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PREFACE

IPIRTI, an Autonomous Research and Training Institute under the Ministry of Environment, Forests and Climate Change, Govt. of India, is an internationally recognized R&D Institution with its headquarters at Bangalore. It was established in the year 1962 as a co-operative research laboratory under the ordain of CSIR at the initiative of the Indian Plywood Industries. Since its inception, the Institute has been closely associated with the development of plywood and panel industry in the country and has been instrumental in the growth of plywood industries from its infant stage. This Institute continues to remain as an industry driven organization and has formed a strong relationship with the industry. This is the only Institute of its kind in the country working for the plywood and panel industry. IPIRTI Field Station, Kolkata was established in 1963 and IPIRTI Centre, Mohali, Punjab was established in 2008 to meet the Testing, Training & Extension requirements of the panel industry in those regions.

This Annual Report highlights the progress made by the Institute in the field of Research & Development, Training, Testing & Standardization and Extension during the year 2013-14.

IPIRTI is basically mandated to carry out Research & Development, Training & Education, Testing & Standardization and Extension in the field of wood and panel products from wood and other lignocellulosics including bamboo and agro-residues. Multidisciplinary research projects are taken up based on the problems identified by the industry and inputs received from scientists and others interested in the activities of the Institute. Research programmes are approved by the Research Advisory Committee of IPIRTI after critical examination.

The Institute is highly thankful to all the sponsors of the various projects viz., MoEF&CC, BMTPC, NMBA, RFRI Jorhat; M/s. Green Timber (P) Ltd, Kolkata; M/s. Nano Steel Pvt. Ltd., Guwahati, Assam; M/s. Indeutsch International, Noida; Central Pulp & Paper Research Institute, Saharanpur, M/s. Sarda Plywood Industries Ltd., Kolkata; M/s. Mangalam Timber Products Ltd., Orissa; M/s. Timpack Pvt. Ltd. Meghalaya, M/s. DIAB Core Materials Pvt. Ltd., Chennai, M/s. Centre for Housing Science and Construction Technology (CHSCT), Chennai, Tripura Forest Development & Plantation Corporation Ltd., Mumbai, Bhabha Atomic Research Centre, Mumbai, WKI, Germany, M/s. ITC, R&D Centre, Bangalore, M/s. Lanxess India Private Limited, Thane (W), M/s. Viziphar Biosciences India Pvt. Ltd., Bangalore, M/s. GTZ (India).
Private Ltd., Kolkata CCF of Forests, Territorial Circle, Chattam, Andaman & Nicobar, Bamboo and Cane Development Institute (BCDI), Agartala for their unstinted support to our research programmes.

My special thanks are due to the Chairman & the members of the Board of Governors and Research Advisory Committee for their continued support, suggestions and encouragement to strengthen our efforts in executing the research activities and effective management of the Institute.

Bangalore

K.S. Reddy
DIRECTOR
EXCLUSIVE SUMMARY

IPIRTI nurtures a vision to come up as an Apex Body of International stature by developing cutting edge State-of-the art Technology along with in-house expertise to carry-out R & D towards advising and/or providing competitive consultancy to the Academia as well as Wood & other lignocellulosic based panel industry about adoption of efficient technologies for products from renewable fibres including plantation timbers and bamboo which while meeting the vital needs of the developing society is in the interest of conservation of Natural Forests and Nature as a whole.

To achieve this vision IPIRITI is continuously engaged in Research & Development, Training & Education, Testing & Standardization and Extension on all aspects related to plywood and panel products from wood, bamboo and other lignocellulosic materials from renewable natural fibers.

The research activities are periodically reviewed and rationalized to keep pace with changing needs of the industry, national policies, raw material scenario and needs of the people engaged in panel products.

Side by the Global concerns for protection of Environment and conservation of Bio-diversity are kept in mind while formulating research programmes.

1. RESEARCH & DEVELOPMENT ACTIVITIES

IPIRTI has been closely associated with the development of panel industry in the country and also instrumental in growth from its infant stage of producing tea chest grade plywood fifty years ago to the present level of technical competence to produce not only high level of quality general purpose plywood but also special grades of panels including marine, structural, aircraft, decorative plywood, and a host of other panel products like block boards, particle boards based on wood and other forest and agro residues.

Consequent to transfer of the Institute to the Ministry of Environment, Forests & Climate Change the research agenda is set and monitored by the Research Advisory Committee (RAC) headed by the leading plywood industrialists and has representatives from other major R&D organizations, under various Ministries of the GOI, apart from the Industry. The projects are formulated based on the needs of the industries. Projects sponsored by different national agencies like BIS, BMTPC, DST, NRDC and international agencies like DFID/TRADA, INBAR, ITTO are also undertaken. Such projects are reviewed in the Internal Research Committee meetings and are then presented to RAC for approval.
Major achievements of the Institute can be broadly classified as:

- Development of processes for various resin systems
- Development of layered composites
- Development of Non-wood products
- Development in Solid Wood Products
- Protection and Enhancement of service life of wood and panel products
- Development of instruments, accessories and equipments

During the year 2013-14, IPIRTI has developed Copper- Ethanolamine- Boron based wood preservative against wood destroying organisms for enhancing the durability of wood and panel products and also worked out an alternative preservative treatment procedure for marine/shuttering grade plywood. An adhesive system based on the renewable material of bio origin viz., soya was developed by partially substituting phenol by soya for the manufacture of boiling water resistance grade plywood. Also extenders alternative to maida was identified for incorporating in UF and PF resin to minimize the cost of adhesive system.

Novel, environmentally safe adhesive system has been developed at the institute using PMDI for the manufacture of panel products which would be suitable for Indian working conditions. The cost of the adhesive system can be minimized by admixing the blocked PMDI resin with synthetic phenol and amino resins presently used by the panel industry.

Durable fire retardant cum preservative coating for wood based panel products and bamboo composites have also been developed.

Exploratory studies on development of nano-biocide for wood preservation has also been carried out to introduce the nano biocide preservative chemicals to the industries for wood preservation.

In addition to the above research work, the projects given below were carried out based on the specific end use by the industry/sponsor:

i) Evaluation of wood preservative –PILOT chemical against wood destroying Fungus, Termites and Borer for plywood by glue line poisoning.
ii) Development of compregs using dyed veneers of plantation species (Densified Laminated lumber).
iii) Exploratory studies on the utilization of industrial waste for the development of wood – plastic composites
iv) Evaluation of bioefficacy of Biocel-WD against wood destroying fungus.
v) Development of Match splints from Acacia Mangium
All the above 5 sponsored projects have been completed and the reports have been submitted to the sponsor.

There were in all 50 projects of which 37 projects were funded by the Institute and 13 projects sponsored by various organizations. The projects cover panel product development from plantation wood, bamboo, rice husk, wheat straw, bagasse, process development for manufacture panel products and development of bio-adhesives, assessing formaldehyde emission from panel products and remedial measures, technology for development of fire retardant door, bamboo based housing system to resist earth quake and other natural disaster, development of new and alternative test methods for panel products and enhancement of service life of panel products using environment friendly preservative, development of coating material for wood and other panel products.

Of the 37 Institute funded projects 12 were completed of which 5 reports so far published & 13 new projects were placed before RAC for approval & 9 were approved by RAC. Among 13 on-going Sponsored Projects, 5 Reports have been submitted to the sponsors.

2. INNOVATIONS AND PATENTS

During the last two decades based on the innovations of IPIRTI on process/product development using wood veneers, bamboo mats as well as development of ecofriendly resin and preservative system, IPIRTI has filed about 8 patents with Patent office, Government of India. Out of 8 patents filed, for 4 process/product innovation patents have been obtained and for 4 innovations the patent numbers are awaited. For all the 8 patents the IPIRTI holds exclusive patent rights.

The list of Patents filed and obtained are as follows:

- Cardanol Phenol Formaldehyde Resin - 146025
- A Method of Manufacturing Bamboo Splints - 199046
- A Process for the Manufacture of Bamboo Mat Moulded Skin Boards for Doors - 242299
- A Process for Producing Compregs from Bamboo Mats/ Veneers of Plantation Timber or a combination thereof - 245157
- Bamboo Mat Corrugated Sheets (BMCS) – 266054 (1172/CHE/2008)
- A Method of Manufacture of Bamboo Mat Ridge Cap for Roofing with Bamboo Mat Corrugated Sheets - 639/CHE/2009 A
- A Method of Manufacture of Flooring Tiles from Bamboo Strips- 2277/CHE/2009
- Wood Preservatives and a Method for Protecting Wood and Wood based Panel Products - 3393/CHE/2012
Process initiated for Filing:

- A method of manufacturing Fire retardant door
- A process for the manufacture of soya based phenolic resins for making boiling water resistance grade plywood

3. TRAINING AND EDUCATION

Training is an integral part of human life. Initially there was little emphasis on training in wood based panel industries in the country because the industry was manufacturing tea-chest grade plywood in a crude manner and was not capable of producing high quality or speciality plywood. However, from the beginning of the years nineteen-seventies the industry gradually became competitive in producing different grades of plywood required for various purposes and started recognizing the need for trained manpower. In recent years human resource planning has assumed greater significance in manufacturing sector, including the wood based panel industry.

Training has been one of the important activities of this Institute from its very inception and so far approximately 1550 trainees from different backgrounds starting from executives to skilled workers in the field of Wood Science and Technology with special reference to wood, plywood, allied products and adhesive have been trained. Newer courses on processing of bamboo, product development and bamboo based housing have been added depending on requirements and changed scenario prevailing in the country. The following courses are conducted in the Institute:

a) Post-graduate Diploma in Wood and Panel Industry Technology:

During the year, 24th batch of One year Post-graduate Diploma Course on Wood and Panel Products Technology for graduates in Science and Engineering was conducted wherein all the 26 candidates completed the course successfully and 100% placement was arranged through Campus selection process. Training course for 25th batch was already started and the course is in progress wherein 27 candidates are undergoing training.

b) Short term vocational training courses:

Various Short term vocational training courses have been conducted during the year 2013-14 for technical personnel from industry to improve their skill in the specialized field of interest such as veneer peeling, resin manufacture, panel/sheet manufacture, testing and standardization as well as specific training in the mode of transfer of technologies 16 training courses on Resin manufacture, Plywood Technology and saw milling and saw doctoring were conducted in Bangalore and IPIRTI Field Station, Kolkata for fresh graduates and technicians from plywood factories. Details of short term training courses conducted for the year 2013-14 is given in Annexure V.
4. TESTING & STANDARDIZATION

Product testing is an important activity aiming at production of quality products by the Industry and helping consumers, including Government organisations in checking quality of goods purchased. IPIRTI is also a laboratory recognized by BIS for testing of wood and wood composites and products for licensing/certification programme. Limited test facility is also available at the Kolkata Field Station and Mohali Testing Centre.

The Institute has got the NABL accreditation as per ISO/IEC 17025 for Mechanical and Chemical test labs at Bangalore, Kolkata and Mohali. Bangalore, Kolkata Field Station and Mohali Centre are recognized by BIS for testing of panel products as per relevant Indian Standards under BIS-LAB recognition scheme. The Institute has been able to provide testing services to get high level of confidence among the consumers in quality requirements of the wood and wood based panel products. IPIRTI continues to play a significant role in designing & developing test methods and formulating standards for wood and wood based panel products, bamboo and other products made from lignocellulosic materials by serving in various committees of Bureau of Indian Standards. Scientists serve on various sectional committees and sub committees of Civil Engineering Division of BIS as conveners/members. Director, IPIRTI is the Chairman of Wood Products and Products from other Lignocellulosic Materials Sectional Committee CED:20.

Test facilities were further strengthened by adding Fatigue testing, LCR meter and Planetary ball mill equipment at IPIRTI, Bangalore, which was a long felt need for R & D in the Institute.

5. EXTENSION

Extension mechanism is necessary not only to carry the technology from laboratory to production units in different regions of the country, but also to create public awareness to use products from plantation timber, bamboo, and other renewable fibers. It is more relevant in to-day’s context as there are more than 1000 mills producing plywood and other allied products which are scattered through out the country and over 30000 sawmills engaged in processing over 90% of the industrial wood required in the country. This has necessitated transfer of technologies to doorsteps of the Industry through effective extension.

MEMORANDUM OF UNDERSTANDING (MOU)

During the year, the Institute signed the following 5 Nos. of MoU for the transfer of technology:

A Memorandum of Understanding (MoU) was signed and exchanged between IPIRTI and M/s. Viziphar Biosciences India Pvt. Ltd., Bangalore for the Sponsor Project on “Weathering on solid wood” on 25th May 2013.
A Memorandum of Understanding (MoU) was signed and exchanged between IPIRTI and Punjab Forest Department for Establishing Common Facility Centre (CFC) for Bamboo at Talwara region, Punjab.

A Memorandum of Understanding (MoU) was signed and exchanged between IPIRTI and Jute Board association for the Development of Jute Stick Particle Board.

A Memorandum of Understanding (MoU) was signed and exchanged between IPIRTI and National Aeronautics Laboratory for making round boats (Tappa) using bamboo mat as a raw material, lignin based adhesive and carbon fibre based products on April 25th 2013.

A Memorandum of Understanding (MoU) was signed and exchanged between IPIRTI and M/s. GTZ (India) Private Ltd., Kolkata for the Project on “A Study of Efficacy of Nano Inorganic Antimicrobial Material in Manufacture of Panel Products as Wood Preservative”.

IPIRTI – INDUSTRY INTERACTIVE MEET

IPIRTI- Industry Interactive Meet at IPIRTI Field Station, Kolkata:

IPIRTI Field Station, Kolkata organized one day Interactive Session on “Adoption of Efficient Technologies in the field of Wood based Panel Industries” on 20th December, 2013 in Kolkata.

6. PUBLICATIONS

For dissemination of relevant information on research, training and other activities of the Institute, publication of the quarterly newsletter, IPIRTI News and Research Reports were continued during the year. The research articles are also published in few journals.

Research Reports/Book Published:

Following Research Reports published during the year:

1. Development of Soya based resin for the Manufacture of Plywood RRNo.169
2. Development of Medium Density Fibre Board (MDF) from plantation grown timber species Grevilea robusta (silver oak) – phase-1 RRNo. 170
3. Bioefficacy study of Colemanite against wood destroying organism RRNo. 171
4. Evaluation of synergistic effect of metal chellators with wood preservative chemicals in wood preservation RR No. 172
5. Effect of cassava flour as an extender in UF and PF resin on the bond quality of plywood RR No. 173

Book: A book on Bamboo Composites –IPIRTI Technologies by Shri. Arun Kumar Bansal,
Dr. C.N. Pandey and Dr. S.K. Nath was published by IPIRTI, Bangalore

This book is an unique, attractive and valuable source of bamboo processing technologies developed at IPIRTI, Bangalore. It should be on every bamboo development practitioner’s bookshelf.

**Proceedings**

Proceeding on the International Conference on “Future of Panel Industry – Challenges & Key Issues” organized from 26th-28th September, 2012 was also published in the year 2013-2014.

**In the year 2013-14 about 12 articles listed below were published in various journals:**


2. Impact of Forestry Products on Climate Change Mitigation in India, Knowledge Systems of Societies for Adaptation and Mitigation of Impacts of Climate Change, Environmental Science and Engineering, 10.1007/978-3-642-36143-2_14, Springer-Verlag Berlin Heidelberg 2013 Pg 225-238.


9. Scenario of climate change research publication in BASIC group of countries. International


7. **STATUTORY MEETINGS**

**Board of Governors Meetings of IPIRTI was held as follows:**

a) 120th Meeting of the Board of Governors of IPIRTI

   120th Meeting of the Board of Governors of IPIRTI, held on 29th July 2013 at IPIRTI, Bangalore. The meeting was chaired by Dr. V. Rajagopalan, IAS, Secretary to Ministry of Environment, Forests and Climate Change, Govt. of India, New Delhi.

b) 121st Meeting of the Board of Governors of IPIRTI

   121st Meeting of the Board of Governors of IPIRTI, held on 26th February 2014 at MoEF&CC, New Delhi. The meeting was chaired by Dr. V. Rajagopalan, IAS, Secretary to Ministry of Environment, Forests and Climate Change, Govt. of India, New Delhi.

Following RAC meetings were held at IPIRTI, Bangalore:

c) 57th Research Advisory Committee (RAC) Meeting of IPIRTI was held on 10th April, 2013 in the Conference Hall at IPIRTI, Bangalore.

d) 58th meeting of the Research Advisory Committee (RAC) of IPIRTI held on 7th March 2014 in the Conference Hall at IPIRTI, Bangalore.
INSTITUTE ACTIVITIES

1. RESEARCH AND DEVELOPMENT

Since 1962, IPIRTI has been closely associated with the development of panel industry in the country and has been instrumental for its growth from infant stage. With the changing raw material scenario in the country, the Institute is now working in the thrust areas of conservation of natural forests through efficient utilization of the existing wood resources. To meet the vital need of developing society, green technologies for the manufacture of wood alternates for panel products from plantation timbers and bamboo including other renewable bio-fibres are being focused as thrust areas of research. An important and unique aspect of R & D work at the Institute is upscaling of the lab scale findings to industrial level to facilitate their quick adoption by the Industries. With the recent addition of number of specialized machinery and equipment, the Institute has built-up core competence and expertise to handle almost any R & D problem in the field of wood and wood based panel products. Besides undertaking a number of projects sponsored by the Industries, Institute has also re-oriented its in-house research efforts to address the issues like economic, environmental, sociological and policy research as pointed out in 159th Report of the Departmental-related Parliamentary Standing Committee on Science & Technology, Environment & Forests.

The Institute meets the HRD needs of the panel industry through several training programmes including One Year Post-Graduate Diploma Course on Wood and Panel products Technology. IPIRTI facilitates the scientists to visit foreign countries for attending seminars/workshops thereby exploring the possibilities of undertaking collaborative research projects in the field of plywood and panel products and also establish a long term linkage.

The Institute is well recognized for Testing and Standardization of wood products and composites from wood and other lignocellulosics. The testing labs in the Institute have NABL accreditation for Testing and Evaluation of Wood Composites in accordance with ISO/IEC 17025:2005.

A multipronged approach is adopted by IPIRTI for quick dissemination of new technologies for the benefit of the industry by periodically organizing IPIRTI-Industry meet which is one of the regular features of the Institute and such meet provides valuable opportunities for plywood manufacturers and consumers to exchange facts, views and challenges for trade and technological development.
1.1 In-House Projects (Progress Report)

1. WC/78/Panel/2009: Establishment of Pilot Scale Facilities for R & D and Training in MDF

Fibre manufacture is a specialized process for fiber board and holds key role in deciding the properties of MDF. Various Agro and Forest residues available in our country can be processed to convert it into MDF. The country is now facing acute shortage of large diameter logs for the manufacture of panel products. In these circumstances, it is necessary to facilitate the growth of MDF manufacturing in the country. To study the pros & cons of machines and the process on a pilot plant facility, the facilities has to be established in India. So far, a refiner for fibre making has been installed.

Fibres from wood particles and other agro residues were made using the refiner installed in the Institute. The process parameters, pressure, temperature, residency time for refining different materials were optimized to achieve good quality fibres. Panels have also been made and evaluated for mechanical properties. The results are encouraging. Quotation has been invited for procurement of additional equipment.

Procurement of hot press, fibre analyzer and glue applicator which are very essential for the R&D work on the development of MDF and the same is under process.

The entire set of equipment will be a part of PG training course of the institute.


Polyurethane adhesives and sealants provide strong bonding and tight seals in a variety of applications. However, they are very expensive and also do not suit for plywood making. The development of water dispersible polyurethane resins facilitates the PU resin to get admixed with the conventional resins being used in India, thus by making the adhesive suitable for plywood making and also for coating purposes.

A study to manufacture the blocked isocyanate resin suitable for bonding plywood was taken up. The blocked isocyanate resin was prepared using phenol and cresol as blocking agents. FTIR analyses confirms the blockage of the isocyanate (–NCO) group. DSC curing characteristics augments the curing at 160-1800C.

Polyurethane resins are formaldehyde free and will be future adhesive for panel products.

The laboratory experiments for developing blocked polyurethane resin were completed and the panels made using this resin system admixed with bio adhesives confirms to BWR/BWP grade.
plywood as per IS: 848-2006. The same resin system was formulated for surface coating. This resin has an added advantage in that the resin is water soluble.

Laboratory work of the project has been completed successfully.

The report on the lab findings has been prepared and sent for printing.

For pilot scale trials and commercial scale upgradation, the project has now been taken up as sponsored by M/s. Bayers Material Science Ltd., Mumbai.

3. **WC/84/Plywood/2010: Studies on anatomical variation in plantation grown Melia dubia including selected clones of Populus deltoids and its suitability for plywood manufacturing.**

The knowledge of variation in properties of wood within the tree is important not only for proper log selection and grading of the material but also for better understanding of the species to develop appropriate processing technique specially sawing, seasoning and wood working procedures. This study helps to establish a relationship between specific gravity and anatomical characteristics with tree age for better utilization small diameter logs.

