ANNUAL REPORT
2016-17

INDIAN PLYWOOD INDUSTRIES RESEARCH & TRAINING INSTITUTE
(Autonomous body of Ministry of Environment, Forest & Climate Change, Govt. of India)
POST BAG NO.2273, HMT LINK ROAD OFF TUMKUR ROAD, YESHWANTHPUR, BENGALURU - 560022
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MESSAGE

It is heartening to learn that the Indian Plywood Industries Research & Training Institute (IPIRTI), one of the Autonomous Bodies of the Ministry of Environment, Forest and Climate Change is bringing out the Annual Report for the year 2016-17.

IPIRTI is a specialized Institute of its kind in the country working for R&D in respect of plywood and panel industry. To meet the growing needs of an emerging economy, green technologies for development of wood alternatives such as panel products from plantation timbers, bamboo, agro-residues and other renewable bio-fibre is the need of the hour. The greater use of such wood substitutes can help to preserve tropical forests thereby helping in increase of forest cover. Bamboo plays an important role in the socio-economy of rural/tribal region of the country particularly in North Eastern region. It has long been traditionally used as a building material for both structural and decorative use. IPIRTI in this respect has made a good contribution in using bamboo composites as engineered building material for bamboo houses and other high value added bamboo products.

The current edition of IPIRTI Annual Report is a compilation which successfully provides a glimpse of its research, training, testing and extension activities during the year. I hope the Annual Report 2016-17 comprising of various activities performed during the year by the Institute in the field of wood and other lignocellulosic composites will be helpful to the industry as a guiding document.

I wish the Institute all the best for its future endeavours.

Date: 03.11.2017

(Dr. Harsh Vardhan)
Indian Plywood Industries Research & Training Institute (IPIRTI) is an Autonomous Body under Ministry of Environment, Forests and Climate Change established in the year 1962 and has grown as a Centre of Excellence in due course in order to carry out R & D activities in the field of panel products based on wood and other lignocellulosic renewable material including Bamboo & Agro residues. IPIRTI is mandated to carry out research, training and outreach activities to facilitate the wood and bamboo based industries for efficient utilization of resources, increase the productivity and reduce the overall cost of production. Human resource needs of the Panel industries based on Wood, Bamboo & other lignocellulosics are met through the Institute by conducting one year post graduate diploma course and various short term training programmes. I am pleased to note that in addition to its regular training programmes, IPIRTI is also undertaking Specialized Training Courses on Skill Development to enhance employability especially in the socio-economically challenged areas of the country in particular North East and Chhattisgarh.

It is a matter of pleasure that IPIRTI is going to publish Annual Report 2016-17 comprising of various activities performed during the year in the field of wood and other lignocellulosic composites which will further benefit industry and other stakeholders.

I wish the Institute great success in future.

(C. K. Mishra)

Dated: 03/11/2017
Place: New Delhi
MESSAGE

The Annual Report 2016-17 is a comprehensive account of the research, training and extension activities of Indian Plywood Industries Research & Training Institute (IPIRTI) and provides information to its members and other stakeholders about the Institute’s achievements.

IPIRTI has excellent infrastructure facilities for carrying out investigations and conducting experiments at laboratory as well as at pilot scale simulating conditions existing in wood based panel industries. These facilities help in effective implementation and easy adaptation of technologies developed at the Institute by the industries. Apart from providing testing facilities as per National/International standards, the Institute imparts practical training on testing of wood and wood based panels. In addition, the Institute is extending significant extension services through various Memorandum of Understandings for technology transfer for the products/processes developed in the Institute. Institute also organizes and participates in Workshops, Seminars, Conferences, Exhibition and interactive meets to share its knowledge with other stakeholders, including the users and consumers from Government and Non-government organizations.

IPIRTI provides unstinted support to wood based panel industries of the country through its excellent R&D programmes. I am sure the current Annual Report will provide sufficient information to all the stakeholders on the activities and achievements of the Institute and its two Field Stations.

Wishing the Institute, a very bright future.  

