research problems.

Dissertation Work : Four month project work in wood science related topics from Forest Products Division.

Industrial Attachment : One month industrial attachment to reputed wood based industry.

Field Exposure

Industrial Attachments

D.S. Doors Pvt. Ltd., Faridabad
In Trading Pvt. Ltd., Gurgaon
Sethia Handicrafts Pvt. Ltd., Jodhpur
Basant Handicrafts Pvt. Ltd., Jodhpur
C.L. Gupta Exports Ltd., Moradabad
Janardan Plywood Industries Pvt. Ltd., Dehradun
Usha Shriram Enterprises Pvt. Ltd., New Delhi
Vamani Overseas Pvt. Ltd., Faridabad
Classic Furniture Mfg.Co. Pvt. Ltd., Faridabad
Evergreen International Pvt. Ltd., Gurgaon
Punjab Plywood Industries Pvt. Ltd., Y. Nagar
Paharpur Cooling Towers Ltd., Kolkata
Surabhi Art World, Jodhpur
Nuchem Industries (Nu-Wud), Sohana
Jai Balajee Plywood Industry, Haryana
R.R. Industries, New Delhi
Indian Plywood Industries Research and Training Institute (IPRITI), Bangalore
A.K. Lumbers Pvt. Ltd. Sonipat
NCL, Industries Ltd. Paonta Sahib
Greenply Industries Ltd. Rudurapur

Visits

Bureau of Indian Standard, Delhi
IPIRTI, Bangalore
Institute of Wood Science and Technology (IWST), Bangalore
Arid Forest Research Institute (AFRI), Jodhpur
Evergreen International Pvt. Ltd., Jodhpur
Various Sports Goods Industries of Jalandhar
Various Plywood Industries of Yamunanagar
Furniture Industries of Goa & Mumbai
Common Facility Center, Jodhpur
National Parks and sanctuaries of Karnataka and Uttarakhand
Jodhpur Handicrafts Exporters Association
Various Wood Industries of Rajasthan &

Extra Curricular Activities

Leading a balanced life is one of the oldest recommendations in Indian tradition. There are number of student committees that enable students to balance their life by pursuing extra-curricular activities. Choices are immense, from organizing cultural events to organizing sports meet, competitions, various activities of Wildlife Club. FRI University facilitates students' involvement to help them shape their world outside studies.



Faculty

Timber Mechanics

Dr. Vimal Kothiyal
Mr. Y .S. Negi
Dr. Y. M. Dubey
Mr. A. K. Khanduri
Mr. S. D. Sharma
Mr. K. K. Uniyal

Wood Working & Finishing

Dr. Kishan Kumar V. S.
Mr. Sachin Gupta

Wood Composite

Mr. D. P. Khali
Mr. J. P. Singh
Dr. Anil Negi

Wood Seasoning

Dr. S. P. S. Rawat
Mr. N. K. Upreti
Mr. Shailendra Kumar
Mr. A. S. Kambo
Mr. K. L. Arora
Mr. Chetan Swaroop
Mr. M. C. Kukreti

Wood Preservation

Dr. Sadhna Tripathi
Mr. Ajmal Samani
Mr. Ram Lal
Dr. P. B. Dobriyal
Mr. S. N. Nautiyal

Chemistry

Dr Y.C. Tripathi
Dr. V. K. Varshney
Dr. Vineet Kumar
Dr. P.K. Gupta
Dr. Rashmi
Mr. Rakesh Kumar

Systematic Botany

Dr. Sas Biswas
Dr. Veena Chandra
Mr. Anup Chandra

Forest Entomology

Mr. R. S. Bhandari
Dr. R. K. Thakur
Dr. Shamila Kalia

Statistics

Mr. S. S. Rajput
Mr. Raman Nautiyal
Mr. S. K. Sheel
Mr. A. S. Chauhan

Human Resource & Management

Mr. R. S. Bhatt

Timber Engg.