In this study the variation in anatomical (Vessel diameter, fiber length, vessel size) physical (Moisture content), Specific gravity & Shrinkage properties and mechanical properties (MOE, MOR, compression) tensile strength of selected clones (G48, S7C8, udai, Wimco 39, Wimco A/26, S7C15) of Populus deltoids and Melia dubia from plantation would be made and its correlation on the bond quality of the panels would be studied and after testing their strength properties recommendation for its use will be made.

The anatomical studies of the different clones are being analyzed. The logs were peeled to study the yield and panels were made. The panels made with different clones were evaluated for its strength properties. The results are being compiled.

4. **WC/85/PB/2010: Development of Fire Retardant Particle Board**

Research on fire retardant wood and wood-based composites is being carried out worldwide for over a decade. Although many kinds of fire retardants for wood and wood-based composites have been studied, the focus still remains mainly on compounds or mixtures containing phosphorus, nitrogen and boron which can be used as a water soluble solution. Keeping this in view, IPIRTI had taken up research work to develop fire retardant particle board using boron and phosphorus chemicals. The pilot scale trial of manufacturing fire retardant particle board was taken up by adopting the process parameters optimized on lab scale. The panels made on pilot scale were subjected for testing to evaluate the fire retardancy of particle board, as per IS:5509 and the physical mechanical properties of the boards as per IS 3087:2005. The evaluation of mechanical and fire resistance properties of
amino resin based boards is completed. However, testing of phenolic resin bonded boards is under progress. This development will provide an economically viable technology for the manufacture of fire retardant particle board.

5. WC/86/FR/CFS/2010 Development of Fire retardant cum Preservative Coating of Wood Based Panel Products and Bamboo Composites

The present invention relates to fire retardant intumescent coating compositions for wood products in order to impart a wood preservative and fire resistant qualities. The objective of the study is to develop a Poly sulphide–Epoxy resin based halogen free novel flame retardant coating which forms an insulating layer in the event of fire by its flame retardancy properties on wood based panel products and bamboo composites. The coating formulation was optimized by poly sulphide based epoxy resin as binder, ceramic material, carbohydrate and halogen free fire retardant which forms an insulating layer on the surface. In order to evaluate the flame retardancy properties, the optimized coating material was coated on the surface of plywood and bamboo composites. The flame retardancy properties was carried as per both IS and BS Specifications. The data reveals that the excellent flame retardancy properties like flame penetration, flammability was achieved. However, the rate of burning was satisfactorily when tested as per IS:5509. A Flame of LPG was allowed to play on the surface of coated and uncoated specimen to test Ignitability as per BS:476 and surface spread of flame as per BS:476. The result shows excellent flame retardancy properties compared to conventional flame retardant coating used. From physical observation it was observed that thick coatings insulate the treated material against high temperatures. The coating melts under the action of heat, covering the treated material with an impermeable insulating crust that deprives the wood from oxygen. However, the study reveals the generation of some gases on event of fire though there was no halogen and ammonium gases and coating was intumescent in nature.

6. NWC/91/Testing/2011: Dielectric and Electrical Properties of Wood and Bamboo Based Composite Products

The dielectric properties of wood are important design factor where wood is employed in a structure subjected to electromagnetic fields. As the studies of structural, dielectric and electrical properties become more sophisticated, other variables were considered such as temperature, structural direction and density with the results showing that these other variables also have important influence on these properties of wood. Knots, spiral grain and other defects can be detected by measuring dielectric properties. The dielectric properties of Sample of wood composite materials after electroding
wood are useful for the understanding of molecular structure of wood, improving the drying, heating and gluing processes, instrumental and industrial applications.

7. **WC/92/Testing/2011: To Study the Fatigue Strength Properties of Structural grade wood panels**

In various applications, materials are subjected to repeated stresses. The behavior of materials under such load conditions differs from the behavior under a static load. Material is being subjected to repeated load-cycles in actual use. As the strength properties determined by static loading do not provide any information of the material to predict its life in actual use. The study is being carried out on fatigue behavior of wood based panel products as a percentage of materials ultimate strength.

The objective of the project is to evaluate the fatigue strength properties of wood based panel products under cyclic loading and to correlate the same with static properties with a view to recommend its use in structural applications and to predict the life span of the product under repeated loading conditions. To determine the allowable design stress as a percentage of MOR under cyclic load effects so as to help the designers to design confidently the furniture/housing systems.

For applications in which cyclic loading must be taken into account, the results suggest that the allowable design stress for a material would be based on that percentage of its ultimate strength that will yield a fatigue life of material that agrees with the anticipated service life load cycles of the parts fabricated from it.
8. WC/94/Resin/2011: Development of PUMF Resin for Plywood

Phenol formaldehyde resin is the most commonly accepted adhesive for making Boiling water resistance plywood. The recent fluctuations on the price of phenol has led to search for all the available alternative to replace phenol or evolve a new resin system that would be economical.

In this study, development of an economical resin for exterior grade panel with negligible or zero formaldehyde emission was taken up.

A new resin system was manufactured using phenol, urea, melamine and formaldehyde. Optimized the process parameters for the manufacture of resin using different percentages of urea, melamine and phenol. Optimized the process parameters for making Boiling water resistance grade plywood as per IS:848:2006. Pilot scale trials by employing various pressing conditions have been repeated to check consistency in results. The compilation of the strength properties of plywood made by using this resin is under progress.


Plywood and wood based panel products has been made by using PMUF resin with fire retardants like Tricresyl phosphate (TCP), Zirconium dihydrogen phosphate as additive during preparation of glue for manufacture of plywood. PMUF resin synthesis and composition of glue has been optimized. Fire retardancy test of plywood has been carried as per IS:5509. Data shows that test results complies with the requirement as per IS:5509. It has been observed that in the presence of heat or flame the adhesive produce substances as fire barrier and reduce combustion. Modification of PMUF resin by guanyl urea phosphate by replacing urea to achieve better fire retardancy is under progress.

10. WC/97/Door/2011: Flush Door with Engineered Core Infill

At present, flush doors are being manufactured using wooden battens. Due to the scarcity of timber and also to have a sustained management of timber use, a study has been undertaken. The objective of this project is to develop a Wood based engineered material that substitutes sawn wood as the infill core material for the manufacture of Flush doors which brings down the volume of timber required to manufacture the door.

Round Mild Steel Rods were procured and different methods were used to convert it into the extruded part of the die (which generates hollow part of the board). It was found that converting the round rods by milling process was economical compared to that of spark erosion and EDM wire cut methods. Steel sheet was procured for the bottom plate of the Die. After manufacturing
the die by welding the milled mild steel rods on to the steel plate initial trials were taken and a hollow core board of 35 mm thickness using poplar particles and urea formaldehyde resin was produced.

**11. WC/100/Testing/ 2011: Study and Analysis of Nano Coating as Fire Retardant on Wood Panel Products**

Nano coating with functional properties provide a new way to modify surface properties of wood and gain added value to wood–based products. Improvement of physical properties such as moisture, UV and absorption resistance, as well as anti-soiling of wood surfaces have been achieved with this nano coating. There is also a market for fire retardant wood products in building applications. The new method as to be developed by using nano coating which retards fire. This would give a great relief to the builders and manufactures from the safety aspects. The nano particles ensure that a crust is formed around the burning material and prevent the fire-resistant substances from evaporating too quickly.

Nano particles using titanium dioxide were made using the Planetary Ball mill. Coating formulation was worked out and trials were taken to coat the panel products with nano particles coating composition. The coating was subjected to flammability test and 30 minutes fire resistance was achieved. Final trials have been completed and report is being prepared.

Formaldehyde emission from Particle Board (PB) and Fibre Board (FB), especially those made with amino resin is an usual hazard associated with manufacture, storing and during use of PB. Level of emission of formaldehyde from PB varies depending on the adhesive formulation and process of manufacture. Particle Board (PB) industry is one of the fastest growing panel industry throughout the world. In India also it is developing in a very fast pace.

When emission of formaldehyde is present in the air at levels at or above 0.1 ppm, acute health effects can occur. To minimize the emission levels by varying the catalyst system in amino resin is being studied in this project.

The Pilot scale trials for the manufacture of particle board were taken up. The strength properties were encouraging as per IS:3087. Emission of formaldehyde by Chamber method is under progress.

13. WC/102/Testing/2012: Statistical data analysis on the properties of wood panels to augment the quality

To statistically analyze all the parameters involved in testing of wood based panels. Elucidation to augment the quality of the wood based panels.

Indian wood based panel industry as on today consists of 62 large and medium size mills and over 2500 small scale industries. In this 25 numbers are particle board units and 6 MDF mills and rest are plywood, block board, doors etc. The quality of the product to be maintained is of great concern.

SPC lies in the ability to examine a process and the sources of variation that give weight to objective analysis over subjective opinions and that allow the strength of each source to be determined numerically. But unfortunately in India no statistical data has been generated till now related to wood based panels to emphasis more attention were the samples fails to pass the requirement of standards.

The outcome of the study helps in planning the methodologies that ensure that the manufactured products meet the required quality standards consistently and to produce good product at the first time.

14. WC/103/Review/2012: Review of method of testing fire resistance of plywood and optimization of test procedure

The objective of the Project was to study and optimize method of testing fire resistance of plywood viz. flammability, flame penetration and rate of burning as given in Indian standard IS 1734 (Part 3)-1983 and to draft amendments for the same.
Rate of burning test method describes the gap between the specimen and the burner but the length of flame is not mentioned. The samples were tested by varying the flame length and the optimum flame length was standardized. Where as in flammability test, it is difficult to test the samples of lesser thickness (<9mm) as the sample placed lower starts burning before the flame catches the second plywood; hence trials were taken by testing samples by pasting two samples. From the results it was observed that the test results can be obtained for samples less than 9 mm thickness by placing two glued samples at each level. The flame length of air and gas mix for flame penetration test was standardized.

15. WC/104/MDF/2012: Development of Medium density Fibre board (MDF) from Plantation grown timber Species *Grevillea robusta* (Silver Oak) and Casuarina-Phase I

A study was conducted to assess the suitability of plantation grown timber species *Grevillea robusta* (Silver Oak) as raw material for the manufacture of Medium Density Fibre board (MDF). Refining parameters for the manufacture of fibres were optimized. It has been found that 0.3 mm disc gap, 6 bar pressure is sufficient for the preparation of fibres suitable for the manufacture of Panel from Silver oak species. MDF panels of size 300 mm x 300 mm x 12 mm were made using urea formaldehyde resin and tested as per IS:12406-2003 “Specification for MDF for general Purpose”. The results showed that all physical & mechanical properties of the panels were above minimum requirements for MDF as specified in IS:12406-2003 standards. Results indicate that MDF can be made from fibre derived from *Grevillea robusta* (Silver oak). Additional work is needed to ascertain the performance of MDF panels from this species. Studies with Casurina as raw material for manufacturing of fibre board has been initiated.

16. WC/105/PB/2012: Study on suitability of plantation grown species viz. *Melia dubia* for particle board manufacture

*Melia dubia* has been one of the most promoted plantation species for wood and wood based panel industry in southern India. The farmers / growers have shown lot of interest in taking up
the *Melia dubia* plantations. Considering its sustainable availability, the study to utilize this species for various end use applications were taken up and one among that was the particle board manufacturing.

Objectives of the current study are to find the suitability of plantation grown timber viz. *Melia dubia* for particle board production and to optimize the particle size and adhesive formulation and finally to evaluate the physical and mechanical properties as per the relevant standards. Project work completed, report preparation is in progress. During drying additional care is to be taken that the particles dried must be processed further without any delay or else particles will pick up the moisture which will enhance the problems of blister formation during pressing.

17. ESL/106/Preservative/2012: Exploratory studies on development of nano-biocide for wood preservation

Nanotechnology presents a tremendous opportunity to boost the field of wood preservation through implementing modern and unique metal biocides with improved properties. Nano form of Copper oxide, Zinc oxide and Copper sulphate were made by mechanical milling in the high energy planetary ball mill with 450 rpm for 12 hours.

Among the three tested nanobiocides Copper sulphate at 0.5% concentration provided protection to the plywood against wood destroying organisms without affecting the bond quality of plywood. This would be the first report to develop and test the efficacy of nanobiocide against wood destroying organisms in India.

18. WC/107/Testing/2012: Assessment of relative toxicity of various panel products and study the toxicity index behavior of treated and untreated wood based panel products

The development and increasing use of new synthetic materials in today’s world has led to the release of many toxic chemicals to the environments very rapidly. Some of these chemicals are highly toxic to human. The concern over the danger of inhaling decomposition products has increased in recent years. The question of whether the steady increase in the use of new materials is likely to result in an increase in the life hazard for the occupants of building in the event of fire is of paramount importance.

The assessment of various toxic gases getting released from the panel products gives an indications of the relative importance of toxic gases produced from a given materials and the relative propensity of materials in generating harmful gases and vapors. Hence this study on assessment of relative toxicity
of various panel products has been taken up. The data collected would contribute for understanding the problem of combustion toxicology and also a limit can be set up for the release of these gases depending on the end use application of the panel products.

19. WC/108/Panel/2012: Development of light weight composite panel products

Lightweight constructions are increasingly used in automotive, aerospace and construction sectors, because using the low density materials allows reducing the structural weight of products. That may result in substantial fuel savings and a lower carbon footprint in transportation and facilitates manipulation of details in the house construction applications.

The use of light weight panels offers a reduction of production costs by lowering wood consumption and transportation costs. This would be a supply option in the face of the increasing scarcity of the raw materials and the increased price of traditional composite panels. Reduces the pressure on timber resources and also minimizes the energy consumption.

Various formulations using different foaming agents incorporated with the resin were evaluated. Different catalyst and surfactants with varying percentages were worked out. The process parameters for the manufacture of panel products based on the foaming behavior were optimized. Control panels without incorporation of foaming agent in the resin were also made. The panels with density of 500-700 kg/m³ were made and evaluated for strength properties. The results were conforms to relevant standard for the panels bonded with the adhesive incorporated with foaming agents, while the control samples did not yield satisfactory results for the same density. Further trials are being continued.

20. NWC/109/MDF/2012: Development of Medium density fiber board–Phase 1–Wheat Straw

The renewable materials that are being dumped as a waste is utilized for the development of a technology for the manufacture of MDF, this would reduce the dependence on wood for the manufacture of MDF.

Interest in producing Medium density fibre board (MDF) panels from agricultural waste is not new but constrains in the straw characteristics due to wax and silica has to be yet overcome. Hence in this study, chemically treated wheat straw was used for the manufacturing of 330 mm x 330 mm x 6 mm MDF using Urea formaldehyde resin and phenol formaldehyde resin. Water absorption was improved in treated boards and satisfied the properties as per IS:12406. Thickness swelling properties (2 hrs) of the alkali treated UF boards with 13% resin were giving encouraging results. However, boards failed to satisfy the requirements.
as per standard for thickness swelling properties (24 hrs) in UF boards. Improvements in thickness swelling properties of UF bonded boards are being worked out using UF resin. Further the boards made using phenolic resin has shown satisfactory properties as per relevant standards.

21. WC/113/survey /2013: Study on trend analysis of wood based panels in India

Indian wood based panel is most important industry in forest sector and it has impact on economic growth and trade of India. Database output on this project will be facilitating wood based panel’s data in time series pattern. The focus of this project would be: Development of a data base on wood based panels in respect of production, Import & Export quantity and value, Analysis of wood based panel’s production, quantity & value of export and import, consumption of the country with statistical analysis and to study the trade of India and international countries of wood based panels, to forecast future trend of wood based panels of India.

Wood based panels trade data has been collected from Directorate General of Commercial Intelligence and Statistics, Kolkata (export and import: quantity and value) during 25 years from 1988-89 to 2012-13 and also visited Green-ply and Century Ply-board, Kolkata for collection of production data. Visited CSO, Kolkata, MOSPI, FIPPI, New Delhi for Industry-wise production data. On the basis of collected data, analysis of wood based panel with the help of statistical and econometric analysis is under process.

22. LP/114/LVL/2013: Study on suitability of Melia dubia for Laminated Veneer Lumber (LVL) manufacturing

Objectives of the current study are to standardize the methodology for manufacturing LVL from fast growing timber species viz. Melia dubia and to optimize the adhesive formulation and concentration of wood preservative chemical for the treatment and finally to evaluate the physical and mechanical properties as per the relevant specifications. After completing the literature survey, order are placed for procurement of Melia dubia veneers.

23. ESL/118/Biocide/2013: Evaluation of Multicomponent biocide for protection of plywood and other panel products

New formulation of preservative chemical to treat plywood and particle board has been developed. The plywood and particle board samples treated by employing chemical formulation of 1%, 2% and 3%, were made and exposed against wood destroying biological agents. Exposure studies are under progress.

24. NWC/123/Housing/2013: Development of cement bonded fibre composite panels for housing applications

Boards with varying ratios of cement and fibres have been made and the samples are subjected for testing.
Progress on Sponsored Project (ongoing)

1. SP/95/Bamboo house/2012: Seismic performance studies on bamboo structures in North East region sponsored by M/s. BMTPC, New Delhi

Objective of the project is Seismic performance studies on proposed bamboo structures in North East region and suggest the improvements based on the findings.

Visited number of bamboo houses in the northeast and studied the various types of construction.

The basic feature of the most of the houses visited is as follows:

- The bamboo columns are the main load bearing elements. The roof is either corrugated iron sheet or thatch roof. Bamboo trusses are being used to transfer the roof loads to the columns.
- Woven flattened bamboo sheet is used as wall panel between the bamboo columns. In some houses bamboo strips were used.
- These woven bamboo sheets are placed between horizontal bamboo members and which is plastered using mud mortar on both outer faces.

The typical houses made by CBTC, Guwahati contains the improved version of the above features. Bamboo houses using IPIRTI-TRADA housing technology were also constructed in some parts of the North East by BMTPC, New Delhi.

Hence, in this test programmes construction of two full scale bamboo model houses of size 8’x8’ on shock table were planned.

**HOUSE MODEL: IPIRTI-TRADA bamboo house (to be tested until damage for comparison)**

A full scale model of IPIRTI-TRADA Bamboo based house of size 2.44m x 2.44m was made on shock table. Rigidity was maintained by welding the U – shaped steel section to the shock table. Bamboo columns were inserted into steel pipe which was connected to the U-shaped steel section. The figure shows the different stages during the construction of the house model.
The prototype resisted the shocks and showed no signs of falling apart, in contrast to a masonry/concrete structure. When most intensive shocks were delivered a few cracks were observed at the end of the shock period. The building system is very effective in resisting earthquake motions of severe intensity. The building system satisfies the design philosophy of IS 1893(2002).

The work on model House 2 is under progress.

The figure shows the progress of failure and crack pattern of the house model tested.

2. NWC/123/HOUSING/2013: Development of cement bonded fibre composite panels for housing applications

The aim of the project is to find the lightweight cement bonded fiber composites that can be produced for the cost effective housing applications.

Initial studies were conducted on panels with a wood particle mixture of Melia dubia and poplar and effect of silica fume on strength of the cement bonded composite was explored.

Increasing values of Peak load have been found during the MOR & MOE and IB test. The panel confirms the additional strength on addition of Silica fume also the gap filling property of Silica fume. Decreasing values of pH have been found during the pH test on the panels.
3. **SP/97/Preservative/2013**: Modification and efficacy study of wood protector, the Eco-friendly wood preservative for glue line treatment during manufacture of plywood

Plywood has been manufactured by using different Physico-mech properties study is under progress. Efficacy study against wood destroying organism is under progress at IPIRTI, Kolkata. Sample has been sent to IPIRTI, Bangalore for efficacy study against termite and borer.

4. **SP/99/Preservation/2013**: Utilization of radiation technology to increase the preservation quality of wood by inhibition of wood rotting fungi and Insects

Radiations studies were performed in the sponsoring organization (BARC) and the samples are exposed against rotting fungi and insects. Observations are being recorded.

5. **SP/100/Bamboo/2012**: Harvest Management Techniques and Storage of Bamboo Culms Viz. Bamboo spp. for the development of Bamboo particle/MDF Board-Phase I

The moment bamboo is felled, decay and insect attack starts. There is an ecological succession of insect borers that invade the felled of bamboos. Bamboo is not safe even at low moisture contents, as some borers like power post beetles and longhorn beetles continue their activity in of bamboo products, which have been in use for several years.

**The objectives of the study were to:**

- Study the harvesting technique of Bamboo in field and study on the Storage life of bamboo after water treatment (water ponding).
- Study the storage life of bamboo after in comparison with control samples.
- Study the storage life of control treatment of bamboo. This study also covers the storage condition of Bamboo at Industry level.

From this study it was found that from both the field and Pilot scale study showing water treatment is the cheapest and economical method to store the bamboo for long duration in terms of protection from borer and fungus attack. However harvesting of bamboo manually with traditional tools is a good practice in India and therefore harvesting is slow and cumbersome. There is plenty of scope to improve harvesting system through mechanization.
6. SP/101/Pencil/2013: Suitability of Lesser known tree species (LKTS) for pencil making technology

Plantation timbers are fast growing species and having juvenile wood, such kind of wood is difficult for Sawing, Scantling, Seasoning, Dyeing and waxing treatment for pencil making and need treatment for improving the property.