(Siddhanta Das)
PREFACE

IPIRTI, an Autonomous Body of the Ministry of Environment, Forest and Climate Change, Govt. of India, is an internationally recognized R&D Institution with headquarters at Bangalore. It was established in the year 1962 as a research laboratory of CSIR at the initiative of the Indian Plywood Industries. Since the inception, the Institute has been closely associated with the development of plywood and panel industry from its infant stage. The Institute continues to remain an industry driven organization with strong relationship and linkages with panel industries and is the only Institute of its kind in the country. IPIRTI Field Station, Kolkata was established in the year 1963 and IPIRTI Centre, Mohali, Punjab in the year 2008 to meet the Testing, Training & Extension requirements of 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 2016-17.

IPIRTI is basically mandated to carry out Research & Development, Training & Education, Testing & Standardization and Extension activities in the field of wood and panel products from all sorts of 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 other interested stake holders. Research programmes are approved by the Research Advisory Committee of IPIRTI after critical examination.

The Institute is deeply thankful to all the sponsorers of the various projects viz., MoEF&CC; Govt. of India, Ministry for Development of North Eastern Region (DoNER), Govt. of India; Indian Council of Forestry Research and Education (ICFRE); State Forest Department, Govt. of Chhatisgarh; Punjab Forest Department, Punjab; M/s. Covestro (India) Private Limited, Mumbai; M/s. Sarda Plywood Industries Ltd., Kolkata; M/s. Osmoste (Thailand) Ltd. Bangkok, M/s. IKEA, Sweden; HNEE, Germany; M/s. ITC Lifescience and Technology Centre, Bangalore, M/s. ARC & Organics Ltd, Kolkata; M/s. Woodcare Enterprise, Kolkata; M/s. GTZ Private Ltd. Kolkata and M/s. Musu India, Kolkata for their unstinted support to our research programmes.

Institute is also thankful to all firms who availed testing facilities at IPIRTI, Bangalore, Field Station, Kolkata and IPIRTI Center, Mohali in general; for “Technology transfer of fire retardant doors” to M/s. Maple Moulding, Paligar, Maharashtra & M/s. Aditya Industries, Chikhli, Gujarat and for “Evaluation of fire rating of Fire rated door shutters” to M/s. Space wood Furnishers Pvt. Ltd., Nagpur, Maharashtra; M/s. Ardor Fire & Safety systems, Mumbai, Maharashtra; M/s. VK Patel & Co., Thane, Maharashtra; M/s. Bull Dog protection, UK; M/s. Shreeji Wood Craft Pvt. Ltd., Borivali, Maharashtra; M/s. Anisha Arjun Hardasani, Andheri, Mumbai; M/s. Ashish Enterprises, Navsari, Gujarat; M/s. Shri Ram Panels Pvt. Ltd., Fatehgarh Sahib, Punjab; M/s. Greenply Industries Ltd., Udham singh nagar, Uttarakhand; M/s. Omfurn India Pvt. Ltd., Kandivali, Maharashtra; M/s.
Lucky ply & Laminates, Valsad, Gujarat; M/s. A.K. Panels, Mangalore, Karnataka; M/s. Pragathi enterprise, Surat, Gujarat; M/s. Shobha Interiors, Bangalore, Karnataka; M/s. Bloom Decor, Ahmedabad, Gujarat; M/s. Promat, Malaysia; M/s. MSBC Secure India, Ahmedabad, Gujarat and M/s. Doors and Doors., Andheri, Maharashtra.

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, training programmes, extension activities and effective management of the Institute.