& Construction

Mr. K.S. Pruthi
Mr R. Bhandari

Wood Anatomy

Dr. Sangeeta Gupta
Dr. P. K. Pande

Forest Pathology

Dr. N. S. K. Harsh
Mr. Amit Pandey
Dr. Y. P. Singh

IT Cell

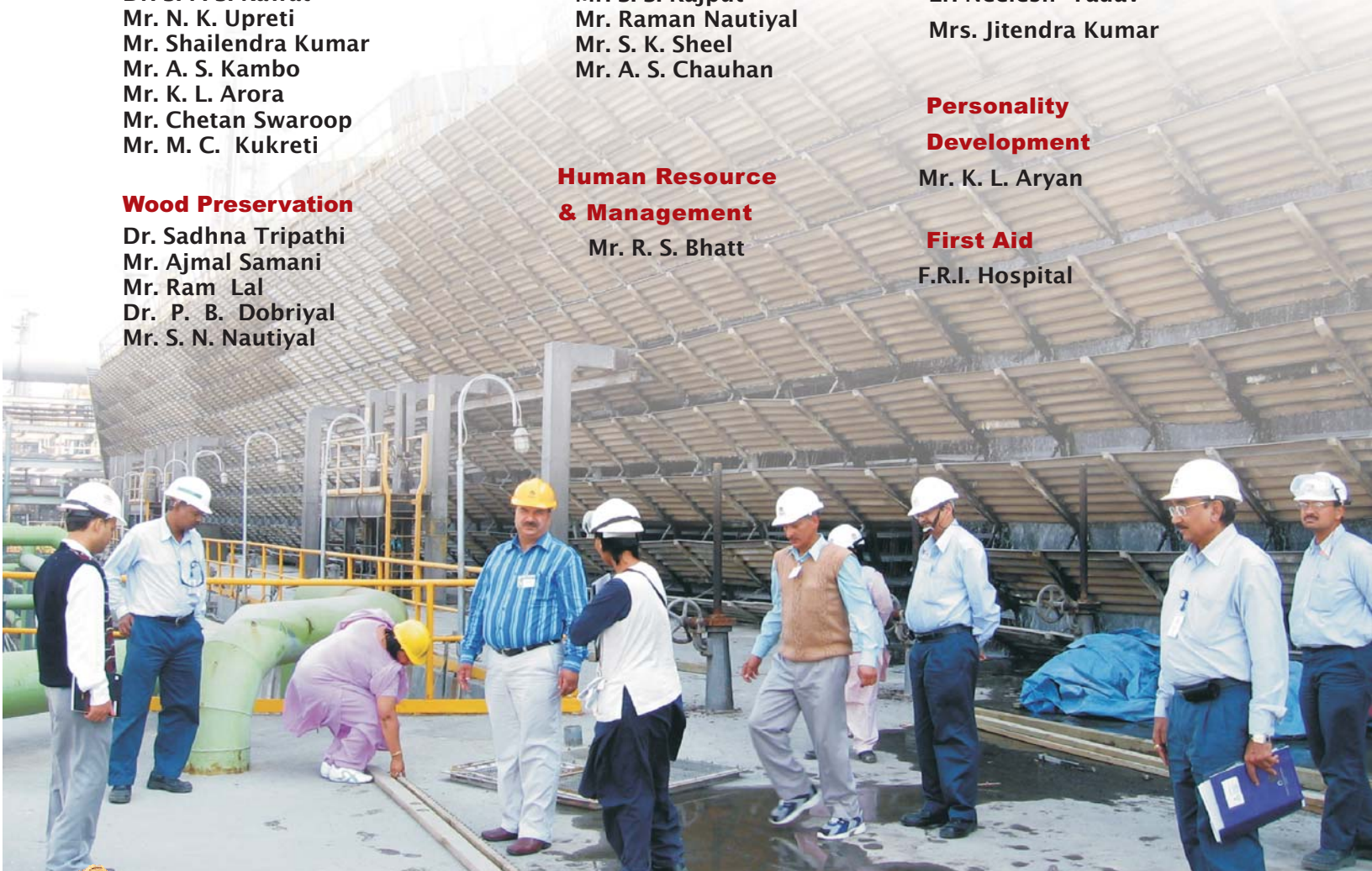
Er. Neelesh Yadav
Mrs. Jitendra Kumar

Personality Development

Mr. K. L. Aryan

First Aid

F.R.I. Hospital





Cross Section of *Cedrus deodara*

(Courtesy FRI Timber Museum)





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