Under this project, ITC has provided Lesser Known Tree Species (LKTS) for pencil making woods in log form and Slats form to generate schedule/Procedure for Seasoning, and for optimizing the parameter for Dyeing and Waxing treatment for pencil making.

Though considerable work, to find out suitable indigenous timbers for pencil making on the species based on natural forests has been done in India and abroad, but due to restriction on felling of forest trees there is a huge gap between the supplies of traditional timbers and demand by the pencil making industry. To meet this gap there is compulsion to use short rotation plantation grown timbers. Lesser known tree species (LKTS) for pencil making are short rotation plantation grown timber which are now available in abundance were tried to find out their suitability for pencil making. Dye-ing and waxing treatment carried out as per procedure laid down in IS:3084 showed encouraging results. Pencils were made at pilot scale and it was found that LKTS may be a promising timber for pencil making industry.

7. SP/102/Preservative/2013: Evaluation the newer biocides against wood destroying organisms and fire resistance in wood based panel products.

Laboratory evaluation and determination of critical concentration of the biocides and incorporation of biocides in the glue line treatment were taken up. Optimization of process parameters for the development fire resistant wood based panel products has been worked out in addition to the study on the durability of the treated panels against natural organisms (Termites, Borers, Fungus and molds).

As per the standard procedure, 3ply construction of plywood samples were made by using both phenol formaldehyde resin (PF) and urea formaldehyde resin (UF). Preventol A12-TK 20 (Fungicide) and Preventol TX-CE12 (Insecticides) both were incorporated in the glue line with different concentration. The samples were exposed in the grave yard (test) observations have been made in the month intervals and the termite attack was found only in the control samples. The same
plywood samples were also exposed to the mould and fungus study, the control samples only had the traces of mould and fungus. Further trails and observations are in progress.

Multi-layer particle board was made by using Eucalyptus particles with the binders of Phenol formaldehyde resin (PF) and Urea formaldehyde resin (UF) along with fungicide & insecticide with different concentration. The samples were exposed to the grave yard, mould and fungus studies. The termite attack was not found in any concentration and also in the control samples. The samples were exposed in the fungus studies, the mild traces were found only in the control at this stage. Further trails and observations are in progress.

8. SP/104/Extender/2013: Efficacy study of the Booster additive as a partial substitution in both phenolic and amino resin for manufacture of plywood.

Since wheat flour is staple food stuff, it is a relatively expensive ingredient for glue mixes, and its availability varies with the world commodities market. The objective of this project is to substitute wheat flour used as a food stuff material with Booster additive which reduces the adhesive cost by providing adhesive properties, increase the coverage and hence reduce the glue line cost. Basically it is a resorcinol based material. Physical and chemical characteristic study has been completed. Rheological properties study has been carried out. Plywood was manufactured by using Booster additive. From the study it has been observed that by incorporation of Booster additive 5 to 10% in amino based resin bonding strength and colour is satisfactory. Details study is under progress.
2. TRAINING & EDUCATION

Training is an important tool to facilitate the industries for efficient utilization of resources, increase the productivity and reduce the overall cost of production. HRD needs of the mechanical wood industries are met by the Institute by conducting one year post graduate diploma course and short term vocational courses. Training enhances the professional competency of managers, supervisory staff and industrial workers. IPIRTI is the only training institute of its kind in the country imparting training in the field of wood and panel products.

In addition to training courses, facilities are also extended to engineering students to undertake project works in the Institute in different disciplines such as civil, mechanical and chemical engineering. IPIRTI is also a nodal centre for pursuing research leading to award of Ph.D by FRI University.

2.1 Post Graduate Diploma Course in Wood and Panel Product Technology

The post graduate diploma course in Wood and Panel Products Technology the only course of its type in the country that had been widely recognized by the industry and the diploma holders who pass out from the Institute are in great demand.

PGDC, a one-year job oriented training course provides an unique opportunity to science and engineering graduates for a career in one of the green industrial processing sectors viz., wood based industry.
During the year, 24th Training Course for One year Post-graduate Diploma in Wood and Panel Products Technology for graduates in Science and Engineering was conducted, wherein all the 26 candidates completed the course successfully and 100% placement was arranged through Campus selection process. Training for 25th Course for One year Post-graduate Diploma in Wood and Panel Industries Technology for graduates in Science and Engineering was started and the course is in progress wherein 26 candidates are undergoing training.

The main objective of the course is to impart professional knowledge and skills with regard to processing technologies for efficient utilization of wood through conversion into engineered wood and a variety of panel materials/products viz., plywood, particle/fiber board, block board and flush door. The course also includes processing technology on bamboo mat based panel products and adhesive technology. Standardization aspects with respect to quality management and BIS certification are dealt. Working knowledge on use of computers and internet is also imparted. Emphasis is given for the trainees to operate all equipments/ machinery related to wood and panel product technology in the lab and pilot plant scale. This would facilitate the trainees to get easily accommodated in the plywood industries. Till date, 570 candidates have successfully completed the P.G. Diploma course.

As a part of PGDC, a study tour was arranged for the trainees during 02.09.2013 to 05.09.2013 in order to acquaint them with the manufacturing processes in wood based industries like M/s. Maheshwari Plywood, Mysore, M/s. Ferro Foundries, Mysore, M/s. Hunsur Plywood Works Pvt. Ltd., Hunsur, M/s. Kanara Wood & Plywood Industries, Mangalore, M/s. Yenopoya Resins, Mangalore, M/s. Kanach ur Seasoning Industries, Mangalore and M/s. Akolite Synthetic Resins, Mangalore.
2.2 Short Term Training Courses

IPIRTI at its headquarters as well as at outreach field stations in Kolkata and Mohali undertakes and organizes training programmes in different disciplines for different target groups ranging from the technicians to managers on sponsorship basis and also for national and international students. By organizing several short term training courses, the institute is continuing to draw attention of several small and medium scale enterprises.

Various Short term vocational training courses have been conducted during the year 2013-2014 for technical personnel from industry to upgrade their skill in the specialized field of interest such as veneer peeling, resin manufacture, panel/sheet manufacture, testing and standardization as well as specific training in the mode of transfer of technologies. A few training courses have also been conducted for artisans/rural people engaged in bamboo related activities on mechanized slivering of bamboo required for mat making. Training has also been provided to NGOs, engineers and architects in bamboo based housing including entrepreneurs for different bamboo based technologies.

**Special Training course on manufacture of BMCS**

As part of technology transfer for Bamboo Mat Corrugated Sheets production, 2 weeks hands on training programme was conducted for representatives from M/s. Brahmaputra Forest Products Pvt. Ltd., Lakhimpur, Assam on 11.02.2014.

The list of short term training courses conducted during the year is shown in Annexure V.
3. PRODUCT TESTING & STANDARDIZATION

3.1 Product Testing

Product testing is an important activity aiming at production of quality products by the Industry and helping consumers, including Government organizations in checking quality of goods purchased. IPIRTI is one of the specialized laboratories recognized by BIS and accredited by NABL as per ISO/IEC 17025 for testing of wood and composites from wood and other lignocellulosics. BIS is using the services of the Institute for issue/renewal of license for panel products to wood based industries. Beneficiaries include Manufacturers, Certifying agencies, Regulating authorities, Traders and Consumers. Test facilities are also available at the Kolkata Field Station and IPIRTI Centre, Mohali, Punjab. During the year 753 samples were tested for conformity to relevant standards, including testing of samples drawn by BIS and from outside agencies. The details of which are given below:

### Products/Materials tested

<table>
<thead>
<tr>
<th>Product/Material</th>
<th>No. of samples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plywood</td>
<td>226</td>
</tr>
<tr>
<td>Block Board &amp; Flush Door</td>
<td>152</td>
</tr>
<tr>
<td>Particle Board &amp; Fibre Board</td>
<td>45</td>
</tr>
<tr>
<td>Resin &amp; Chemicals</td>
<td>67</td>
</tr>
<tr>
<td>Wood &amp; Veneers</td>
<td>236</td>
</tr>
<tr>
<td>Others</td>
<td>27</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>753</strong></td>
</tr>
</tbody>
</table>

3.2 Standardization

Standardization facilitates use of right material for right purpose. It also helps to build consumer confidence in any material/product and ensure product quality conforming to the specifications. It helps the manufacturer to compete in the international market for selling his products. The Institute continues to play a significant role in formulating and evaluating standard specifications for wood, wood products and products from lignocellulosic materials by serving on various committees/subcommittees of BIS, the national standards body of India responsible for formulation of standards.
IPIRTI is very much involved in the activities of BIS related to Standards on Wood and wood based Panels. Scientists serve on various sectional committees and sub committees of Civil Engineering Division of BIS as convenors/members. Director, IPIRTI, is the Chairman of wood products and products from other lignocellulosic materials sectional committee CED:20 and also a member of BIS Council.
4. INFORMATION & PUBLICATIONS

4.1 Library

The Institute has an unique library dedicated to composite products made from wood and other lignocellulosic materials. A collection of 4510 books on forestry, wood science, polymer science, polymers and allied subjects, journals including international journals and 2618 back volumes are available for ready reference. The library facilities are extensively used by the scientists and trainees, and are also open to industry personnel and researchers from other institutes. 9 Journals including 4 International Journals are subscribed at the main library at Bangalore.

4.2 Internet Services

As an electronic media for sharing & disseminating technical and products information, internet holds immense potential for forest based industry. The forestry sector including the timber industry is already having a substantial presence on the Net. To facilitate sourcing of global research and information related to technological development, internet facilities were established. To give global research overview on wood products “Wood Products Research Update”- a bimonthly digital information service of IPIRTI was rendered to members of IPIRTI’s Society through E-mail.

In anticipation of user’s needs, global information on forestry, wood, wood composites/bamboo composites has been downloaded from Internet and the same has been maintained in digital folder entitled “Global Information from Library to Library Clientele” on a local shared server of the Institute to enable the users to access the information offline.

4.3 Publications

Research Reports Published:

Following Research Reports published during the year:

1. Development of Soya based resin for the manufacture of plywood RR No. 169
2. Development of Medium Density fibre board (MDF) from plantation grown timber species Grevilea robusta (Silver Oak) – Phase-I RR No. 170
3. Bioefficacy study of colemanite against wood destroying organism RR No. 171
4. Evaluation of synergistic effect of metal chellators with wood preservative chemicals in wood preservation RR No. 172
5. Effect of cassava flour as an extender in UF and PF resin on the bond quality of plywood RR No. 173

**Book:**

A book on Bamboo Composites –IPIRTI Technologies by Shri. Arun Kumar Bansal, Dr. C.N. Pandey Dr. S.K. Nath was published by IPIRTI, Bangalore

This book is an unique, attractive and valuable source of bamboo processing technologies developed at IPIRTI, Bangalore.

**Proceeding:**

Proceeding on the International Conference on “Future of Panel Industry – Challenges & Key Issues” organized from 26th-28th September, 2012 was also published in the year 2013-2014

### 4.4 E-Governance activities at IPIRTI

E-governance is the computerization and automation of common government processes with the goal of lowering costs, improving efficiency and generally providing better services and to enhance information access for the benefit of Staff, Citizens, Organizations and Government functionaries.

With the emphasis given by MoEF&CC on computerization, IPIRTI initiated action for strengthening of E-Governance/IT activities of the Institute. IPIRTI has setup a Client/Server network and providing the following services to both the staff and the PGDC Trainees.

1. Net Access
2. Virus management
3. Storage Server for data with backup
4. Biometrics for Staff’s attendance
5. Website designing and updating
6. ERP implementation
7. In-house resolving of issues related to Hardware/Software
8. Support to Users related to Applications
9. Graphics and Designing of Reports/Newsletters, etc.
10. Any other support related to IT
5. EXTENSION SERVICES

5.1 Transfer of Technology

A Memorandum of Understanding (MoU) was signed and exchanged between IPIRTI and National Aeronautics Laboratory for making round boats (Tappa) using bamboo mat as a raw material, lignin based adhesive and carbon fibre based products on 25th April 2013.

A Memorandum of Understanding (MoU) was signed and exchanged between IPIRTI and M/s. Viziphar Biosciences India Pvt. Ltd., Bangalore for the Sponsor Project on “Weathering on solid wood” on 25th May 2013.

A Memorandum of Understanding (MoU) was signed and exchanged between IPIRTI and Punjab Forest Department for establishing Common Facility Centre (CFC) for Bamboo at Talwara region, Punjab.

A Memorandum of Understanding (MoU) was signed and exchanged between IPIRTI and Jute Board Association for the Development of Jute Stick Particle Board.

A Memorandum of Understanding (MoU) was signed and exchanged between IPIRTI and M/s. GTZ (India) Private Ltd., Kolkata for the project on “a study of efficacy of nano inorganic antimicrobial material in manufacture of panel products as wood preservative”. 

Dr. C.N. Pandey, Director IPIRTI, and Dr. Selvarajan, Sr. Scientist, NAL, Bangalore exchanging signed MoU on 25th April 2013.
5.2 Meeting/Seminars/Workshops/Conference/:

Meetings:

02.04.2013-03.04.2013: Dr. C.N. Pandey, Director, IPIRTI attended 1st Meeting for Quarter wise pending issues pertaining to different institutions at MoEF&CC, New Delhi.

07.05.2013: Dr. C.N. Pandey, Director and Dr. S.K Nath, Joint Director, Ms. Sujatha D., Shri. Anand Nandanwar, Dr. Ranjana Yadav and Dr. Pradeep Kr. Kushwaha, Scientists attended the 6th Steering Committee Meeting of IPIRTI-CENTRE, Mohali at Udhyog Bhavan, Chandigarh.

11.05.2013 to 12.05.2013: NABL Audit of Test labs was carried out at IPIRTI, Bangalore.

17.05.2013: Dr. C. N. Pandey, Director as Chairman, Dr. S.K. Nath, Joint Director and other Scientists as Members of the committee attended of CED 20 Subcommittee of BIS meeting at IPIRTI, Bangalore.

27.05.2013-29.05.2013: Dr. C.N. Pandey, Director and Dr. S.K. Nath, Joint Director attended meeting with M/s. Kandla Timber Association for Establishing New Field Station at Kandla, Gujarat.

31.05.2013: Ms. Sujatha, Mrs. Ravikala Kamath and Dr. Aparna Kalawate, Scientists, attended Annual General Meeting of Indian Academy of Wood Sciences at IWST, Bangalore.

29.07.2013: 120th Meeting of the Board of Governors of IPIRTI, held at IPIRTI, Bangalore. The meeting was chaired by Dr. V. Rajagopalan, IAS, Secretary to Ministry of Environment, Forests and Climate Change, Govt. of India.

17.09.2013-18.09.2013: Dr. S.K. Nath, Joint Director and Shri. Uday D.N, Scientist visited to MoEF&CC, New Delhi to attend meeting on Project “Upgradation of BMCS Technology” and presented paper on the project.

06.01.2014: Dr. Ranjana Yadav, Officer In-charge, IPIRTI Center, Mohali attended the meeting arranged by NIPMA president Shri. Naresh Tiwari with other wood industrialists of Amritsar, Hoshiarpur and Jalandhar at Sarb Multiplex, Jalandhar.

26-02-2014: 121st Meeting of the Board of Governors of IPIRTI, held at MoEF&CC, New Delhi. The meeting was chaired by Dr. V. Rajagopalan, IAS, Secretary to Ministry of Environment, Forests and Climate Change, Govt. of India, New Delhi.

07.03.2014: 58th meeting of the Research Advisory Committee (RAC) of IPIRTI was held in the Conference Hall at IPIRTI, Bangalore.

25.03.2014: Shri. Narasimha Murthy, Scientist participated in CED:9 Meeting of BIS for discussion on CEB preservative chemical to incorporate in IS 401 held at FRI, Dehra Dun.
Seminar/Workshop/Conference

15.04.2013–17.04.2013:
Dr. V.K. Upadhyay, Scientist attended the National seminar on “Recent advances in applied statistics and its application in Forestry” during International year of Statistics, 2013 and made oral presentation on the topic: “Statistical analysis of export and import of wood based panels in India” at Tropical Forest Research Institute, Jabalpur, India.

26.06.2013-29.06.2013 & 02.12.2013-03.12.2013:
Shri. Jagadish Vengala, Scientist, attended the workshop on “Building with Bamboo” and delivered a lecture on “Bamboo Housing” organized by South Asia Bamboo Foundation and BMTPC at Manipur & Shillong.
Asia Regional Bamboo and Rattan Workshop organized by INBAR in collaboration with MoEF&CC, Govt. of India, at New Delhi, 10th-13th December, 2013. Shri. Jagadish Vengala, Scientist, IPIRTI delivered a talk on “Performance Studies on Bamboo Based Housing”.

28.10.2013-29.10.2013: Dr. K.Ch. Varadarajulu and Dr. Pradeep Kushawaha, Scientists attended and presented article on “Composites from wood and other lignocellulosic Materials” at workshop on “Creating awareness of stakeholders on forest instruments (NLBL)” organized by IIFM at Chennai.

19.11.2013-22.11.2013: Dr. Ranjana Yadav, Officer In-Charge, IPIRTI Centre, Mohali attended the Quality management training on “Laboratory Quality System Management & Internal Audit as per IS/ISO 17025” at Noida.

26.11.2013: Ms. Sujatha D., Scientist presented a paper on “Agro based composite products-the materials of future” at the Design Awareness programme on Agro based Composite products organized by Karnataka State Coir Development Corporation Ltd., Bangalore.


19.12.2013: Shri. Uday D.N. and Shri. Anand Nandanwar, Scientists attended the seminar on “Adoption of efficient technologies in the field of wood based panel industries” organized by IPIRTI Field Station, Kolkata. Shri. Uday D.N. presented a paper on “Problems related to processing of Timber and technological solution” and Shri. Anand Nandanwar presented a paper on Advances in testing of panel products for wider applications”.

20.12.2013: Ms. Sujatha D., Scientist attended the seminar on “Adoption of efficient technologies in the field of wood based panel industries” organized by IPIRTI Field Station, Kolkata and presented a paper on “Bio adhesives for panel products”.

20.12.2013: Mrs. Mamatha B.S., Scientist attended and anchored the seminar on “Adoption of efficient technologies in the field of wood based panel industries” organized by IPIRTI Field Station, Kolkata.
06.02.2014-07.02.2014: Dr. S.K. Nath, Joint Director and Dr. Vipin K. Chawla, Scientist attended National Seminar on “Recent Advances on Bamboo Research and Development in India” organized by Rain Forest Research Institute (Indian Council of Forestry Research & Education) Jorhat, Assam and presented a paper entitled "Development of Bamboo Strand Lumber".


21.02.2014: Dr. S.K. Nath, Joint Director and Shri. Anand Nandanwar, Scientist attended seminar on “Applications of Canadian softwood species” at Hotel Taj West End, Bangalore.

22.02.2014-23.02.2014: Dr. Vipin K. Chawla, Scientist, Dr. S.K. Nath, Joint Director and Shri. Anand Nandanwar, Scientist attended International Bamboo Conclave & Expo-2014 at University of Agricultural Sciences, GKVK, Bangalore and made Poster presentation on “Bamboo Strand Lumber: A Wood Alternative”. And also Bamboo Products developed at IPIRTI are exhibited in the university campus.


25.02.2014: All the Scientists of IPIRTI, Bangalore attended “India wood 2014 – Expo” at BIEC, Bangalore.

28.03.2014: Ms. Sujatha D., Scientist participated in the “Entrepreneur Development Workshop” at CSIR-AMPRI, Bhopal.

Visit to Abroad:

Ms. Sujatha D., Scientist IPIRTI, Bangalore participated and presented a paper on “Green Adhesives for panel products” in the poster session at the International conference on wood adhesives 2013 held at Toronto, Canada during 09.10.2013-11.10.2013:

Industry/Organisation visits:

01.05.2013-03.05.2013: Shri. Prakash. V, Scientist visited Govt. Sawmill at Chatham, A & N Islands to inspect the layout of the sawmill and to finalize the tender document for modernization of Govt. Sawmill at Chatham.
01.05.2013-04.05.2013: Ms. Sujatha D., Scientist visited M/s. TT plyboards, Yamuna nagar to attend to the floor level problems and demonstrate the manufacture of Amino Resins.

06.05.2013-10.05.2013: Dr. Aparna Kalawate, Scientist, visited Bhabha Atomic Research Centre (BARC), Mumbai for Radiation studies under the project entitled “Utilization of radiation technology to increase the preservation quality of wood by inhibition of wood rotting fungi and Insects”.

23.05.2013: Dr. S.K. Nath, Joint Director, Dr. Vipin K. Chawla and Shri. Narasimha Murthy, Scientists visited Mundargi, Gadag to select the plantation species.

27.05.2013-28.05.2013: Shri. Prakash V., Scientist, visited Bamboo and Cane Development Institute (BCDI), Agartala for inspecting the machines procured by NCDPD and installed at BCDI.

10.06.2013-12.06.2013: Ms. Sujatha D. and Shri. Uday D.N., Scientists visited M/s. Sarda Plywood Industries Ltd., Chattisgarh with regard to the GITA due diligence site visit by the team constituted by GITA on the project ”Commercialization of the technology on the manufacture of Medium density fiber board from rice straw”.