Bangalore

DIRECTOR
LIST OF BOARD OF GOVERNORS OF IPIRTI

Shri. Ajay Narayan Jha, IAS
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Utthan-Centre for Sustainable Development
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Shri. B. K. Sinha
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The Managing Director,
**M/s. Akolite Synthetic Resins**
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The Managing Director,
**M/s. Alishan Veneer & Plywood Pvt.Ltd.**
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The Managing Director,
**M/s. Ambika Timber Works**
NH-60, Bikna, Keshiakole, Bankura,
West Bengal State

The Managing Director,
**M/s. Ambi Ply Panels and doors**
678/3, Kurumbanur, Dasanoor Post,
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The Managing Director,
**M/s. ARCL Organics Ltd.**
13, Camac Street, 2nd Floor,
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**M/s. Assam Timber Products Pvt. Ltd.,**
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State-736160

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**M / s. Devanshi Plyboard Industries Pvt. Ltd.**
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The Managing Director,
**M / s. Elegant Products (P) Ltd.,**
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**M/s. Hero Plywoods & Boards**  
M anchal, Kurumathur P. O, Thaliparamba,  
Kannur, Kerala State-670142  

The Managing Director,  
**M/s. Indian Laminate Manufacturer’s Association**  
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Hospital, N.R. Vastrapur Lake, Vastrapur,  
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The Managing Director,  
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The Managing Director,  
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The Managing Director,  
**M/s. Kanachur Seasoning Industries**  
N. H. 66, Kallapu, Post Permannur,  
Mangalore-575017
The Managing Director,
**M/s. Kanara Wood & Plywood Industries Ltd.**,  
Jeppu, Mangalore-575002

The Managing Director,
**M/s. Kaziranga Wood Products Pvt. Ltd.**  
724 Peace Enclave, 3rd Floor, ulubari Chariali, Guwahati-781007

The Managing Director,
**M/s. K.Sankara Krishnan**  
“Thejas”, New No.13, Old No.7 ‘W’ Block, 5th Main Road Anna Nagar, Chennai, Tamil Nadu State-600040

The Managing Director,
**M/s. Laxmi Timber Industries**  
37A, BENTINCK Street, 2nd Floor, R/ No. 2014, Kolkata, West Bengal State

The Managing Director,
**M/s. Madras Chipboard Ltd.**  
Sri Bhavanam, 1089/20, P.S.K Nagar, P.B. No. 59, Rajapalayam, Tamil Nadu State-626117

The Managing Director,
**M/s. Maple Mouldings Pvt. Ltd.**  
MSSIDC’s, Plot No. 24, Wood Based Industrial Complex, AT & TAL: Wada, Dist: Thane, Maharashtra State-421303

The Managing Director,
**M/s. Masa India**  
7/1A, Grant Lane, 4th Floor,  
Suite - 4G, kolkata, West Bengal State-700012

The Managing Director,
**M/s. Kandla Timber Association**  
Timber Bhavan, Plot No. 47, Sector 8 B.P. No.172, Gandhidham, Kachchh, Gujarat State-370 201

The Managing Director,
**M/s. Lamba Timber Works Pvt. Ltd.**  
A - 37, W. H. S. Kirti Nagar, Kirti Nagar, Delhi State-110015

The Managing Director,
**M/s. Krishna Antioxidants Pvt. Ltd.**  

The Managing Director,
**M/s. Lucky Ply & Laminates**  
Shop No.2, Rinkoo Apartments, Vallabhai Road, Vile Parle West, Mumbai - 400 056

The Managing Director,
**M/s. Mak Plywood Industries Pvt. Ltd.**  
Kunjathur Padane Post, Kunjathur Manjeshwar, Kasaragod Dist., Kerala State-671323

The Managing Director,
**M/s. Mars Plywood Industries Pvt. Ltd.**  
Mauza-Panchghara, P. O. - Panchagha Bazar, P. S. Chanditala, Dist. Hooghly, West Bengal State

The Managing Director,
**M/s. Ma Tara Plywood**  
Bahadurganj Road, Kadamrasul, Kishanganj, Bihar State-855107
The Managing Director,
M/s. Mridul Chemicals Pvt. Ltd.,
7 Burnt Salt Gola Lane,
5th Floor, Flat No. 5A, Howrah,
West Bengal State-711101

The Managing Director,
M/s. Merino Panel Products Ltd.
44 Km, Delhi Rohtak Road, Village
Rohad P.O. Rohad, Dist. Jhajjar, Haryana
State-124501

The Managing Director,
M/s. Minimax Metals & Plywood Pvt. Ltd.,
494-A, Court Road, Jagadhri, Haryana
State-135003

The Managing Director,
M/s. MSPC Secure India Pvt. Ltd.,
301, 3rd Floor, Balleshwar Square, Opp.
ISKON Temple, S. G. Highways, Ahmedabad,
Gujarat State-580015

The Managing Director,
M/s. Natural Wood and Veneers Pvt. Ltd.,
Vettickal, P.O., (Via) Mulanthuruthy,,
Ernakulam Dist., Kerala State-682314

The Managing Director,
M/s. Parvatiya Plywood Pvt. Ltd.
Village Shivlalpur, Kashipur Road, P.O
Ramnagar, Dist. Nainital, Uttarakhand
State-244715

The Managing Director,
M/s. Mayur Ply Industries Pvt. Ltd.,
NH-2, Delhi Road, Belumilki,
via - Sheoraphully, Dist. Hooghly,
West Bengal State-712223

The Managing Director,
M/s. Metro Plywood Pvt. Ltd.
Damla, Delhi Road, Yamunanagar,
Haryana State-135 001

The Managing Director,
M/s. Modern Gramoudyog
No.272, Zak Industrial Area, Zak Village,
Ta-Dhegoon, Gandhinagar, Gujarat
State-382330

The Managing Director,
M/s. Mutha Industries Pvt. Ltd.
Plot Am Bamboo Park, R.K. Nagar,
Agartala, Tripura State-799008

The Managing Director,
M/s. Omfurn India Pvt. Ltd.
109. Gundecha Industrial Complex,
Akurli Road, Kandivali (East),
Mumbai, Maharashtra State-400101

The Managing Director,
M/s. Plystone Plywoods Pvt. Ltd
P.O Allapra, Perumbavoor, Ernakulam
Dist., Ernakulam, Kerala State-683553
The Managing Director,
**M/s. Raavela Doors & Decors**
A-13, Road No. 9, I.D.A., Nacharam, Hyderabad, Andra Pradesh State-500076

The Managing Director,
**M/s. Rama WoodCraft**
11th Mile Stone, Panna Road, Village-Bamhour, P.O. Sitpura, Dist. Satna, Madhya Pradesh State-485441

The Managing Director,
**M/s. Reyami Millennium Interiors Pvt. Ltd.,**
O.ff. No.501-504, “TRANSBAY”, O pp. SKP Campus, Balewadi, Pune-411045,

The Managing Director,
**M/s. Sarda Plywood Industries Ltd.,**
Rajkot Gondal Highway, P. O. Shapar, Dist - Rajkot,, Gujarat State-360024

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

The Managing Director,
**M/s. Shri Ram Panels**
Village Shahpur, Khanna - Amloh Road Mandi Gobindgarh, Distt. Fatehgarh Sahib Khanna, Punjab State-147301

The Managing Director,
**M/s. SpaceWood Furnisher’s Pvt. Ltd.**
T - 47/48, MIDC Areaed, HINGNA, NILDODH, NAGPUR, Maharashtra State-440016

The Managing Director,
**M/s. Rajkripal Exim Pvt. Ltd.,**
295/ 2, , Gandhidham, Gujarat State-370201

The Managing Director,
**M/s. Regency Plywood Industries Pvt. Ltd.**
Bakhrahat Road, Vill -Charaktalla P.O - Rasapunja, VIA - JOKA, SOUTH 24 - PRAGANAS, West Bengal-700104

The Managing Director,
**M/s. Safa Plywoods Pvt. Ltd.**
Near IDA, Erumathala P.O, Aluva,, Ernakulam District, Kerala State-683112

The Managing Director,
**M/s. Shiv Shankar Plywood**
A-3/ 59, Sector - 3, , Rohini, Delhi State-110085

The Managing Director,
**M/s. Shree Nath Jee Ply Products**
Vill - Mukrabpuk, Chhachhrouri Road, Jagadhri,, Yamunanagar, Haryana State-135003