05.08.2013-08.08.2013: Shri. Narasimha Murthy, Scientist visited to West Bengal Forest Department to provide training on wood preservation to staff members of forest department

05.08.2013: Shri. Prakash V., Scientist visited Bamboo and Cane Development Institute, Agartala to inspect the advance bamboo processing machines procured in the second phase by BCDI.

05.08.2013-06.08.2013: Shri. Amitava Sil, Officer-In-Charge, IPIRTI Field Station Kolkata and Shri. Narasimha Murthy, Scientist visited West Bengal Forest Development Corporation, Siliguri, North Bengal for giving onsite training on wood and bamboo preservation, technical assistance and valuable suggestions on timber treatment plant.

30.08.2013: Shri. Amitava Sil, Officer-in-Charge, IPIRTI Field Station Kolkata visited M/s. Green Ply Industries accompanied by one month course trainee’s as factory visit being a part of course on “Plywood Manufacturing Technology”.


17.01.2014: Dr. Ranjana Yadav, Officer In-charge, IPIRTI Center, Mohali visited M/s. Star Ply Pvt. Ltd., Jalandhar to attend floor level problem of the factory.

21.01.2014: Dr. S.K. Nath, Joint Director and Dr. V.K. Chawla, Scientist visited Talwara Forest Region, Punjab for establishing Common Facility Centre (CFC) for Bamboo.

23.01.2014: Shri. Prakash. V, Scientist and D. Ravi, Mechanic visited Kandla to have interactions with the sawmill industry technicians through Kandla Sawmill Association.


08.02.2014: Dr. S.K. Nath, Joint Director and Dr. Vipin K. Chawla, Scientist visited M/s. Hindustan Paper Mill Co-operation, Assam to study the bamboo storage and harvesting technique.


17.02.2014-18.02.2014: Dr. V.K. Upadhyay, Scientist visited Directorate General of
Commercial Intelligence & Statistics, Kolkata and met Dr. D. Sinha, D.G. and Dr. Amitava Saha, Director (Data Dissemination) for 25 years data collection on the export and import of wood based panels in India.

18.02.2014: Dr. V.K. Upadhyay, Scientist visited M/s. Century ply and M/s. Green Ply Industries at Kolkata for the data collection of production, export and import of wood based panels.


19.02.2014: Dr. V.K. Upadhyay, Scientist visited Central Statistics Office, Industrial Statistics Wing, Ministry of Statistics and Programme Implementation, Kolkata and met Shri. Sudipta Bhattacharya to get data on production of wood based panel in India for the period of 25 years.


IPIRTI – INDUSTRY INTERACTIVE MEET

IPIRTI- Industry Interactive Meet at IPIRTI Field Station, Kolkata:

A view of interactive session at Kolkata
IPIRTI Field Station, Kolkata organized one day interactive session on “Adoption of efficient technologies in the field of wood based panel industries” on 20th December, 2013 in Kolkata.

**Theme of the Interactive Session :**

- Developing technology for utilizing agro residues for making panel products to substantially reducing dependency on wood/ timber
- Development of non-toxic adhesives for production of plywood
- Development of natural fibres for reinforcement of bio-composites technological intervention for utilization of fast growing plantation species
- Energy efficient and reduced effluent based production process
- Enhanced service life for panel materials made out of plantation grown timbers
- Cost effective and environment friendly technology
- Human resource development training for factory works manager to improve product quality
- Life cycle analysis of panel products
- Bamboo based housing system
- Enhancement of service life of panel products by eco - friendly preservatives
- Minimizing formaldehyde emission level in composite products
- Core competence and expertise to handle almost any R & D problem in the field of wood and wood based panel products.

Dr. S.K. Nath, Joint Director, IPIRTI welcomed the gathering followed by inaugural address by Chief Guest Shri Ujjwal Bhattacharya, IFS, PCCF, Government of West Bengal. Shri. K. Anbarasu, Deputy Director General (Eastern Region), Bureau of Indian Standards also gave valuable speech who was also the Guest of Honour of the session. Finally, Shri. K.S. Reddy, IFS, Director, IPIRTI graced the inaugural session with thought provoking address. After the inaugural session, Scientists from the institute gave presentation on the above theme in technical session:

(a) “Problems related to processing of timber and technological solution” by Shri. Uday D.N. Scientist, IPIRTI, Bangalore
(b) “Bio adhesives for panel products” by Ms. Sujatha. D, Scientist, IPIRTI, Bangalore
(c) “Advances in testing of panel products for wider applications” by Shri. Anand Nandanwar, Scientist, IPIRTI, Bangalore
(d) “Bamboo composite based housing system for disaster prone areas” by Shri. Amitava Sil Officer In-Charge, IPIRTI Field Station Kolkatta
(e) “Low or no formaldehyde emission wood adhesive technology for wood based panel industry” by Shri. S.C. Sahoo, Scientist IPIRTI Field Station Kolkatta
Total 50 participants from different Plywood factories, Government organization, Educational institutes, Resin manufacturers attended the meet.

5.5 Visit of Dignitaries:

17.06.2013: Shri. Arun Mukhopadhaya, Divisional Manager, West Bengal Forest Development Corporation visited IPIRTI Field Station, Kolkata and met Officer-In-Charge regarding preservative treatment of logs and bamboo in Salugura, North Bengal.

30.09.2013: Dr. R. N. Ray, Director, Dr. J. Chaudhuri, M/s. GTZ (India) Pvt. Ltd, Kolkata visited IPIRTI, Field Station Kolkata and discussed with Shri. Amitava Sil, Officer-In-Charge regarding efficacy study of the preservative developed for application in the manufacture of panel products.

26.11.2013: Shri. Rajesh Mundra, Managing Director, M/s. Allied Resins & Chemicals Ltd., Kolkata visited IPIRTI Field Station, Kolkata for discussion regarding sponsoring a project.

04.12.2013: Mrs. Sudha Bagde, Director, M/s. Trades-India International, Kolkata visited IPIRTI Field Station, Kolkata for discussion regarding sponsoring a project.

16.12.2013: Shri. Dr. J. Chaudhuri, GTZ (India) Pvt. Ltd., Kolkata visited IPIRTI Field Station, Kolkata for discussion with Shri. Amitava Sil, Officer-In-Charge regarding sponsored project proposal on Efficacy study of their preservative developed for application in manufacture of panel product

12.02.2014: Shri. Praveen Kumar, Joint Director, BIS, Mohali visited IPIRTI Centre, Mohali along with delegates from Asia and Africa.
6. STATUTORY MEETINGS

6.1 Board of Governors Meetings

120th Meeting of the Board of Governors of IPIRTI

120th Meeting of the Board of Governors of IPIRTI, held on 29th July 2013 at IPIRTI, Bangalore. The meeting was chaired by Dr. V. Rajagopalan, IAS, Secretary to Ministry of Environment, Forests and Climate Change, Govt. of India.

121st Meeting of the Board of Governors of IPIRTI

121st Meeting of the Board of Governors of IPIRTI, held on 26th February 2014 at MoEF&CC, New Delhi. The meeting was chaired by Dr. V. Rajagopalan, IAS, Secretary to Ministry of Environment Forests and Climate Change, Govt. of India, New Delhi

6.2 57th RAC Meeting of IPIRTI, Bangalore was conducted on 10th April 2013

Dr. C.N. Pandey, Director, extended a hearty welcome to Shri. Sajjan Bhajanka, Chairman of RAC. He thanked the chairman for sparing his valuable time and making it convenient to preside over the Meeting. He said that 57th RAC is the first meeting of the newly constituted committee (2013-2017) and welcomed all members present at the meeting. He also welcomed Dr. Selvarajan, scientist from NAL, Bangalore and Dr. R. N. Kumar, ex-scientist of IPIRTI who were attending the RAC meeting as invitee. Dr. Pandey then requested all members to introduce themselves.

In his introductory speech Dr. Pandey briefed the activities of the Institute which is serving the industry for last 50 years. R&D work of IPIRTI has brought the panel industry to international standard. Research on utilization of fast growing timber, agro and forest residue for panel product
has given a new direction to panel industry. Institute takes up the research work based on the problems identified by the industries. He said that IPIRTI conducts ‘IPIRTI- Industry Meet’ almost every year with the southern and northern panel industry to listen their problems and to share the knowledge also and this forms the basis in formulating research projects. This Institute is actively involved in formulation of standards for panel products. He said that extension is very important activity in R&D work and Institute is trying to disseminate its technological innovation to the industry. This is the time to focus on those R&D works which could serve the industry in a better way.

He informed the Committee that there are going to be 12 new project proposals which have to be critically analyzed for this year without any bias. He stressed that Institute projects are very important because it serves the mandate of the Institute whereas Sponsored projects are taken up based on the sponsor need.

**Introductory remarks by the Chairman**

Shri.Sajjan Bhajanka, Chairman, RAC, extended hearty welcome to all the members present at the meeting and also wished everyone a very fruitful Indian New Year. He said that as Dr.Pandey informed that this meeting is very important to critically review the new projects to be submitted by the scientists. He informed about the problems faced by the industry in importing the timbers and opined that IPIRTI, FRI and Industry have to work together to identify new species for plywood manufacture.
He said that there is a need to develop environment friendly technology to manufacture panel products, for example, low formaldehyde emission panel products, eco-friendly preservative chemicals, etc. He also stated that this is the only Institute in India, where R&D work is based on wood science and technology and more particularly panel product technology. He appreciated the close relation of IPIRTI with industry and said that research work of IPIRTI has always been guided by the need of the panel industry.

With the permission of the Chair, technical session began.

**Technical Session**

Initiating the technical discussions, Dr. Nath, Joint Director, informed the RAC that all research projects are industry driven and have been taken up based any one of the following themes.

- On the Consumption and Production of Wood Based Panels
- Process and Product Development to Minimize Occupational Health Hazards and Environmental Impacts
- Development of Bio-Adhesives and VOC Emission Free Binder for Panel Products
- Development of Non-Formaldehyde Adhesives for Wood Bonding
- Development of Surface Coating Polymer for Panel Products
- Development of Fire Retardant Composites/Panel Products
- Development of Bio Fiber Reinforced and Wood Plastic Composites
- National Information on the Consumption and Production of Wood Based Panels
- Process and Product Development to Minimize Occupational Health Hazards and Environmental Impacts
- Application of Nano-Technology in Panel Products
- Energy Auditing, Carbon Footprint and LCA study on Wood and Bamboo Based Panel Products
- Formulation of Standards at par with International Standards for Plywood and Panel Products
- Eco-Friendly Preservative for Panel Products Alternative to the Existing Practice
- Development of Knock-Down Housing for Natural Disaster Regions

After this, Agenda of the Meeting was taken up.

1.0 To note and record the Minutes of the 56th meeting of RAC held on Wednesday the 24th May, 2012, at the Conference Hall of IPIRTI, Bangalore.

The Minutes as approved by the Chairman of the meeting were circulated to all members vide letter No. JD/56th RAC/1049 – 1069/2012 dated 15.06.2012. No comments were received.

The Committee accepted the minutes of 56th RAC.
Overview of Research activities during the reporting period:

2.1. **Research Projects: Dr. Nath presented a brief report on the progress of the research, training and other activities of the institute.**

There were in all 45 projects since last RAC meeting held on 24-05-2012 of which 35 projects were funded by the Institute and 10 projects sponsored by various organizations. The 5 projects cover panel product development from plantation wood, bamboo, rice husk, wheat straw, bagasse, process development for manufacture panel products and development of bio-adhesives, assessing formaldehyde emission from panel products and remedial measures, technology for development of fire retardant door, bamboo based housing system to resist earthquake and other natural disaster, development of new and alternative test methods for panel products and enhancement of service life of panel products using environment friendly preservative, development of coating material for wood and other panel products. Emphasis was given to meet R & D need of the industry, develop wood alternative from bamboo and other lignocellulose material and process development where mass employment generation could be created. Keeping in view the growing consciousness about harmful emission of formaldehyde and other organic volatile compounds from panel materials among users, projects were taken to develop adhesive system with reduced emission. Attention has also been given for development of MDF and end-use product from panels based on agro and forest residue. Field application through demonstration of the process/product output in the factory was taken up in project mode for rapid implementation. Study on energy auditing in production of panel products, life cycle analysis of panel products have been undertaken.

Of the 35 Institute funded projects, 6 were completed and 4 reports published. Twelve new projects were placed before RAC for approval.

2.2 **Projects for discontinuation and merger other projects:**

i) Project WC/46/Panel/2004: “Development of fire retardant flush door” was meant to develop fire retardant door by chemical treatment of wooden strip and veneer. However significant success was not achieved and hence the project was merged with project WC/82/FR/2009: “Development of fire retardant flush door through construction concept”.

**RAC approved the merger.**

ii) WC/98/Panel/2011: Development of Tubular particle board for door infill/acoustical application. Since development/procurement of machinery from indigenous source is found to be difficult attempts are being made to collaborate with M/s. Sauerland Spanplatte who initially agreed to supply the material but so far no material has been received from them. At this stage it is not possible to continue the project. Hence may approve to discontinue the project.
**RAC approved to discontinuation the project.**

iii) NWC/99/Housing/2011: Development of pre-fabricated house using BMB and BMCS to counteract the housing problem arising due to natural disaster.

In the 56th RAC it was suggested to approach BMTPC, New Delhi, for sponsoring the project. However, no response was received from BMTPC so far. Hence the project be allowed to discontinue.

**RAC approved the same.**

**2.3. Merger of two projects:**

The following two projects:

WC/110/Resin/2012: Keratin modified urea formaldehyde resin for particle board. and

ESL/111/Resin/2012: Enhancing service life of plywood by keratin modified urea formaldehyde resin. Were placed 56th RAC when the Committee suggested combining the projects and taking up one project.

The combined project submitted before the RAC was

WC/110/Resin/2012: Keratin modified urea formaldehyde resin for particle board and plywood and study on the durability of panel products.

**58th RAC Meeting of IPIRTI, Bangalore:**

A view of 58th RAC Meeting chaired by Shri. Sajjan Bhajanka, M.D.
M/s. Century Plyboards (India) Ltd., Kolkata
58th meeting of the Research Advisory Committee (RAC) of IPIRTI held on 7th March 2014 in the Conference Hall at IPIRTI, Bangalore

Highlights of RAC Meeting:

Shri. K. S. Reddy, IFS, Director IPIRTI, welcomed the Chairman, RAC, Shri. Sajjan Bhajanka, M.D. M/s. Century Plyboards (India) Ltd., Kolkata and all the members of RAC present in the meeting. He expressed his gratitude for the Chairman’s keen association with IPIRTI and requested the RAC members to critically examine all the projects and suggest any modifications in the projects.

Shri. Sajjan Bhajanka, Chairman, RAC, welcomed all the members, scientists, bureaucrats and foresters present in the meeting.

The Chairman informed that imports of panel products have been totally stopped from China and that there is recession in Indian economy and the industries are struggling to survive. While citing the changes taking place in the country and world over, he said that now it is time to reflect on our roles. He also said that, IPIRTI should suggest import substitution and some cheaper cost effective technologies to develop environment friendly products, which are the need of the hour.

Technical Session:

Dr. Nath, Joint Director, welcomed all the members present in the meeting. He made a power point presentation on the progress of work since last RAC meeting.

With the permission of the Chair the Agenda items were taken up for discussions.

Out of the 37 Institute funded projects, 12 projects have been completed and 5 Research Reports are published, 3 project reports are under publication and 4 project reports are under vetting.

Out of 13 Project Proposals submitted, only following 10 project proposals are approved in the RAC Meeting:

1. Development of fire retardant composite products
2. Development of wood plastic composite
3. Development of suitable preservative treatment process for wood-based composites with supercritical co2 impregnation system
4. Investigation on the susceptibility of various panel products to wood-deteriorating biological agents
5. Development of particle board and fibre board from Cassava stem and sun flower stalk (Resubmission)
7. Study on the physical and mechanical properties of strands obtained by disintegration of bamboo strip for manufacture of moulded product.
8. Selection criteria and optimization of parameters of wooden frames used in Fire rated doors of different ratings.
9. Study on the effect of density variation through thickness on properties of three layer particle board.

The following new sponsored projects were placed before RAC for ratification:
1. A study on efficacy of Nano Inorganic Antimicrobial material in manufacture of panel products as wood preservative.
2. Efficacy study of Booster Additive as an extender for phenolic and amino resins for manufacture of plywood.
3. A study on efficacy of new herbal wood preservative chemicals against termites.
4. Weathering Studies on solid wood. (collaborative project).
6. To Study the Techno-Economic Feasibility for the Development and Commercialization of Particle Board from Jute Sticks.
7. Establishment of process for Bamboo Strand Lumber and common facility centre at foot hills of Shivalik, Talwara Forest (Hoshiapur)-Punjab.
8. Polyurethane based adhesives for bonding wood based products.

The technical session concluded with the presentation on the progress of ongoing projects by the concerned scientists.

Dr. S.K. Nath, Joint Director, IPIRTI extended the vote of thanks.
ORGANIZATION

The need for a Research and Development infrastructure for wood and wood based panel industries in the country was recognized in early sixties. It was necessary to pursue the chosen path for management of natural resources consistent with the overall strategy for national development for a developing country like India which has abundant natural forest resources. The Indian plywood Manufacturers’ Research Association (IPMRA) was formed in 1962 as a cooperative research laboratory under the umbrella of Council of Scientific and Industrial Research (CSIR) for undertaking applied research on PLYWOOD, an important wood based panel material.

The Institute was re-designated as Indian Plywood Industries Research Institute in 1970 and its administrative control was transferred to the Ministry of Industry in 1978.

Realizing the need for trained manpower for wood based panel industries, training facilities in Mechanical Wood Industries Technology were established during 1988 with the assistance of Food and Agriculture Organization (FAO)/United Nations Development Programme (UNDP)/Government of India (GOI).

As recognition to the greater role of the Institute in conservation of natural resource, the administrative control was transferred to the MoEF&CC in 1990.

As a reflection to its premier position in training for Mechanical Wood Industries Technology as a centre of excellence, the name of the Institute was changed to Indian Plywood Industries Research and Training Institute in 1992.

The PGD (Post Graduate Diploma) Course on Mechanical Wood Industries Technology was redesigned & re-named as PGDC on Wood & Panel Products Technology.

In the year -2012, IPIRTI entered the 50th glorious year of its yeoman service to the nation in the field of Research & Development and Training on Wood & Wood based Panel Sector. To commemorate this Golden Jubilee Year of IPIRTI, an International Conference was organized during 26th - 28th September, 2012.

STATUS

The Institute is a Society registered under the Karnataka Societies Registration Act, 1962; Union Minister for Environment & Forests is the ex-officio President of the Society. Statutory members include Secretaries to Government of India in Ministries of Environment & Forests, Agriculture, Science & Technology, Planning, Director General of Forests, Chief Secretary, Government of
Karnataka, Director General, ICFRE and nominations of scientific organizations like CSIR and regulatory bodies like BIS. Membership is also open to industries. It is recognized (since 1989) as a Scientific & Industrial Research Organization by the Government of India under the Department of Scientific and Industrial Research Scheme, 1989.

It is also recognized (since 1999) as a nodal centre by Forest Research Institute and University, Dehra Dun for pursuing Research programme for award of Ph.D. degree.

The Institute has its headquarters at Bangalore spread over an area of about 7 hectares where the most modern R & D, testing & training facilities are housed. It has an outreach field station (FS) established in 1963 located at Kolkata. IPIRTI Centre at Mohali in Punjab was established in 2008 to cater the needs of the industry in the North West region.

**THRUST AREA**

IPIRTI’s thrust area is Conservation of Natural Forests through efficient utilization of existing wood resources & development and adoption of technologies for manufacturing wood alternates and panel products from plantation timber and bamboo including renewable fibres to meet the vital needs of our developing society.

**Mandate**

The mandate of the Institute includes Research on all aspects of production of sawn timber, manufacturing plywood and other allied engineered and reconstituted wood and lignocellulosic products, including improvement of materials, manufacturing processes, machines and appliances and conditions of work standard of factories.

Training in connection with forest product utilization for plywood industry and trade and allied industries. Imparting technical education and/or training at undergraduate, postgraduate, and/or any other level in technology of agro and forests products, adhesives and laminates, and/or synthetic finishing and manufacturing machinery.

Standardization and testing of all forest products viz. plywood, wood, timber, hardboard, particleboard, chipboard, furniture, glue-lam, compreg, doors, panel doors, block board, flush doors, veneered panels, veneers, laminated panels, composite boards, and the products of allied trade and industry.

Extension includes transfer of technology for commercialization, information dissemination through research/technical reports, quarterly newsletter, and participation in exhibition, seminars, conferences, and workshop, scientists’ visit to the industry to assist in process and product development.
VISION

IPIRTI’s vision is to become an apex institution of international repute by equipping itself with concurrent state-of-the-art technology and develop inhouse frontline expertise to be able to carry out necessary R & D towards advising and/or providing competitive consultancy to the academia as well as wood & other lignocellulosic based panel industry sector regarding the conservation of natural forests through development and adoption of efficient technologies in the field of wood and panel products from renewable fibres including plantation timbers and bamboo while meeting the vital needs of the developing society.