The Managing Director,
**M/s. SLK Progressive Veneer Pvt. Ltd.**
Delhi Rd. Village & P.O, Rajhat, Hooghly, West Bengal State-712123

The Managing Director,
**M/s. Sunlight Boards Pvt. Ltd.,**
Mill Road, Baliapattam,, Kannur, Kerala State-670 010
The Managing Director,
**M/s. Surya Vikas Plywood Ltd.**
Village Damla, Delhi Road, Yamunanagar, Haryana State-135001

The Managing Director,
**M/s. Sylvan Plyboard (India) Pvt. Ltd.**, 
NH-2, Delhi Road, Chinamore & Champsara, Baidyabati, Hooghly, West Bengal State-712222

The Managing Director,
**M/s. The Indian Plywood Manufacturing Company Pvt. Ltd.**, 
704, Embassy Centre, 7th Floor, Nariman Point, Mumbai-400021, Mumbai, Maharashtra

The Managing Director,
**M/s. West Coast Polymers Pvt. Ltd.** 
Kankole, Via Payyannur, Kannur Dist., Kerala State-670307

The Managing Director,
**M/s. Uniply Industries Ltd.,** 
No.5, Branson Garden Street, Kilpauk, Chennai - 600010, Kanchipuram Dist. Tamil Nadu State-603107

The Managing Director,
**M/s. Virgo Panel Products** 
Haryana Road, Daulowal Village, Hoshiarpur, Punjab State-146208

The Managing Director,
**M/s. Vritti Impex Pvt. Ltd.** 
60, Ram Mahal, TULSIPIPE Road, Opp. Mahim Street, Mahim West, Mumbai, Maharashtra State-400016

The Managing Director,
**M/s. Swadesh Plywoods Pvt. Ltd.,** 
Chakdha Bongan Road, Village. Kamsona, P.O, Media Bazar, P.S.Gopal Nagar 24th Parganas North, West Bengal State-743262

The Managing Director,
**M/s. Swastik Plyboard Ltd.,** 
D-8, Kabir Marg, Bani Park, Jaipur, Rajasthan State-302 016

The Managing Director,
**M/s. The Western India Plywoods Ltd.** 
Mill Road, Baliapatam P.O, Kannur, Kerala State-670010

The Managing Director,
**M/s. Timpack Pvt. Ltd.** 
15th Mile, G. S. Road, Byrinhat, Meghalaya State-793101

The Managing Director,
**M/s. Vidhata Industries Pvt. Ltd.,** 
Opp. New DMC Hospital, Civil Lines, Dist. Ludhiana, Punjab State-141 001

The Managing Director,
**M/s. V. K. Patel & Co.** 
Plot No.19& 20, MSSIDC, A\*Gandhare, N.R. Vaitarna River, Taluka - wada, Dist. Thane, Maharashtra State-421303

The Managing Director,
**M/s. Wood Cure Enterprise,** 
Madhus Malancha, Ashram Math, South Naldang, Bandel, Hoogly, West Bengal State-712123
I DIRECTOR’S REPORT (EXECUTIVE SUMMARY)

IPIRTI has a vision to come up as an Apex Body of International stature by developing cutting edge State-of-the-art Technology for advising and/or providing competitive consultancy to the Academia as well as Panel Industry at large. This is generally aimed at providing of efficient technologies for engineered products from renewable fibres including plantation timbers and bamboo. This while meeting the vital needs of the developing society entails conservation of Forest and Environment as a whole.

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 for panel products. Side by the Global concerns for protection of Environment, human health and conservation of Biodiversity are kept in mind while formulating research programmes.

Vision

The vision of IPIRTI is to be an apex institution of international repute for knowledge generation and carry out Research & Development on panel products from plantation wood, bamboo and other natural fibers.

In order to accomplish this vision, IPIRTI 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.

Mission

The mission 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, scientist’s visit to the industry to assist in process and product development.