ADMINISTRATION

The general superintendence, direction and control of the affairs of the Institute are vested with the Board of Governors (BoG). The Research Advisory Committee (RAC) constituted by the Board of Governors finalizes research and training agenda of the institute. Composition of BoG and RAC are given in Annexure VI and VII respectively.

The Institute is headed by the Director. Research work in the Institute is carried out by a team of both experienced and young scientists with the assistance of technical staff, Research Scholars and others. The Institute has many divisions, viz., Timber Identification and Preservation, Adhesive Technology, Process Development Engineering, Saw Milling and Saw Doctoring (PDES), Product Application (PA), Training and Information Technology. In order to give more focused attention on the utilization of bamboo resource as well as testing and standardization and extension activities, Centre for Bamboo Development (CBD), Centre for Testing and Evaluation of Wood Composites (CENTEC) and Extension Division were created.

IPIRTI FIELD STATION, KOLKATA

This outreach field station was established in the Year 1963 and equipped with research & development, training and testing facilities related to adhesives, plywood and other panel products. IPIRTI field station, Kolkata is also a recognized BIS laboratory under BIS lab recognition scheme, specialized laboratory category. Mechanical
and Chemical testing labs of IPIRTI Field has got NABL accreditation this year.

**IPIRTI CENTRE, MOHALI, PUNJAB**

The Indian Plywood Industries Research and Training Institute (IPIRTI) Centre (IPIRTI-CENTRE) at Mohali (Chandigarh) was established on 11/3/08 as a joint venture of Indian Plywood Industries Research and Training Institute (IPIRTI), Bangalore, an autonomous body of the Ministry of Environment, Forests and Climate Change, Government of India, Department of Industries and Commerce (DIC), Govt. of Punjab and Northern India Plywood Manufacturers Association (NIPMA) for serving the needs of wood based industries in the Northern Region. IPIRTI Centre is a specialized laboratory got recognized by the Bureau of Indian Standards (BIS) under the Laboratory Recognition Scheme. It is fully equipped with the latest test equipment and is manned by trained personnel so as to facilitate testing of wood and wood based panel products as per relevant Indian and other National Standards besides providing solutions to the floor level problems of the industries in the region and upgrade skills of technical man-power through short-term courses on manufacture and testing of wood based panel products.
ANNEXURE II

INDIAN PLYWOOD INDUSTRIES RESEARCH AND TRAINING INSTITUTE
(AN AUTONOMOUS BODY OF THE MINISTRY OF ENVIRONMENT, FORESTS AND CLIMATE CHANGE)

UNION MINISTER FOR ENVIRONMENT, FORESTS AND CLIMATE CHANGE, PRESIDENT, IPIRTI SOCIETY SOCIETY

SECRETARY, MoEF&CC, GoI, CHAIRMAN, BOARD OF GOVERNORS

DIRECTOR

HQrs. AND MAIN LABORATORY, BANGALORE
- Timber identification and preservation
- Adhesive Technology
- Process Development, Engineering, Sawmilling and Sawdoctering
- Product Application
- Information Technology

FIELD STATION, KOLKATA
- CBD
- CENTEC
- Extension
- Training
- Administration

IPIRTI CENTRE, MOHALI
- Testing
- Training
- Extension
- Research
INFRASTRUCTURE FACILITIES

The Institute has multifarious infrastructure facilities for carrying out investigations and conducting experiments at laboratory levels and trials at pilot scale levels simulating conditions existing in factories in the field of wood, plywood and other panel products from lignocellulosic materials. These facilities help in effective implementation and easy adaptation of technologies developed at the Institute by the Industries.

PLYWOOD PLANT

The plywood plant comprises of machinery for manufacture of plywood and other wood based panel products of commercial size, established under FAO/UNDP/Govt. of India project. The important machines in the plant are Peeling lathe, Veneer Slicer, Clipper, Dryer, Guillotine jointer, Splicer, Core Composer, Glue Spreader, Glue applicator, Pre-press, Hot presses, Trimming machine, Sander, etc.

SAWMILL

The sawmill is well equipped with machines for sawing timbers of any size, including plantation timbers of small girth. Kiln seasoning plant for sawn wood is also installed for training for mechanical wood industries technology. The main machines in the mill are Band Headrigs, Band re-saws, Narrow band saw machines, Edgers, Multiple rip saw machine, Cross-cut machines, Thickness planer, Four side planer, Vertical spindle moulder, etc.

FINGER-JOINTING AND EDGE LAMINATION

In this set up, facilities are available for finger-jointing of timbers especially wood sections from short length and small girth plantation timbers and for producing timber of wider size by edge
lamination techniques and for making beams by gluelam techniques. The vital machines in the section are Finger-shaping machine, Finger-gluing machine, Finger-pressing machine, Pneumatic clamp carrier, etc.

**SAWDOCTORING**

The servicing and maintenance work for tools used in wood working machines such as knives, saws, cutters are carried out in saw-doctoring shop which was set up under FAO/UNDP/Govt. of India funded project for training purpose and it is one of the largest in South East Asia. The important equipment installed in saw-doctoring are Leveling and tensioning machines, Band saw and Circular saw sharpening machines, Satellite tipping machines, Tungsten carbide Tipping and Grinding machine, Cutter grinding machines, MIG welding machine, Brazing equipment, Grinders for Peeling knife and Planer knife etc. These facilities are also open to Industries for servicing of wood cutting tools.

**CENTRE FOR BAMBOO DEVELOPMENT (CBD)**

The centre has machinery for primary processing of bamboo and machines for developing bamboo laminates and bamboo mat based panel products. The main machines concerned with these activities are Bamboo cross-cutting machine, Bamboo splitting machine with knife and circular saws, two side planer, four side planer, Slivering machines, Bamboo mat corrugated press, Bamboo laminate press, External Knot Removal machine, Splitting machine, flattening cum Internal Knot Removal machine, Edge Cutting machine etc.
MAINTENANCE WORKSHOP AND CARPENTRY SHOP

The Institute has a maintenance workshop for taking care of repair and maintenance works of machines installed in various plants and mills and also for fabrication of small equipments, instruments, jigs, fixtures, accessories etc. There is a carpentry shop which caters to the development of furniture, joinery and other housing components as needed under different R&D projects. The test specimens as per BIS standards required for testing various types of panel products are also prepared in the carpentry shop.

ADHESIVE TECHNOLOGY LAB

The lab has facilities to undertake development of synthetic resin system, evaluation of resin characteristics, testing of resin as per relevant BIS standards, analysis of raw materials used in resin preparation and preservative chemicals etc. The main equipment available in the lab are Resin reactors, Brookfield viscometer, pH meter, High Pressure Liquid Chromatography (HPLC), Humidity chamber, Differential Scanning Calorimeter(DSC), Atomic Absorption Spectrometer (AAS), Formaldehyde Emission Testing Chamber, Liquid Chromatography Mass spectrometer (LCMS) etc.
FORMALDEHYDE EMISSION TEST CHAMBER

Formaldehyde Emission Test Chamber has been established and the emission testing of particle board and plywood of 1m² surface area as per the international standards requirements EN 717-I and ISO/DIS 12460-1 can be carried out.

MECHANICAL TESTING LAB (CENTEC)

Facilities are available in the lab for testing wood, plywood and other panel products from lignocellulosic materials as per relevant BIS specification.

The major equipments are UTM [25T, 10T, 5T, 2T], Door testing equipment, Temperature & Humidity control chamber for door testing, Ovens, Hot water bath, Vacuum pressure test apparatus, NDT equipments such as Modulus sonic and ultrasonic equipments, Abrasion tester, Acoustic Pulse
Tester, Shear/Scratch Tester, Fire resistance test apparatus, Thermal conductivity apparatus, Rockwell Hardness Tester, Digital Multigloss meter, etc.

**SHEAR/SCRATCH TESTER**

Scratch tester is specialized equipment used to measure the relative resistance or susceptibility of a material surface to shearing, gouging, scratching, scraping, and engraving and other physical damage not classified as ordinary wear.

**DIGITAL MULTI GLOSS METER**

The facilities have been established at IPIRTI for testing glossiness of surfaces suitable for laminates, overlays and films used by panel and other industries and is ideally suited for measuring flat, non-textured surfaces.

Gloss measurement is essential where an aesthetic appearance of the coating/finish is required and it is measured at an angle of 20°, 60° or 85°.

**TEMPERATURE AND HUMIDITY CONTROL CHAMBER (CLIMATIC CHAMBER)**

The facilities have been established at IPIRTI for measuring the dimensional changes caused by temperature and humidity for different kinds of wooden door shutters. At a time 6 doors can be accommodated in the chamber and can simulate the conditions inside the chamber mentioned as per IS 4020 (part 12). Temperature & Humidity Controlled Chamber works at temperature range of 10° C to 85° C and humidity 20 to 95 % RH, can be operated through a direct LAN connecting through Ethernet port.
TIMBER IDENTIFICATION & WOOD PRESERVATION

The lab has facilities to take up investigations on preservatives for protection of wood and other panel products from Fungi, Borers, Termites, etc. It has also facilities for wood identification. The important equipments available are Incubation chamber, Humidity chamber, Ultraphot microscope, Binocular microscope, Microtome, etc.

In addition, for large scale application of preservatives, vacuum/pressure impregnation plant and Boucherie process plant are also available for research and training.

COMPUTER IMAGING DIGITAL MICROSCOPE WITH IMAGE ANALYSIS SOFTWARE SYSTEM

Facilities have been established at IPIRTI for Identification of wood samples by studying wood anatomical feature using computer imaging digital microscope with image analysis software system.

STEREOMICROSCOPE WITH IMAGE ANALYSIS SOFTWARE SYSTEM TO IDENTIFY THE WOOD SAMPLES

A facility has been established at IPIRTI, Bangalore for identification of wood samples by studying wood anatomical structures using...
computer imaging digital microscope with image analysis software system by a new stereo discovery stereomicroscope. This digital microscope has Stereo discovery V 20 zoom optics with SYCOP control panel. This is very much useful to identify the wood samples without cutting into thin sections.

PARTICLE BOARD PLANT

Particle board is an alternative panel to plywood. Manufacture of particle board can be done with any type of wood and other lignocellulose material and conversion ratio is higher than plywood.

Pilot Plant for Particle board serves many purposes: (1) The plant of 1 ton per day capacity is set up with entirely indigenous machinery which will encourage the industry to set up bigger plant with indigenous machinery. (2) Exploration of the suitability of various timber species, soft and hard for particle board manufacture. (3) Development of suitable adhesive with low formaldehyde content and standardize process parameters. (4) HRD through training for supporting the industry. (5) R & D for product development.

SHORT CYCLE LAMINATING PRESS

A Short cycle laminating hot press of 1200 Tons capacity and 2.6 mx1.4 m platen size with conveyor system was installed in the Pilot Plant for laminating panel products.

WIDE BELT SANDER

A three head Wide belt sander specially designed to calibrate Particle board for obtaining smooth surfaces and thickness uniformity of panel size 1330 mm x 2500 mm and panel thickness of 2.5 mm to 150mm was installed in the pilot plant.
PILOT PLANT FACILITY FOR ULTRAFLTRATION OF BLACK LIQUOR/LIGNIN

A new pilot plant facility consisting of three columns to house three different size ceramic membrane having different molecular sieve with two stainless steel (SS) tank, of 40 liter capacity has been recently established at IPIRTI. The three vertical membrane is connected with feed pump (3HP.) The equipment is meant to fractionate chemical in mixture into definite molecular fractions by passing through micro-sieve of ceramic column. Using this equipment various molecular mixtures, present in waste black liquor was fractionated into various molecular weight range and the same were used for manufacture of adhesive for wood based panel products.

XENON WEATHER-O-METER

To upgrade the accelerated weathering studies with actual weather effect like sun spectrum with all range of irradiance, lower and higher range of relative humidity and also the rain effect, Xenon weather-o-meter was procured. The sample holding rack was modified with two racks keeping the bigger sizes of panel products from wood and other lignocellulosic materials. This higher version of accelerated Xenon Weather-o-meter is capable to generate data on simulated conditions as per all the national and international standards related to weathering.
NATURAL WEATHER STATION

Natural weather station was installed with accessories which is capable to record the actual weather datas like sun light irradiance, rain fall, temperature and wind speed. Each day data will be summarized to the server at 23.59 hours. Sample holding rack can be tilted to any degree as per choice.

PAPER IMPREGNATION PLANT

Paper impregnation plant with all accessories are available for making Film face for panel products. The working width of the plant is 1,500 mm with overall width of 10 ft and overall length of 60 ft. The plant is operated for the development of paper impregnated with different types of resins.

FIRE DOOR TESTING EQUIPMENT

The salient features of the door testing setup are the Vertical front open furnace structure with refractory bricks & ceramic wool blanket for best heat insulation. The chamber is fitted with Computer programmable Automated LPG burners, hot gas exhaust system with automated dumper, pillar mounted I beam jib crane with electric hoist, Test frame to hold door under test.
with trolley and roller skid, Thermocouple assembly with good measurement accuracy, PC based multi-channel data logger, etc.

**REFINER**

Refiner for Medium density fibre board plant installed in the Institute. Refiner is needed to make fibres for the manufacture of MDF from wood and other lignocellulosics material.

**TOXICITY MEASURING INSTRUMENT**

Toxic measuring instrument installed at IPIRTI, Bangalore has the capability to precise analyze of 14 toxic gases which are liberated when burnt from different types of panel products.

**PLANETARY BALL MILL**

In short grinding times and finest grinding results down into the nano range. Planetary ball mills are all-rounders and are suitable for wet and dry grinding of hard, medium-hard, brittle and fibrous materials. The ball mill is a key piece of equipment for grinding crushed materials, and it is widely used in production nano coatings. Presently our institute is facilitating planetary ball mill with particle size below 50nm. By using this facility we are developing fire retardant Nano coatings for wood panel which protect from fire.

**PRE – PRESS FOR PILOT PLANT**

1000 tons capacity Pre-press was installed in plywood pilot plant with automatic chain conveyor system Pre-press is also called cold-press which is used in prepress process of plywood/compreg production. This press is used for both R & D activities and training.
**LIMITED OXYGEN INDEX TESTING MACHINE**

Limited Oxygen Index is the minimum concentration of oxygen that will just support flaming combustion in a flowing mixture of oxygen and nitrogen expressed as percentage. This helps us to investigate the flammability of polymers or composites. It is particularly used to investigate the effectiveness of a fire retardant material. Higher the LOI value the safer is the material.

**FATIGUE TESTING MACHINE**

Fatigue testing machines was installed in the CENTEC Lab to evaluate the performance of panel products under cyclic loading to predict the life span of the product under repeated loading conditions. Fatigue testing machines apply cyclic loads to test specimens. Fatigue testing machine is a dynamic testing machine and can be used to simulate how a component/material will behave/fail under real life loading/stress conditions. It can incorporate tensile, compressive, bending stresses.

**LCR METER FOR TESTING OF DIELECTRIC PROPERTIES**

LCR meter was installed in CENTEC lab to study and analysis of dielectric and electrical (conductivity & Impedance) properties of wood and Bamboo based panel products. LCR meter is used to measure the inductance (L), capacitance (C) and resistance (R) of a component. Usually the specimen is subjected to an AC voltage source. The meter measures the voltage across and the current through the specimen. From the ratio of these the meter can determine the magnitude of the impedance.
NEW INFRASTRUCTURE FACILITIES ADDED DURING THE YEAR 2013-14

HOT PRESS

120 tones hydraulic hot press of platen size 600mm x 600mm was installed at the institute for pilot plant trials on MDF. The specialty of this hot press is the thickness of the panels can be well controlled within our requirement including customized controlling of temperature. Multi level pressure control with predetermined time.

BAMBOO PROCESSING UNIT

The outreach field station of this institute located at Kolkata has infrastructural facilities for mechanized processing of bamboo which is a renewable source. Bamboo in panel form is best opted to replace timber in many applications. To overcome all the limitations of manual slivering, the field station has established full fledged facilities for processing of bamboo for cross cutting, splitting, knot removal, sliver making, double side moulding, preservative treatment tank, lab scale hot press, resin applicator, resin kettle and glue mixer. To cater the need of people living in north eastern parts of India working for handicraft sectors and bamboo composite based industries, the institute now full facility to conduct special short term courses on mechanised processing of Bamboo.
ATOMIC ABSORPTION SPECTROMETER

Accurate analysis of metal components in wood preservative at PPM level can be determined using Atomic Absorption Spectrometer. Utilization of this process will not only be accurate in addition it saves the time spent in the classical method of analysis.

LIBRARY AND INFORMATION

It is a unique library with exhaustive collection of publications connected with wood and wood products for dissemination of information in wood science and technology. About 3000 bound volumes of Indian and Foreign journals published in the field of wood science and technology and more than 4000 books in relevant subjects are available for reference. The library has collections of both National and International Specifications and Code of Practices of Indian and Foreign Standards.

HOSTEL AND CANTEEN

A modern hostel and canteen are provided in the campus for comfortable stay & study for trainees of one year Post Graduate Diploma and short term courses. The rates are subsidized for the trainees.

TRAINING AND TEACHING AIDS

Class rooms with modern amenities including audio and video facilities for conducting classes for the trainees of One year PGDC and short term courses are available for training purpose.

STAFF RECREATION

In order to facilitate the recreation for scientists and other staff of the Institute, a staff recreation club is functioning which provides indoor games, reading section with magazines and novels.
## ANNEXURE IV

### ONGOING IN–HOUSE PROJECTS

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Project Title</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Establishment of Pilot Scale Facilities for R &amp; D and Training in MDF</td>
</tr>
<tr>
<td>2.</td>
<td>Polyurethane based adhesive for bonding wood and bamboo based products</td>
</tr>
<tr>
<td>3.</td>
<td>Zero Formaldehyde Emission Adhesive for Surface coating of Wood and Bamboo Based Products</td>
</tr>
<tr>
<td>4.</td>
<td>Studies on anatomical variation in plantation grown Melia dubia including selected clones of Populus deltoids and its suitability for plywood manufacturing</td>
</tr>
<tr>
<td>5.</td>
<td>Development of Fire Retardant Particle Board</td>
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<tr>
<td>6.</td>
<td>Development of Fire retardant cum Preservative Coating of Wood Based Panel Products and Bamboo Composites</td>
</tr>
<tr>
<td>7.</td>
<td>Dielectric and Electrical Properties of Wood and Bamboo Based Composite Products</td>
</tr>
<tr>
<td>8.</td>
<td>To Study the Fatigue Strength Properties of Structural grade wood panels</td>
</tr>
<tr>
<td>9.</td>
<td>Development of PUMF Resin for Plywood</td>
</tr>
<tr>
<td>10.</td>
<td>Innovative and Competitive Technology for Manufacture of Fire Retardant Wood Adhesive for Wood based Panel Products</td>
</tr>
<tr>
<td>11.</td>
<td>Flush Door with Engineered Core Infill</td>
</tr>
<tr>
<td>12.</td>
<td>Study and Analysis of Nano Coating as Fire Retardant on Wood Panel Products</td>
</tr>
<tr>
<td>13.</td>
<td>Effect of Catalyst to Achieve Lower Formaldehyde Emission Values for Wood Composites</td>
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<tr>
<td>14.</td>
<td>Statistical data analysis on the properties of wood panels to augment the quality</td>
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<td></td>
<td>Project Description</td>
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<tr>
<td>15.</td>
<td>Review of method of testing fire resistance of plywood and optimization of test procedure</td>
</tr>
<tr>
<td>16.</td>
<td>Development of Medium density Fibre board (MDF) from Plantation grown timber Species Grevillea robusta (Silver Oak) and Casuarina-Phase I</td>
</tr>
<tr>
<td>17.</td>
<td>Study on suitability of plantation grown species viz. Melia dubia for particle board manufacture</td>
</tr>
<tr>
<td>18.</td>
<td>Exploratory studies on development of nano-biocide for wood preservation</td>
</tr>
<tr>
<td>19.</td>
<td>Assessment of relative toxicity of various panel products and study the toxicity index behavior of treated and untreated wood based panel</td>
</tr>
<tr>
<td>20.</td>
<td>Development of light weight composite panel products</td>
</tr>
<tr>
<td>21.</td>
<td>Development of Medium density fiber board–Phase 1–Wheat Straw</td>
</tr>
<tr>
<td>22.</td>
<td>Study on trend analysis of wood based panels in India</td>
</tr>
<tr>
<td>23.</td>
<td>Study on suitability of Melia dubia for Laminated Veneer Lumber (LVL) manufacturing</td>
</tr>
<tr>
<td>24.</td>
<td>Evaluation of Multicomponent biocide for protection of plywood and other panel products</td>
</tr>
<tr>
<td>25.</td>
<td>Development of cement bonded fibre composite panels for housing applications</td>
</tr>
</tbody>
</table>
## ANNEXURE V

### SHORT-TERM COURSES CONDUCTED

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Courses</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A Special training course on “Sawmilling &amp; Saw doctoring and Wood working &amp; Wood finishing” was conducted for students from Kannur university, Kerala at IPIRTI, Bangalore.</td>
<td>27 May - 06 June 2013</td>
</tr>
<tr>
<td>2</td>
<td>“Resin Manufacturing” was conducted at IPIRTI, Field Station Kolkata.</td>
<td>22-24 May 2013</td>
</tr>
<tr>
<td>3</td>
<td>“Formaldehyde Emission by perforator method as per IS-13745” was conducted at IPIRTI Centre, Mohali.</td>
<td>19-21 June 2013</td>
</tr>
<tr>
<td>4</td>
<td>“Plywood Manufacturing Technology” was conducted for seven candidates at IPIRTI Field Station Kolkata.</td>
<td>01–31 August 2013</td>
</tr>
<tr>
<td>5</td>
<td>“Plywood Manufacturing Technology-II” was conducted for six candidates at IPIRTI, Bangalore.</td>
<td>15-19 July 2013</td>
</tr>
<tr>
<td>6</td>
<td>“Development of skills on Bamboo sector” was conducted at IPIRTI, Bangalore.</td>
<td>10-13 September 2013</td>
</tr>
<tr>
<td>7</td>
<td>“Testing of plywood and block board” was conducted at IPIRTI, Bangalore.</td>
<td>23-27 September 2013</td>
</tr>
<tr>
<td>8</td>
<td>“Manufacture of bamboo mat corrugated sheets” was conducted for seven candidates sponsored by M/s. Brahmaputra Forest Products Pvt. Ltd., Assam at IPIRTI, Bangalore.</td>
<td>27 November – 03 December 2013</td>
</tr>
<tr>
<td>9</td>
<td>“Low Cost And Special Resin for Manufacture of Plywood” was conducted for five candidates at IPIRTI, Field Station, Kolkata.</td>
<td>25-29 November 2013</td>
</tr>
<tr>
<td>10</td>
<td>“Testing of Plywood as per IS 303, 1328, 710 &amp; 4990” was conducted for four candidates at IPIRTI Centre, Mohali.</td>
<td>25-29 November 2013</td>
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<tr>
<td></td>
<td>Description</td>
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<tr>
<td>11</td>
<td>“Testing of Plywood as per IS 1734 (part-II)” was conducted at IPIRTI Centre, Mohali.</td>
<td>27 December 2013</td>
</tr>
<tr>
<td>12</td>
<td>“Testing of plywood and block board as per IS:303, IS:710, IS:1328, IS:4990 and IS:1659” was conducted for nine candidates sponsored by the plywood industries at IPIRTI, Bangalore.</td>
<td>6-10 January 2014</td>
</tr>
<tr>
<td>13</td>
<td>One month training programme on “Plywood Manufacturing Technology” was conducted for five candidates sponsored by plywood industries.</td>
<td>12 February – 18 March 2014</td>
</tr>
<tr>
<td>14</td>
<td>“Testing of plywood, block board and flush door” was conducted 2-28 March, 2014 for five candidates sponsored by plywood industries at IPIRTI Field Station, Kolkata.</td>
<td>2-28 March 2014</td>
</tr>
<tr>
<td>15</td>
<td>Five Days Training Programme on “Skill development of bamboo artisans” was conducted during 10-14 March 2014 at IPIRTI, Bangalore for 17 Artisans from Karnataka which was funded by National Bamboo Mission through Karnataka Forest Development Corporation, Aranya Bhavan, Bangalore.</td>
<td>10-14 March 2014</td>
</tr>
</tbody>
</table>
ANNEXURE VI

LIST OF BOARD OF GOVERNORS OF IPIRTI

Dr. V. Rajagopalan, IAS
Secretary to Govt. of India &
Chairman, IPIRTI, BoG
Ministry of Environment, Forests &
Climate Change,
Paryavaran Bhavan,
CGO Complex, Lodhi Road,
New Delhi-110 003.

The Director General (Forests),
Ministry of Environment, Forests &
Climate Change,
Paryavaran Bhavan, CGO Complex,
B Block, Lodhi Road,
New Delhi-110 003.

The Director General,
Indian Council of Forestry
Research & Education (ICFRE)
New Forest P.O.,
Dehra Dun-248 006
Uttaranchal.

Shri R. Sridharan, IAS
Principal Secretary
Government of Karnataka
Forest Ecology and
Environment Department
Room No.404, 4th Floor,
3rd Stage, M.S. Building,
Dr. Ambedkar Road
Bangalore-560 001.

Shri. S.S. Mohanty,
Additional Secretary and Financial Adviser,
Ministry of Environment, Forests &
Climate Change,
Paryavaran Bhavan,CGO Complex,
B Block, Lodhi Road,
New Delhi-110 003.

Dr. B. Harigopal,
Adviser & Head, SERC,
Min. of Science & Technology
19, Technology Bhavan,
New Mehrauli Road
New Delhi-110 016.

Shri. D.K. Agrawal,
Head, Civil Engg. Divn.,
Bureau of Indian Standards
Manak Bhavan, 9,
Bahadur Shah Zafar Marg
New Delhi-110 002.

Prof. R.S. Deshpande,
Director,
Institute for Social
and Economic Change (ISEC)
P.O. Nagarbhavi, Bangalore-560 072.

Shri Sajjan Bhajanka,
President,
Federation of Indian Plywood and Panel
Industry (FIPPI), 404, Vikrant Tower
4, Rajendra Place, New Delhi-110 008.
The Secretary,
Dept. of Industrial Policy and Promotion,
Ministry of Commerce & Industry,
Room No. 254A, Udyog Bhavan,
New Delhi-110 011.

Dr. Alind Rastogi,
Managing Director,
Tripura Forest Development &
Plantation Corporation Limited,
P.O. – Abhoynagar, Agartala,
Tripura West - 799005.

Dr. S.S. Jattan, IFS
Managing Director
Haryana Forest Development Corporation,
Bays No. 27-28, Sector-4,
Panchkula, Haryana

Shri. Moiz S. Vagh,
Managing Director,
Hunsur Plywood Works Pvt. Ltd.,
P.B. No. 2, Hunsur – 571 105.

Shri. Jaydeep Chitlangia,
Managing Director,
M/s. Sarda Plywood Industries Ltd.,
113, Park Street, North Block, 4th Floor,
Kolkata – 700 016.

Shri S. R. Mundra,
Managing Director,
M/s. Allied Resins and Chemicals Limited
(ARCL),
13 Camaac Street, 2nd Floor,
Kolkata – 700017.

Shri. S.P. Mittal,
Chairman,
16A, Shakespere Sarani,
New B.K. Market, Ii Floor,
Kolkata – 700 071.

Shri. Pushpendra Mohan,
Managing Director,
M/s. Shivhari Plywood Ltd,
44Km Stone Kashipur Road, Jaspur- 244712,
Dist.Udham Singh Nagar, Uttaranchal.

Shri. Naresh Tewari,
President, NIPMA
M/s. Venus Plywood Pvt. Ltd.,
Village Rawalli, Post Office: Nurpur,
Pathankot Road, Distt. Jalandhar (Pb.)

Shri. V.S. Raju,
President,
All India Agro Boards Association,
“Eco house”,
65/1-A, Akarshak Building,
Opp. Nal stop, Karve Road, Pune – 411 004.

Shri. R.K. Mehta,
Chairman,
M/s. Mozo Bamboo Technologies Pvt. Ltd.,
Plot No.8-2-611/10, Road No.10,
Banjara Hills, Hyderabad – 500 034.

Dr. D.N. Tewari,
President,
Utthan-Centre for Sustainable Development &
Poverty Alleviation,
18-A, Auckland Road, Civil Lines,
Allahabad – 211 001 (U.P.)
Ms. D. Sujatha,
Scientist,
IPIRTI,
Bangalore-22.

Shri. Amitava Sil,
Officer-In-Charge,
IPIRTI Field Station,
2/2, Biren Roy Road West,
Sarsuna, Kolkata – 700 061

Dr. C.N. Pandey,
Director & Member Secretary,
IPIRTI,
Bangalore-22.

Invitees

Dr. Sushil Kumar Nath
Joint Director,
IPIRTI, Bangalore.

Dr. D.K. Sharma,
DIGF (RT),
Ministry of Environment, Forests
& Climate Change,
RoomNo.113, Paryavaran Bhavan,
CGO Complex, Lodi Road,
New Delhi-110 003.

Shri. Surjit Singh,
Joint Secretary (FE),
Ministry of Environment, Forests and Climate
Change,
Paryavaran Bhavan, CGO Complex,
Lodhi Road, New Delhi-110 003.
ANNEXURE VII

LIST OF RESEARCH ADVISORY COMMITTEE (RAC) OF IPIRTI FOR THE YEARS 2013-2014

The research, development and training activities of the Institute are carried out under the supervision and with the approval of the Research Advisory Committee having following composition.

A. Institutional

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>President, Federation of Indian Plywood &amp; Panel Industries (FIPPI), 404, Vikrant Tower, 4, Rajendra Place, New Delhi – 110 008.</td>
<td>Chairman</td>
</tr>
<tr>
<td>2</td>
<td>Director, IPIRTI.</td>
<td>Co-Chairman</td>
</tr>
<tr>
<td>3</td>
<td>Director &amp; Head (Civil Engg.) Bureau of Indian Standards, Manak Bhavan, 9, Bahadur Shah Zafar Marg, New Delhi-110 002.</td>
<td>Member</td>
</tr>
<tr>
<td>4</td>
<td>Director or Nominee (Sc.F. or above) Institute of Wood Science &amp; Technology P.O. Malleswaram, Bangalore – 560003.</td>
<td>Member</td>
</tr>
<tr>
<td>5</td>
<td>Scientist F or above Department of Science &amp; Technology Technology Bhawan, New Mehrauli Road, New Delhi – 110 016.</td>
<td>Member</td>
</tr>
<tr>
<td>6</td>
<td>Prof.G.Jagadeesh Department of Aerospace Engineering, Indian Institute of Science, Bangalore – 560012.</td>
<td>Member</td>
</tr>
<tr>
<td>No.</td>
<td>Name and Designation</td>
<td>Details</td>
</tr>
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</tr>
<tr>
<td>7</td>
<td>Director or Nominee</td>
<td>Institute for Socio-Economic Change, P.O. Nagarbhavi, Bangalore – 560072.</td>
</tr>
<tr>
<td>8</td>
<td>Member</td>
<td>Dr. K.V.S.N. Raju, Scientist F, HOD, OCP Division, Indian Institute of Chemical Technology (CSIR), Uppal Road, Hyderabad – 500 007.</td>
</tr>
<tr>
<td>9</td>
<td>Member</td>
<td>DIG (RT), MoEF&amp;CC, GOI, New Delhi.</td>
</tr>
<tr>
<td>10</td>
<td>Convener</td>
<td>Joint Director, IPIRTI</td>
</tr>
</tbody>
</table>

**B. Members representing State Forest Department /Corporation :**

<table>
<thead>
<tr>
<th>No.</th>
<th>Name and Designation</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Member</td>
<td>PCCF, Karnataka or his Nominee</td>
</tr>
<tr>
<td>12</td>
<td>Member</td>
<td>PCCF, Punjab or his Nominee</td>
</tr>
<tr>
<td>13</td>
<td>Member</td>
<td>MD, Tripura Forest Development Corporation, Tripura</td>
</tr>
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</table>

**C. Representatives from Panel and Allied Industries :**

<table>
<thead>
<tr>
<th>No.</th>
<th>Name and Designation</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
<td>Name and Designation</td>
<td></td>
</tr>
<tr>
<td>-----</td>
<td>---------------------</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Managing Director, M/s. ARCL Organics Ltd., 13, Camac Street, 2nd Floor, Kolkata – 700017.</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Ms. Sujatha.D, Scientist E</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Shri. Amitava Sil, Scientist C OIC, IPIRTI, FS Kolkata.</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Shri. Pradeep Kumar Kushwaha, Scientist C, OIC, IPIRTI Centre, Mohali.</td>
<td></td>
</tr>
</tbody>
</table>

**Invitees: All Scientists of IPIRTI**
IPIRTI REPRESENTATION ON COMMITTEES/SUB-COMMITTEES OF BIS

1. **Dr. C.N. Pandey, Director**
   Chairman, Wood Products Sectional Committee CED 20
   Principal member, Timber Sectional Committee CED 9

2. **Dr. S. K. Nath, Joint Director**
   Principal member, Sub-committee, wood, other lignocellulosic based building boards and specialty wood products CED 20:6

3. **Shri. Anand Nandanwar, Scientist C**
   Alternate member, Civil Engineering Divisional Council (CEDC)
   Principal member, CED 20 Sectional Committee
   Alternate member, Timber Sectional Committee CED 9
   Principal member, Door, Windows and Shutters Sectional Committee CED 11
   Principal Member, Sub-Committee, Wood and other lignocellulosic materials based doors, Windows and shutters CED 11:1.
   Principal member, National Building Code (NBC) CED 46:P3, Panel for Building Materials
   Principal member, National Building Code (NBC) CED 46:P6, Panel for Timber

4. **Smt. D. Sujatha, Scientist D**
   Alternate member, CED 20 Sectional Committee
   Principal member, Sub-Committee, Plywood CED 20:1
   Alternate member, Sub-Committee, Building Boards CED 20:6

5. **Shri. Uday D. N., Scientist D**
   Principal member, Sub-Committee, timber terminology, conversion, seasoning, preservation, grading and testing CED 9:1

6. **Shri. Jagadish Vengala, Scientist C**
   Principal member, Sub-Committee, timber stores subcommittee CED 9:13
   Alternate Member, Door, Windows and Shutters Sectional Committee CED 11
   Alternate member, National Building Code (NBC) CED 46:P3, Panel for Building Materials
   Alternate member, National Building Code (NBC) CED 46:P6, Panel for Timber

7. **Shri. Vipin Chawla, Scientist C**
   Alternate member, Sub-Committee, timber terminology, conversion, seasoning, preservation, grading and testing CED 9:1

8. **Shri. Narsimhamurthy, Scientist B**
   Alternate member, Sub-Committee, Plywood CED 20:1

9. **Shri. M. C. Kiran, Scientist B**
   Alternate member, Sub-Committee, timber stores subcommittee CED 9:13
   Alternate Member, Sub-Committee, Wood and other lignocellulosic materials based doors, Windows and shutters CED 11:1.
LIST OF MEMBER FIRMS OF IPIRTI SOCIETY

M/s. A. B. composites Pvt. Ltd.,
1/1B/18, Ramkrishna Naskar Lane, Kolkata,
West Bengal -700 010

M/s. ARCL Organics Ltd.,
13, Camac Street, 2nd Floor,
Kolkata, West Bengal -700017

M/s. Akolite Synthetic Resins
Plot No. 192C, Industrial Area, Baikampady,
Mangalore, Karnataka -575011

M/s. Alishan Veneer & Plywood Pvt. Ltd.
46, B. B. Ganguly Street, Kolkata,
West Bengal -700 012

M/s. Ambi Ply Panels and doors
678/3, Kurumbanur, Dasanoor Post,
Mettupalyam, Coimbatore, Tamil Nadu -641305

M/s. Ambika Timber Works
NH-60, Bikna, Keshiakole,
Bankur, West Bengal

M/s. Amul Boards Pvt Ltd.
Goyal avenue, Plot No. 318,
Ward 12-B, Opp. LIC Block,
Gandhidham (Kutch), Gujarat -370 201

M/s. Anutone Acoustics Ltd.,
3A, Visvesaraya Industrial Area,
Mahadevapura, Bangalore, Karnataka -560 048

M/s. Ashit Kumar Ghosh
Chandrakona Road,
P. O. Satbankura, Dist: Paschim Medinipur,
West Bengal -721253

M/s. CLS Industries Pvt. Ltd.
120, Ist Floor, Plot No. 93,
Sector 8, Gujarat - 370 201

M/s. Century Plyboards (I) Ltd.,
6, Lyons Range, Kolkata,
West Bengal -700001

M/s. Century Plywoods,
Keeriyad, Kattampally,
P.O., Kannur, Kerala -670 015

M/s. Deekay Pine Board Pvt. Ltd.,
Plot No. 74, Ward No. 10 A,
Gandhidham (Kutch),
Gujarat -370201

M/s. Deepak Lamination
Garhi Road, Post Midania,
Lakhimpur, Kheri, Uttar Pradesh -262701

M/s. Elegant Products Pvt. Ltd.,
H. No. 1-4-6, Flat No. 301, III Floor,
Street No. 7, Bliss Apartment,
Habsiguda, Hyderabad,
Andra Pradesh -500007

M/s. Everest Ply and Veneers (P) Ltd.
288/2, Dakamarri Village,
Bheemunipatnam Mandalam, Visakhapatnam,
Andra Pradesh -531162

M/s. Feroke Boards Ltd.,
H.O. Karad, P.O.,
Malappuram DT,
Kerala - 673632
<table>
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<tr>
<th>Company Name</th>
<th>Address</th>
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<tbody>
<tr>
<td>M/s. Fine Wood Products Pvt. Ltd.</td>
<td>R.S. No 99/2 &amp; 99/3, Madukarai, Pondicherry, Tamil Nadu -605 105</td>
</tr>
<tr>
<td>M/s. G. B. Timber Industries Pvt. Ltd.</td>
<td>5, JoraBagan Street, Kolkata, West Bengal-700006</td>
</tr>
<tr>
<td>M/s. Green Timber</td>
<td>7th Mile, Chumkedima, Dimapur, Nagaland -797112</td>
</tr>
<tr>
<td>M/s. Greenply Industries Ltd.</td>
<td>Vill - Kiriparampur, P. O. Sukdevpur, Dit-24, Paraganas (S), West Bengal</td>
</tr>
<tr>
<td>M/s. Hero Plywoods &amp; Boards</td>
<td>Manchal, Kurumathur P. O, Thaliparamba, Kannur, Kerala -670142</td>
</tr>
<tr>
<td>M/s. Hunsur Plywood Works Pvt. Ltd.</td>
<td>Post Box No. 2, Hunsur, Karnataka -571105</td>
</tr>
<tr>
<td>M/s. Indian Timber Products (P) Ltd</td>
<td>Sy.No.55/A, Dundigal Air Force Academy, Narsapur Road, Annaram Village, Medak Dist, Hyderabad, Andra Pradesh -502 313</td>
</tr>
<tr>
<td>M/s. J. N. Forest Products (P) Ltd.</td>
<td>Makardah Road, Balitkuri, Howrah, West Bengal -711113</td>
</tr>
<tr>
<td>M/s. Jawahar Saw Mills Pvt. Ltd.</td>
<td>47, Mustafa Bazar, Byculla (E), Mumbai, Maharashtra-400 010</td>
</tr>
<tr>
<td>M/s. Kalyan Industries</td>
<td>Jagadhri Road, Yamuna Nagar, Haryana -135 001</td>
</tr>
<tr>
<td>M/s. Kanachur Seasoning Industries</td>
<td>N. H. 66, Kallapu, Post Permunnur, Mangalore, Karnataka -575017</td>
</tr>
<tr>
<td>M/s. Kanara Wood &amp; Plywood Industries Ltd.</td>
<td>Jeppu, Mangalore, Karnataka -575002</td>
</tr>
<tr>
<td>M/s. Kandla Timber Association</td>
<td>Timber Bhavan, Plot No. 47, Sector 8, Gandhidham, Gujarat -370 201</td>
</tr>
<tr>
<td>M/s. Lamba Timber Works Pvt. Ltd.</td>
<td>A - 37, W. H. S. Kirti Nagar, Kirti Nagar, New Delhi -110015</td>
</tr>
<tr>
<td>M/s. Laxmi Timber Industries</td>
<td>Vill - Balakuthi, Coochbehar, Kolkata, West Bengal.</td>
</tr>
<tr>
<td>M/s. Ma Tara Plywood</td>
<td>Bahadurganj Road, Kishanganj, Bihar-855107</td>
</tr>
<tr>
<td>M/s. Mackintosh Burn Ltd.</td>
<td>D-1/1, Gillander House, 8, N. S. Road, Kolkata, West Bengal -700001</td>
</tr>
<tr>
<td>M/s. Madras Chipboard Ltd.</td>
<td>Sri Bhavanam, 1089/20, P.S.K Nagar, P.B. No. 59, Rajapalayam, Tamil Nadu -626 117</td>
</tr>
<tr>
<td>M/s. Mak Plywood Industries Pvt. Ltd.</td>
<td>No. 1, The Presidency, Ground Floor Unit No. 1/8, St. Marks Road, Bangalore, Karnataka -560 001</td>
</tr>
<tr>
<td>M/s. Mangalam Timber Products Ltd.</td>
<td>Vill. - Kusumi, P. O. &amp; Dist. Nabargangpur, Orissa -764059</td>
</tr>
</tbody>
</table>
M/s. Maple Mouldings Pvt. Ltd.,
MSSIDC's, Plot No. 24,
Wood Based Industrial Complex,
At: Wada, Dist: Thane,
Maharashtra-421 303

M/s. Mars Plywood Industries Pvt. Ltd.
30, C. R. Avenue, 1st Floor,
Kolkata, West Bengal -700 012

M/s. Mayur Ply Industries Pvt. Ltd.,
NH-2, Delhi Road, P.O:Belumilki,
Via:Sheoraphully, Hooghly,
West Bengal -712223.

M/s. Merino Panel Products Ltd.,
No. 5, Alexandra Court, 60/1,
Chowringee Road, Kolkata,
West Bengal -700 020

M/s. Nefab India Pvt. Ltd.
Gat No. 519 1/4/8, 30Km Milestone,
Near Kalubai Mandir,
Golden Quadrilateral, NH-4,
Village Kelavade,Taluka-Bhor,
Dist-Pune, Maharashtra-412213

M/s. RITES Ltd.
56, C. R. Avenue, 3rd Floor,
Kolkata, West Bengal -700012

M/s. Raavela Door & Decors
A-13, Road No. 9, I.D.A., Nacharam,
Hyderabad, Andra Pradesh -500 076

M/s. Radha Krishna Ply and Board Industries
Vill. Badi Majra,
Behind Happy Dharam Kanta,
Yamunanagar,
Haryana -135001

M/s. Rama Wood Craft
11th Mile Stone, Panna Road,
Village- Bamhour, P.O. Sitpura,
Dist. Satna, Madya Pradesh-485441

M/s. S. R. Worth Ltd.,
Bijna, Madrpr, Post-Madarpur,
P. S. Bijnur, Dist. North 24 Pgs,
West Bengal -743166

M/s. Sarkar Timber Works
187, Maharshi Debendro Road,
Kolkata, West Bengal -700006

M/s. Seni Saw Mill
Vill: Paschim Dangra, P. O. & Block: Pingla,
Dist: Paschim, Midnapur,
West Bengal -721140

M/s. Shero Plywoods
Door No. AP VIII 585M,
Industrial Development Plot,
Andoor, Parassinikadavu, P.O., Kannur,
Kerala - 670 563

M/s. Shivhari Plywood Ltd.
44Km stone, Kashipur road,
Dist.Udham Singh Nagar,
Jasipur, Uttaranchal -244712

M/s. Shree Jalaram Timber Depot Pvt. Ltd.,
Agar Bazar, S. K. Bole Road, Dadar (W),
Mumbai, Maharashtra -400028

M/s. Shree Sakthi Modern Flush Door
2-C, "Riaz Garden", #29,
Kodambakkam High Road,
Nungambakkam, Chennai,
Tamil Nadu -600034
M/s. Shri Ram Panels  
Village - Shahpur, Khanna - Amloh Road, 
Mandi Gobindgarh, Punjab -147301

Shri. Shankara Krishnan  
Thejas New No. 13, Old No. 7, 
W-Block, 5th Main Road, Anna Nagar, 
Chennai, Tamil Nadu -600 040

M/s. Sleek Boards (I) LLP,  
20, LANDMARK, 4th Floor, 
Near Krishna Hospital, Kothrud, 
Paud Road, Pune, Maharashtra -411 038

M/s. Sobha Developers Ltd.,  
Division Interiors, Plot No. 09, 
JBLR, Industrial Area, 
Bommasandra, Bangalore, 
Karnataka -560 105

M/s. Sylvan Plyboard (India) Pvt. Ltd.,  
5, Nimtalla Ghat Street, 
Kolkata, West Bengal -700 006

M/s. Tara Lohia Pvt. Ltd.,  
135/1, Rajdanga Gold Park, 
Kolkata, West Bengal -700 107

12, R. N. Mukherjee Road, 
Kolkata, West Bengal -700001

M/s. The Daga Timbers Co.,  
21, Manmath Nath Ganguly Road, 
Kolkata, West Bengal - 700 002

# 4, Garden Reach Road, 
Kolkata, West Bengal -700 023

M/s. Timpack Pvt. Ltd.  
15th Mile, G. S. Road, 
Byrinhat, Meghalaya -793101

M/s. Truwoods Pvt. Ltd.  
9-19-56/3, 2nd Floor, 
C.B.M. Compound, VIP Road, 
Visakhapatnam, 
Andhra Pradesh -530 003

M/s. Uniply Industries Ltd.  
No. 5, Branson Garden Street, 
Kilpauk, Chennai, 
Tamil Nadu -600010

M/s. V. K. Patel & Co.  
G 2/3/4, Mahesh Darshan, 
Near Makhmali Talao, 
Old Agra Road, Thane (w), Mumbai, 
Maharashtra -400 601

M/s. Veneer Mills  
Plot No. 1 & 2, 5th Main, 
Yadavagiri Industrial E, 
Mysore, Karnataka -570020

M/s. Vidya Ply & Board Pvt. Ltd.,  
H. O: Gandhiganj, Shahjahanpur, 
Uttar Pradesh -242001

M/s. West Bengal Forest Development Corporation Ltd.  
6A, Raja Subodh Mallick Square, 
Kolkata, West Bengal -700 013

M/s. Yash Plywood Pvt. Ltd.,  
Agra Bye Pass Road, Manipuri, 
Uttar Pradesh -205001.
ANEXURE X

SERVICES OFFERED BY IPIRTI TO MEMBER INDUSTRIES

1. Preference in providing trained manpower to the plywood and panel industries through One year Post Graduate Diploma Course and Short term Course.

2. Arranging Training and education for the candidates sponsored by the factories through regular short term vocational courses as well as specially conducted courses as per the request of sponsors.

3. Providing solutions to common problems of the industries and their needs through regional workshops/meetings. A free visit to the member firms in the region will be made after the workshop by a group of scientists to solve their floor level problems.

4. Extending technical support services related to processing and production of plywood in the form of Telephonic advice or direct contact, through correspondence, or visit to factories, etc., are provided.

5. Granting concession to member firms in testing and training fees.

6. Focusing the problems and needs of the industries in R&D projects.

7. Formulating Specifications for the new products developed by the industry and issue of draft amendments to existing standards.

8. Highlighting the problems of the industry at Ministry/Government level.

9. Undertaking sponsored projects given by the factory for their process and product development.

10. Enlightening the Members as well as non-Members from the Wood and Wood-based Industries regarding the significant achievements and other important events conducted in the Institute during the quarter, as well as research and training planned for the following quarter, through Quarterly IPIRTI News.

11. Furnishing references of the selected articles on wood and wood products chosen from a wide range of National/International Journals which are of interest to the user groups are provided as “Wood Products Research Update” through e-mail service (E-mail ID to be provided by the interested users). In addition, direct web links have also been provided for more detailed information.
We have audited the Balance Sheet of “Indian Plywood Industries Research & Training Institute” # 2273, Tumkur Road, Bangalore -22. as at 31st March 2014 and the Income and Expenditure Account for the year ended on that date, and a summary of significant accounting policies and other explanatory information annexed thereto.

Management’s responsibility for the financial Statements

This executive Committee Members of Indian Plywood Industries Research & Training Institute responsible for the Preparation of these financial statements in accordance with the requirements of Karnataka societies Registration Act, 1960. This responsibility includes the design, implementation and maintenance of Internal control relevant to preparation of the financial statements that are free from material misstatement, whether due to fraud or error.

Auditor’s Responsibility

Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with the Standards on Auditing issued by the Institute of Chartered Accountants of India. Those standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures the financial statements. The procedures selected depend on the auditors judgment, including the Assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessment, the auditor considers internal control relevant to the Associations preparation and fair presentation of the financial statements in order to design
audit procedures that are appropriate in the circumstances, An audit also includes evaluating the appropriateness of accounting estimates made by the management, as well as evaluating the overall presentation of the financial statements.

**Opinion**

In our opinion and to the best of our information, and according to the explanation given to us, the said accounts read with the schedules and notes thereto, are prepared, in all material respects, in accordance with the Karnataka Societies registration Act, 1960 and give true and fair view:

1. In case Balance sheet, of the State of Affairs of the above named Institute as at 31st March 2014.
2. In case of the Income and Expenditure Account, of the surplus, being the Excess of Income over Expenditure of its accounting year ended 31st March 2014.

FOR S.R.R.K.SHARMA ASSOCIATES
Chartered Accountants

Sd/-
H.R.Ramaswamy
Partner,
Membership No. 207116

Place : Bangalore
Date : 29.09.2014
ANNEXURE-I

TO THE AUDIT REPORT DATED 29TH SEPTEMBER 2014

1. Institute Funds are utilized for purchase of Special Machineries for use of research purposes. Internal controls measures for purchase of fixed assets needs to be strengthened getting. For example, the viability of the Machinery and the projects may be got scrutinized by a committee of Experts.

2. Accounts are generally maintained on Accrual Basis.

3. Institute has during the year ended 31st March 2014 received grants from Government of India of Rs. 5,79,00,000/- and Rs. 1,72,50,000/- towards Plan and Non Plan Expenditure respectively.

4. Fixed Deposits with Banks reconciled and unreconsiled and interest of earlier year have been Accounted.

5. TDS effected on testing charges receive by the institution is accounted as per information provided to us.

FOR S.R.R.K.SHARMA ASSOCIATES
Chartered Accountants

Sd/-
H.R.Ramaswamy
Partner,
Membership No. 207116

Place : Bangalore
Date : 29.09.2014
NOTE NO.25 & 26  
SIGNIFICANT ACCOUNTING POLICIES AND ON ACCOUNTS:  
OVERVIEW


It is registered under section 12A (a) of the Income Tax Act, 1961, Vide no.DIT(E)/12a/Vol.III/T-168/W-2/02-03 dated 06.01.2003  

GOVERANCE

The Executive Committee has the overall responsibility for the general control, administration and management of the activities of the association. The responsibility is joint and several. The internal control system in operation provides reasonable assurance against errors frauds.

SIGNIFICANT ACCOUNTING POLICIES

Basic of Preparation of Financial Statements

The financial statements are prepared and presented under the historical cost convention on the cash basis of accounting, unless otherwise stated elsewhere.

1. Revenue Recognition
   a. Life Membership fees received is credited to send fund. This practice has been followed by the Society consistently from the past.
   b. Interest on term Deposits held as investments is recognized on accrued basis.
   c. Interest on SB Accounts is recognized as income when received.

2. Expenses  
   All expenses are accounted on accrual basis

3. Allocation/Transfers to restricted funds
   a. The Society has a policy to allocate/transfer interest to Restricted Fund Accounts to recognize the amount received attributable to those Funds like Research Growth Fund, Upgradation of Scientist Skills Fund
b. Allocation/Transfer of interest to restricted funds are made on the basis of Proportionate interest attributable to the balance standing in the respective fund account at the end of the year.

c. The practice to allocate/transfer interest to the Restricted funds has been consistently followed by the Society from the past.

4. Prior Period Items

Prior period items, being any income or expense, which has arisen in the current period as result of errors or omissions in the preparation of the financial statements of one or more prior periods are recognized as and when they are noticed and shown separately.

5. Fixed Assets

a) The fixed assets have been capitalized at acquisition cost, with all identifiable Expendifiable expenditure incurred to bring the asset into present condition.

b) The assets acquired for specific usage are accounted as its full value.

6. Depreciation

Depreciation has been provided on the fixed assets except on land on written Down Value basis in accordance with the rates prescribed under Income Tax Act, 1961 read with Income Tax Rules 1962.

7. Investments

Investments amounting to Rs. 17,61,54,911/- and other investments to Rs.2,32,77,000/- towards R & D Growth Fund has been classified in Term Deposits under investment.

8. Income Tax

The Society is registered under Section 12(a) of the Income Tax Act, 1961 and hence no provision has been made towards income tax.

9. Provision, Contingent Liabilities and Contingent Assets

A Provision is recognized when the Society has present obligation as a result of past event; it is probable that an outflow of resource will be required to settle obligations, in respect of which a reliable estimate can be made.

Contingent Liabilities, if any, not provided for are disclosed by way of Notes.

Contingent Assets are neither recognized nor disclosed.

Provision, Contingent Liabilities and Contingent Assets are reviewed at each Balance Sheet date.
NOTES FORMING PART OF ACCOUNTS AS ON 31-03-2014

1. The balances as reflected in the Balance Sheet as at 31st March 2014 of Receivables, Payables, Loans and Advances and Deposits, are subject to confirmation and subject to any adjustments And reconciliation after confirmation.

2. In the opinion of the Director, the amounts shown in the Balance Sheet are reflected at their realizable values, unless stated otherwise.

3. Contingent Liability – Nil (Previous Year – Nil)

4. Miscellaneous Provision
   Establishment charges provision amounting to Rs. 4,82,57,961/- provided for the year.

5. The Director/Administrative Officer has assessed the Fixed Assets for any impairment as on 31.03.2014 and has concluded that there has been no significant impairment in any of the Fixed Assets that needs to be recognized in the books of accounts.

6. Figures have been rounded off to nearest rupee value.

7. Previous year figure have been regrouped /rearranged to be in conformity with the current years’ presentation.

FOR S.R.R.K.SHARMA ASSOCIATES
Chartered Accountants

FOR INDIAN PLYWOOD INDUSTRIES
RESEARCH TRAINING INSTITUTE

Sd/-
H.R.Ramaswamy
Partner,
Membership No. 207116

Sd/-
Dr.B.N.Mohanty
Director

Place : Bangalore
Date : 29.09.2014
# Form of Financial Statements (Non-Profit Organisation)

## Indian Plywood Industries Research and Training Institute

### Balance Sheet As At 31.03.2014

<table>
<thead>
<tr>
<th>Corpus/Capital Fund and Liabilities</th>
<th>Schedule</th>
<th>Current Year</th>
<th>Previous Year</th>
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<tbody>
<tr>
<td>Corpus/Capital Fund</td>
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<td>373857379</td>
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<tr>
<td>Reserves and Surplus</td>
<td>2</td>
<td>5253963</td>
<td>4626415</td>
</tr>
<tr>
<td>Earmarked/Endowment Funds</td>
<td>3</td>
<td>47655</td>
<td>49455</td>
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<tr>
<td>Secured Loans and Borrowings</td>
<td>4</td>
<td>15855831</td>
<td>12404573</td>
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<tr>
<td>Unsecured Loans and Borrowings</td>
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<td></td>
<td></td>
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<tr>
<td>Deferred Credit Liabilities (Deposit Received)</td>
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<tr>
<td>Current Liabilities and Provisions</td>
<td>7</td>
<td>4056788</td>
<td>3866339</td>
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**Total**  
399071617  
383638892

### Assets

<table>
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<tr>
<th>Assets</th>
<th>Schedule</th>
<th>Current Year</th>
<th>Previous Year</th>
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<tbody>
<tr>
<td>Fixed Assets</td>
<td>8</td>
<td>158,854,315</td>
<td>174156018</td>
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<tr>
<td>Investments- From Earmarked/Endowment Funds</td>
<td>9</td>
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<td></td>
</tr>
<tr>
<td>Investments- Others</td>
<td>10</td>
<td>199431911</td>
<td>200261987</td>
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<tr>
<td>Current Assets, Loans, Advances etc</td>
<td>11</td>
<td>40785391</td>
<td>9220887</td>
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**Miscellaneous Expenditure**  
(to the extent not written off or adjusted)

**Total**  
399071617  
383638892

### Significant Accounting Policies

### Contingent Liabilities and Notes On Accounts

---

**For Indian Plywood Industries Research & Training Institute**

Sd/-
Director

Sd/-
Administrative Officer

IN TERMS OF OUR REPORT ATTACHED
FOR S.R.R.K. SHARMA ASSOCIATES
Chartered Accountants
Firm Registration No.003790S

Sd/-
H.R. Ramaswamy
Partner, Membership No.207116

---

IPIRTI ANNUAL REPORT 2013-2014  
83
<table>
<thead>
<tr>
<th>Schedule 1 - Capital Fund:</th>
<th>31.03.2014</th>
<th>31.03.2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance as at the beginning of the year</td>
<td>335123921</td>
<td>312466108</td>
</tr>
<tr>
<td>Add: Contribution to Corpus/Capital Fund</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Add/(Deduct): Balance of net income(expenditure transferred from the Income and Expenditure Account)</td>
<td>8655075</td>
<td>22657813</td>
</tr>
<tr>
<td></td>
<td>343778996</td>
<td>335123921</td>
</tr>
<tr>
<td>Corpus Fund</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balance as at the beginning of the year</td>
<td>27568189</td>
<td>21264397</td>
</tr>
<tr>
<td>Add: Contribution to Corpus/Capital Fund</td>
<td>253829</td>
<td>197546</td>
</tr>
<tr>
<td>Add/(Deduct): Balance of net income(expenditure transferred from the Income and Expenditure Account)</td>
<td>2256366</td>
<td>2337893</td>
</tr>
<tr>
<td></td>
<td>30078384</td>
<td>27568189</td>
</tr>
<tr>
<td>Balance as at the Year End</td>
<td>373857379</td>
<td>362692110</td>
</tr>
</tbody>
</table>
## SCHEDULE2- RESERVES AND SURPLUS

<table>
<thead>
<tr>
<th>Description</th>
<th>CURRENT YEAR</th>
<th>PREVIOUS YEAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Capital Reserve:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>As per last Account</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Addition During the year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less: Deductions during the year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Revaluation Reserve:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>As per last Account</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Addition During the year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less: Deductions during the year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Special Reserves:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upgradation on Scientific Skills</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Opening Balance</td>
<td>4559815</td>
<td>3518953.8</td>
</tr>
<tr>
<td>Add: Contribution to Corpus/Capital Fund</td>
<td>63457</td>
<td>49386</td>
</tr>
<tr>
<td>Add/(Deduct): Balance of net income (expenditure transferred from the Income and Expenditure Account)</td>
<td>564092</td>
<td>91474.8</td>
</tr>
<tr>
<td></td>
<td>5187363</td>
<td>4595814.6</td>
</tr>
<tr>
<td>4. General Reserve: Entrance Fee Fund</td>
<td></td>
<td></td>
</tr>
<tr>
<td>As per last Account</td>
<td>66600</td>
<td>66600</td>
</tr>
<tr>
<td>Addition During the year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less: Deductions during the year</td>
<td>66600</td>
<td>66600</td>
</tr>
<tr>
<td>TOTAL</td>
<td>5253963</td>
<td>4626414.6</td>
</tr>
</tbody>
</table>
### "SCHEDULE3-EMARKED/ENDOWMENT FUNDS"

<table>
<thead>
<tr>
<th>Dr.Narayana Murthy Endowment Fund</th>
<th>Mr.Keith Baddley Endowment Fund</th>
<th>Citabul Endowment Fund</th>
<th>Arunachal Pradesh Endowment Fund</th>
<th>Shivhari Plywood India Pvt Ltd Endowment Fund</th>
<th>Alumni Association Fund (old Students fund)</th>
<th>IPIRTI Old Student Trainee Fund</th>
<th>&quot;Current Year&quot;</th>
<th>&quot;Previous Year &quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>7472</td>
<td>5857</td>
<td>5729</td>
<td>7132</td>
<td>17009</td>
<td>900</td>
<td>5293</td>
<td>49455</td>
<td></td>
</tr>
</tbody>
</table>

#### b) Additions to the Funds:

- i. Donations/grants
- ii. Income from investments made on accounts of funds
- iii. Other additions (specify nature)

**TOTAL (a+b)**

<table>
<thead>
<tr>
<th>Dr.Narayana Murthy Endowment Fund</th>
<th>Mr.Keith Baddley Endowment Fund</th>
<th>Citabul Endowment Fund</th>
<th>Arunachal Pradesh Endowment Fund</th>
<th>Shivhari Plywood India Pvt Ltd Endowment Fund</th>
<th>Alumni Association Fund (old Students fund)</th>
<th>IPIRTI Old Student Trainee Fund</th>
<th>&quot;Current Year&quot;</th>
<th>&quot;Previous Year &quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>7472</td>
<td>5857</td>
<td>5729</td>
<td>7132</td>
<td>17009</td>
<td>900</td>
<td>5293</td>
<td>49455</td>
<td></td>
</tr>
</tbody>
</table>

#### c) Utilisation/Expenditure towards objectives of funds

- i. Capital Expenditure
  - Fixed Assets
  - Others
  - Total
- ii. Revenue Expenditure
  - Salaries, Wages and allowances etc
  - Rent
  - Other Administrative expenses (Plan & Non Plan)
  - Total

**TOTAL (c)**

<table>
<thead>
<tr>
<th>Dr.Narayana Murthy Endowment Fund</th>
<th>Mr.Keith Baddley Endowment Fund</th>
<th>Citabul Endowment Fund</th>
<th>Arunachal Pradesh Endowment Fund</th>
<th>Shivhari Plywood India Pvt Ltd Endowment Fund</th>
<th>Alumni Association Fund (old Students fund)</th>
<th>IPIRTI Old Student Trainee Fund</th>
<th>&quot;Current Year&quot;</th>
<th>&quot;Previous Year &quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>400</td>
<td>300</td>
<td>300</td>
<td>300</td>
<td>500</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**NET BALANCE AS AT THE YEAR END (a+b-c)**

<table>
<thead>
<tr>
<th>Dr.Narayana Murthy Endowment Fund</th>
<th>Mr.Keith Baddley Endowment Fund</th>
<th>Citabul Endowment Fund</th>
<th>Arunachal Pradesh Endowment Fund</th>
<th>Shivhari Plywood India Pvt Ltd Endowment Fund</th>
<th>Alumni Association Fund (old Students fund)</th>
<th>IPIRTI Old Student Trainee Fund</th>
<th>&quot;Current Year&quot;</th>
<th>&quot;Previous Year &quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>7072</td>
<td>5557</td>
<td>5492</td>
<td>6832</td>
<td>16509</td>
<td>900</td>
<td>5293</td>
<td>47655</td>
<td>49455</td>
</tr>
</tbody>
</table>

**Notes:**
1) Disclosures shall be made under relevant heads based on conditions attaching to the grants.
2) Plan Funds received from the Central/State Government are to be shown as separate Funds and not to mixed up with any other Funds.
## SCHEDULE 4- SECURED LOANS AND BORROWINGS

<table>
<thead>
<tr>
<th>Description</th>
<th>Current Year</th>
<th>Previous Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Central Government</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. State Government (Specify)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Financial Institutions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Term Loans</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) Interest accrued and due</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Banks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Term Loans</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Interest accrued and due</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) Other Loans (Specify)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Interest accrued and due</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Other Institutions and Agencies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Debentures and Bonds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Others (Specify)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Old Students Training Fund</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Running Projects</td>
<td>11806134</td>
<td>9894340</td>
</tr>
<tr>
<td>Deposit Received</td>
<td>4049697</td>
<td>2510233</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>15855831</strong></td>
<td><strong>12404573</strong></td>
</tr>
</tbody>
</table>

Note: Amounts due within one year
## SCHEDULE 5: UNSECURED LOANS AND BORROWINGS

<table>
<thead>
<tr>
<th></th>
<th>CURRENT YEAR</th>
<th>PREVIOUS YEAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Central Government</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. State Government</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Specify)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Financial Institutions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Banks:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Term Loans</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) Other Loans (Specify)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Other Institutions and Agencies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Debentures and Bonds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Fixed Deposits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Others (Specify)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Amounts due within one year

<table>
<thead>
<tr>
<th></th>
<th>CURRENT YEAR</th>
<th>PREVIOUS YEAR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Amounts due within one year

## SCHEDULE 6: DEFERRED CREDIT LIABILITIES

<table>
<thead>
<tr>
<th></th>
<th>CURRENT YEAR</th>
<th>PREVIOUS YEAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Acceptances secured by hypothecation of capital equipment and other assets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) Others</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Amounts due within one year
### SCHEDULE 7 - CURRENT LIABILITIES AND PROVISIONS

<table>
<thead>
<tr>
<th>A. CURRENT LIABILITIES</th>
<th>CURRENT YEAR</th>
<th>PREVIOUS YEAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Acceptance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Sundry Creditors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) For Goods and Services</td>
<td>25937</td>
<td>3274400</td>
</tr>
<tr>
<td>b) Others</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Advances Received</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Interest accrued but not due on:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Secured Loans/ Borrowings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) Unsecured Loans/ Borrowings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Statutory Liabilities:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Overdue</td>
<td>42700</td>
<td>15879</td>
</tr>
<tr>
<td>b) Others</td>
<td>95247</td>
<td>11680</td>
</tr>
<tr>
<td>6. Other Current Liabilities</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL (A)</strong></td>
<td><strong>163884</strong></td>
<td><strong>3301959</strong></td>
</tr>
</tbody>
</table>

| B. PROVISIONS                                   |              |               |
| 1. Taxation                                     |              |               |
| 2. Gratuity                                     |              |               |
| 3. Superannuation/Pension                       |              |               |
| 4. Accumulated Leave Encashment                 |              |               |
| 5. Trade Warranties/Claims                      |              |               |
| 6. Others (Specify)                             | 3892904      | 3544579       |
| **TOTAL (B)**                                   | **3892904**  | **3544579**   |
| **TOTAL (A+B)**                                 | **4056788**  | **6846538**   |
### SCHEDULE 8 - FIXED ASSETS

#### DESCRIPTION
- **A. FIXED ASSETS**
  -  **1. LAND**
    - a) Freehold (Bangalore, Kolkata) 224228 224228 224228 224228
    - b) Leasehold
  -  **2. BUILDINGS**
    - a) On Freehold Land (Bangalore, Kolkata) 55737346 1157827 56895173 10436880 4645829 15082709 41812464 33309921
    - b) On Leasehold Land
    - c) Ownership Flats/Premises
    - d) Superstructures on Land not belonging to the entity
  -  **3. PLANT & MACHINERY & EQUIPMENT**
    - Bangalore 84740150 1042595 0 85782745 24383020 9209959 33592979 52189766 65887559
  -  **4. VEHICLES**
    - 935143 935143 348077 88060 436137 499006 1385370
  -  **5. FURNITURE, FIXTURES** (Bangalore, Kolkata) 1970826 278948 2249774 374457 187532 561989 1687785 1773743
  -  **6. OFFICE EQUIPMENTS** (Bangalore, Kolkata) 1086340 1086340 300671 117850 667819 918129
  -  **7. COMPUTER PERIPHERALS** (Office Equipment) 0 0 0 0 0 0 0 0
  -  **8. ELECTRIC INSTALLATIONS** (Bangalore, Kolkata) 4717472 4717472 896319 382115 1278434 4245725
  -  **9. LIBRARY BOOKS** (Bangalore, Kolkata, Mohali) 3330593 505234 3835827 443774 1321109 25189766 2518307
  -  **10. TUBEWELL & WATER SUPPLY** (Kitchen Equip) 173519 173519 44501 19353 63854 109665 123154
  -  **11. OTHER FIXED ASSETS**
    - 79613956 6639311 86253269 20712297 9831146 30543443 55709826 66011480
  - **TOTAL OF CURRENT YEAR** 232529575 9623915 0 242153490 34879436 24925618 83299175 158854315 176397616
## SCHEDULE 9- INVESTMENTS FROM EARMARKED/ENDOWMENT FUNDS

<table>
<thead>
<tr>
<th>Investments Type</th>
<th>Current Year</th>
<th>Previous Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>In Government Securities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other approved Securities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shares</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Debentures and Bonds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subsidiaries and Bonds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>0</strong></td>
<td></td>
</tr>
</tbody>
</table>

## SCHEDULE 10- INVESTMENTS - OTHERS

<table>
<thead>
<tr>
<th>Investments Type</th>
<th>Current Year</th>
<th>Previous Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>In Government Securities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other approved Securities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shares</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Debentures and Bonds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subsidiaries and Bonds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others (to be specified)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed Deposits</td>
<td>198897106</td>
<td>199727182</td>
</tr>
<tr>
<td>Statutory Deposits with various Govt Organisation</td>
<td>533144</td>
<td>533144</td>
</tr>
<tr>
<td>UNESCO Coupons</td>
<td>1661</td>
<td>1661</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>199431911</strong></td>
<td><strong>200261987</strong></td>
</tr>
</tbody>
</table>
### SCHEDULE 11 - CURRENT ASSETS, LOANS, ADVANCES

#### A. CURRENT ASSETS:

1. **Inventories**
   - a) Stores and Spares: 488254
   - b) Loose Tools
   - c) Stock-in-trade
2. **Sundry Debtors**
   - a) Debts Outstanding for a period exceeding six months: 20437
   - b) Others: 101654
3. **Cash Balances in hand (including cheques/drafts and imprest)**: 79440
4. **Bank Balances:**
   - a) With Scheduled Banks
     - On Current Accounts: 36674991
     - On Deposit Accounts (includes margin money)
     - On Savings Accounts: 96751
   - b) With non-Scheduled Banks
     - On Current Accounts: 24948
     - On Deposit Accounts (includes margin money)
     - On Savings Accounts
   - IPIRTI Branch: 1541311
5. **Post Office Savings**

#### TOTAL (A)

<table>
<thead>
<tr>
<th>CURRENT YEAR</th>
<th>PREVIOUS YEAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>38926132</td>
<td>7791437</td>
</tr>
</tbody>
</table>
## SCHEDULE 11 –CURRENT ASSETS, LOANS, ADVANCES ETC.(Cont.)

<table>
<thead>
<tr>
<th>B. LOANS, ADVANCES AND OTHER ASSETS</th>
<th>Current Year</th>
<th>Previous Year</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Loans:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Staff</td>
<td>1658919</td>
<td>1414099</td>
</tr>
<tr>
<td>b) Other Entities engaged in activities/objectives similar to that of the Entity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c) Other(Specify)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2. Advances and other amounts recoverable in cash or in kind or for value to be received:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) On Capital Account</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) Prepayments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c) Others from Staff</td>
<td>200340</td>
<td></td>
</tr>
<tr>
<td><strong>3. Income Accrued:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;a) On Investments from Earmarked/Endowments Funds IPIRTI Benovelent Fund-(B)&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) On Investments-Others</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c) On Loans and Advances</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;d) Others (includes income due unrealized - Rs......) Interest on FD Accured&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>4. Claims Receivable Grants Receivable</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service Tax</td>
<td></td>
<td>15351</td>
</tr>
<tr>
<td><strong>TOTAL(B)</strong></td>
<td>1859259</td>
<td>1429450</td>
</tr>
<tr>
<td><strong>TOTAL(A+B)</strong></td>
<td>40785391</td>
<td>9220887</td>
</tr>
<tr>
<td>INCOME</td>
<td>SCHEDULE</td>
<td>CURRENT YEAR</td>
</tr>
<tr>
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<tr>
<td>Income from Sales/Services</td>
<td>12</td>
<td>3688491</td>
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<tr>
<td>Grants/Subsidies (Plan &amp; Non Plan)</td>
<td>13</td>
<td>75150000</td>
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<tr>
<td>Fees/Subscriptions</td>
<td>14</td>
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<tr>
<td>Income from Investments( Income on Investment, from earmarked/endow. Funds transferred to Funds)</td>
<td>15</td>
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<td>Income from Royalty, Publication etc</td>
<td>16</td>
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<td>Interest Earned</td>
<td>17</td>
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<td>Other Income</td>
<td>18</td>
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<td>Increase/(decrease) in stock of Finished Goods and WIP</td>
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<td>TOTAL(A)</td>
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<td>EXPENDITURE</td>
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<td>Establishment Expenses</td>
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<td>Other Administrative Expenses (Plan &amp; Non Plan)</td>
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<td>Expenditure on Grants, Subsidies etc.</td>
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<td>Interest</td>
<td>23</td>
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<td>Depreciation (Net total at the year end- corresponding to Schedule 8)</td>
<td>24</td>
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<td>Balance being excess of Income over Expenditure (A-B)</td>
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<td>Transfer to / from General Reserve</td>
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<td>Transfer to Special reserve (R&amp;D Growth Fund)</td>
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<td>Transfer to Special reserve (upgradation of Sci Skills)</td>
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<td>BALANCE BEING SURPLUS/(DEFICIT) CARRIED TO CORPUS/CAPITAL FUND</td>
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<td>SIGNIFICANT ACCOUNT POLICIES</td>
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<td>Grand Total</td>
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<td>Schedule 12 – Income from Sales/Services</td>
<td>Current Year</td>
<td>Previous Year</td>
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<td>----------------------------------------</td>
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<td>---------------</td>
</tr>
<tr>
<td>1) Income from Sales</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Sale of Finished Goods</td>
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<tr>
<td>b) Sale of Raw Material</td>
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<tr>
<td>c) Sale of Scraps</td>
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<td>2) Income from Services</td>
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<td>a) Testing Charges</td>
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<td>b) Hostel &amp; Lodging Charges</td>
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<tr>
<td>c) Professional/Consultancy Services</td>
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<tr>
<td>d) Agency Commission and Brokerage</td>
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<tr>
<td>e) Maintenance Services (Equipment/Property)</td>
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<td>f) GSLI</td>
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<td>g) Application fees</td>
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<td>Car Charges Recovered</td>
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<td>e) Others (Specify)</td>
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<th>Schedule 13 – Grants/Subsidies</th>
<th>Current Year</th>
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<tr>
<td>(Irrevocable Grants &amp; Subsidies Received)</td>
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<td>1) Central Government Grants Receivable Plan</td>
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<td>1) Central Government Grants Received Plan</td>
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<td>1) Central Government Grants Received Non Plan</td>
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<td>2) State Government</td>
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<td>3) Government Agencies</td>
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<tr>
<td>4) Institutions/Welfare Bodies</td>
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<tr>
<td>5) International Organisations</td>
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<td>6) Others (Specify)</td>
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<td><strong>TOTAL</strong></td>
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### SCHEDULE 14 – FEES/SUBSCRIPTION

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<tr>
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<tr>
<td>1) Entrance Fees</td>
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<td>3) Seminar/Program Fees</td>
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<td>4) Consultancy Fees</td>
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<td>(transfer of technology)</td>
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<td>5) Others(specify)</td>
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<td>Vocational Training Fees</td>
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<td>Hostel Lodging Charges</td>
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<tr>
<td>Contributions from Members</td>
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<td><strong>Total</strong></td>
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<td><strong>3974014</strong></td>
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Note – Accounting Policies towards each item are to be disclosed

### SCHEDULE 15 – INCOME FROM INVESTMENTS

(Income on Invest . from Earmarked/Endowment funds transferred to Funds)

1. Interest
   - a) On Govt. Securities
   - b) Other Bonds/Debentures
2. Dividends:
   - a) On Shares
   - b) On Mutual Fund Securities
3. Rents
4. Others(Specify)

**TOTAL** 11688

TRANSFERRED TO EARMARKED/ENDOWMENT FUNDS
SCHEDULE 16 – INCOME FROM ROYALTY, PUBLICATION ETC.

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<tr>
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<tr>
<td>1) Income from Royalty</td>
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<td>2) Income from Publications</td>
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<td>3) Others (specify)</td>
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<td><strong>TOTAL</strong></td>
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<td>48518</td>
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SCHEDULE 17 – INCOME FROM ROYALTY, PUBLICATION ETC.

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<td>1) On Term Deposits:</td>
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<td>a) With Scheduled Banks</td>
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<td>b) With Non-Scheduled Banks</td>
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<tr>
<td>c) With Institutions</td>
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<td></td>
</tr>
<tr>
<td>d) Others</td>
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<td>2) On Saving Accounts:</td>
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<tr>
<td>a) With Scheduled Banks</td>
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<tr>
<td>b) With Non-Scheduled Banks</td>
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<tr>
<td>c) Post Office Savings Accounts</td>
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<td></td>
</tr>
<tr>
<td>d) Others</td>
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<td></td>
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<tr>
<td>3) On Loans:</td>
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<tr>
<td>a) Employees/Staff</td>
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<td>68861</td>
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<tr>
<td>b) Others</td>
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<td>4) Interest on Debtors and Other Receivables</td>
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<td><strong>TOTAL</strong></td>
<td>15178638</td>
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Note – Tax deducted at source to be indicated
### SCHEDULE 18 – OTHER INCOME

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<thead>
<tr>
<th>Description</th>
<th>Current Year</th>
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<tbody>
<tr>
<td>1) Profit on Sale/disposal of Assets:</td>
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<tr>
<td>a) Owned assets</td>
<td></td>
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<tr>
<td>b) Assets acquired out of grants, or received free of cost</td>
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<tr>
<td>2) Export Incentives realized</td>
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<tr>
<td>3) Fees for Miscellaneous Services</td>
<td>192,407</td>
<td>1513771.2</td>
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<td>4) Miscellaneous Income</td>
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<td>Visit of Parliament Members</td>
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<td>IFS Office Training NPB</td>
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<td>Century Plyboard Pvt Ltd</td>
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<td>Life Cycle Assessment</td>
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<td>Greenply (Gold Medal)</td>
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<td>RTI Information NP</td>
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<td>Accrued Interest reconciliation Difference</td>
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<td>Others credit no longer required</td>
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<td>Transfer of Technology</td>
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<tr>
<td><strong>TOTAL</strong></td>
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## SCHEDULE 19 – INCREASE/(DECREASE) IN STOCK OF FINISHED GOODS & WORK IN PROGRESS

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<td>a) Closing stock</td>
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<tr>
<td>- Finished Goods</td>
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<tr>
<td>- Work-in-progress</td>
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<tr>
<td>b) Less: Opening Stock</td>
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</tr>
<tr>
<td>- Finished Goods</td>
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<tr>
<td>- Work-in-progress</td>
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<tr>
<td>NET INCREASE(DECREASE) [a-b]</td>
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## SCHEDULE 20 – ESTABLISHMENT EXPENSES

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<tbody>
<tr>
<td>a) Salaries and Wages ( Non Plan)</td>
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<td>Salaries and Wages ( Plan)</td>
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<tr>
<td>Salaries and Wages ( Accured)</td>
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<tr>
<td>b) Allowances and Bonus</td>
<td>86,350</td>
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<tr>
<td>c) Contribution to Provident Fund</td>
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<td>d) Contribution to other Fund (specify) Contribution to Family</td>
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<td>284708</td>
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<td>e) Staff Welfare Expenses</td>
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<td></td>
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<tr>
<td>f) Expenses on Employees’ Retirement and Terminal Benefits</td>
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<tr>
<td>g) Other (specify)</td>
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<td>Reimbursement of Telephone bills</td>
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<td>Gratuity</td>
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<td>Leave Salary</td>
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### SCHEDULE 21 – OTHER ADMINISTRATIVE EXPENSES ETC.

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<td>Administration Charges on EDLIS</td>
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<td>MAINTAINENCE OF EQUIPMENTS FS MOHALI</td>
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<tr>
<td>Life Cycle Assessment</td>
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<td>IPIRTI MEET(KOLKATA)</td>
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<td>Hindi Rajbhasha</td>
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<tr>
<td>IFS Office Training NPB</td>
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<tr>
<td>TOTAL Non Plan Expenditure</td>
<td>5656795</td>
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FROM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS)  
SCHEDULES FORMING PART OF INCOME & EXPENDITURE FOR THE  
PERIOD/YEAR ENDED 31.03.2014

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount 1</th>
<th>Amount 2</th>
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<tbody>
<tr>
<td>Administration Charges on EDLIS</td>
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<td>Advertisement Charges</td>
<td>388786</td>
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<td>Bonus</td>
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<td>Canteen Maintenance</td>
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<td>Audit Fees-</td>
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<td>Building Maintenance-</td>
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<td>Campus Maintenance</td>
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<td>Conveyance Allowance</td>
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<td>Electricity Charges</td>
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<td>Hostel Maintenance</td>
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<td>Information and Publicity</td>
<td>270662</td>
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<tr>
<td>Inspection Charges on PF</td>
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<td>30932</td>
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<tr>
<td>Internal Audit Fee-</td>
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<td>11000</td>
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<td>Maintenance of Equipment</td>
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<td>Postage and Telegram</td>
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<td>Printing and Stationary</td>
<td>78220</td>
<td>125459</td>
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<td>Sundries</td>
<td>502609</td>
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<td>Telephone Charges</td>
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<td>Travellinge Expenses</td>
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<td>Vehicle Maintenance -</td>
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<td>Wages</td>
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<td>Papers &amp; Periodicals</td>
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<td>Legal Fees</td>
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<td>Honararium for Guest PB</td>
<td>39218</td>
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<td>I.F.S. Officer Training PB</td>
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<td>Lab Expenses Bangalore PB</td>
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<td>Medical Expenses-Plan</td>
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## FROM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS)

**SCHEDULES FORMING PART OF INCOME & EXPENDITURE FOR THE PERIOD/YEAR ENDED 31.03.2014**

<table>
<thead>
<tr>
<th>Item</th>
<th>Plan Expenditure</th>
<th>Other Administrative Expenses</th>
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<tbody>
<tr>
<td>Meeting Expenses Plan</td>
<td>160144</td>
<td>251682</td>
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<tr>
<td>News Paper &amp; Periodicals PB</td>
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<td>Employees Contribution FS KP</td>
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<td>Forest Sports PK</td>
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<td>General Expenses- PK</td>
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<td>GSLI -Kolkata</td>
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<td>Other consumables</td>
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<tr>
<td>WORKSHOP/SEMINAR EXPENDITURE</td>
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<tr>
<td>C V RAMAN FELLOWSHIP</td>
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<tr>
<td>TRAVELLING EXPENSES(FOREIGN TOUR)</td>
<td>259479</td>
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<td>TRANSFER TRAVELLING ALLOWANCE(PLAN)</td>
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</tr>
<tr>
<td>TOTAL Plan Expenditure</td>
<td>8676241</td>
<td>6916250</td>
</tr>
<tr>
<td>TOTAL Other Administrative Expenses</td>
<td>14333036</td>
<td>22126912</td>
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</table>
FROM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS)
INDIAN PLYWOOD INDUSTRIES RESEARCH AND TRAINING INSTITUTE
SCHEDULES FORMING PART OF INCOME & EXPENDITURE FOR THE
PERIOD/YEAR ENDED 31-03-2014

**SCHEDULE 22 – EXPENDITURE ON GRANTS, SUBSIDIES ETC..**

<table>
<thead>
<tr>
<th></th>
<th>Current Year</th>
<th>Previous Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Grants given to Institutions/Organisations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) Subsidies given to Institution/Organisations</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note** - Name of the Entities, their activities along with the amount of Grants/Subsidies are to be disclosed

**SCHEDULE 23 – EXPENDITURE ON GRANTS, SUBSIDIES ETC.**

<table>
<thead>
<tr>
<th></th>
<th>Current Year</th>
<th>Previous Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) On Fixed Loans</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) On Other Loans (including Bank Charges)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c) Other (specify)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>