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

1. Research & Development activities

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

From its inception, research projects are carefully selected based on the perceived needs of the panel industry. Till the year 1990, the research projects were approved by the Board of Governors which was chaired by the Secretary of erstwhile MoEF and comprised of leading plywood industrialists of the country. Consequent upon 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 with representatives from other major R&D organizations and other Academia. 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 IKEA, Canadian Softwood Association, HNEE, WKI, DFID/ TRADA, INBAR, ITTO are also undertaken. Such projects after due scrutiny are then presented before RAC for approval.

In addition to the RAC, the Institute has an Internal Research Committee (IRC) comprising of all the scientists that is headed by the Director for regular monitoring of the research and training activities in accordance with the decisions of the RAC.

There is a huge gap between supply and demand for wood which is of the order of 50 percent of the demand. The gap may decrease gradually when the benefits of the intensive efforts now being made to grow trees through agro/social/farm forestry, other plantation and better management of natural forests through innovative practices including JFM approach start flowing to the society. Wood is the most carbon neutral material and can be sustainably produced to meet the increasing demand of society. The so called wood-substitutes, like metal and plastics, that have been advocated in the recent past in the wake of massive degradation natural forests, are high energy consuming, non bio-degradable and on the whole damaging to environment.
The Institute adopts multidisciplinary and result oriented approaches in executing R & D projects that enhance the confidence level of sponsors of the projects. As a consequence there is a spurt in the number of projects being sponsored over the years. The technologies developed in the Institute are environmental friendly, cost effective and socially acceptable.

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
- Protection and Enhancement of service life of wood and panel products
- Development of instruments, accessories and equipments

Some of the important themes identified by the Institute for future line of R & D are:

i. Development of Bio-Adhesives and VOC Emission Free Binder for Panel Products
ii. Development of Non-Formaldehyde Adhesives for Wood Bonding
iii. Development of Surface Coating Polymer for Panel Products
iv. Development of Fire Retardant Composites/Panel Products
v. Utilization of renewable material for making panel products.
vi. Process and Product Development to minimize Occupational Health Hazards and Environmental Impacts
vii. Application of Nano-Technology in Panel Products Development
viii. Energy Auditing, Carbon Footprint and LCA Study on Wood and Bamboo Based Panel Products
ix. Formulation of Standards at par with International Standards for Plywood and Panel Products
x. Eco-Friendly Preservative for Panel Products alternative to the existing practice
xi. Development of Knock-Down Housing for Natural Disaster Regions.

The Institute has already initiated the work on the above thrust areas. There were in all 89 projects of which 50 projects were funded by the Institute and 19 projects sponsored by various organizations and 20 consulting projects.

Of the 50 numbers of Institute funded projects 21 were completed out of which 13 reports so far published. Further, 10 new projects were placed before RAC which were approved for taking up. Among 19 on-going Sponsored Projects, 10 Reports have been submitted to the sponsors. 20 consultancy projects were received from various firms and organisations in the year 2016-17.
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 already obtained 5 Patents and 8 filed to be patented from Patent office, Government of India as per details given below:

**Patented :**

1. Cardanol Phenol Formaldehyde Resin - 146025
2. A Method of Manufacturing Bamboo Splints - 199046
3. A Process for the Manufacture of Bamboo Mat Moulded Skin Boards for Doors - 242299
4. A Process for Producing Compregs from Bamboo Mats/Veneers of Plantation Timber or a combination thereof - 245157
5. Bamboo Mat Corrugated Sheets (BMCS) – 266054

**Filed and awaiting to be patented :**

1. A Method of Manufacture of Bamboo Mat Ridge Cap for Roofing with Bamboo Mat Corrugated Sheets - 639/ CHE/ 2009 A
2. A Method of Manufacture of Flooring Tiles from Bamboo Strips- 2277/ CHE/ 2009
3. Wood Preservatives and a Method for Protecting Wood and Wood based Panel Products - 3393/ CHE/ 2012
4. Fire Retardant Door Assembly - 4468/ CHE/ 2015
5. Method of Manufacturing of Rice Straw Medium Density Fibre Board – 201641004352
6. Method of Manufacturing of Rice Husk Particle Board – 201641015011
7. Polyurethane Based Adhesive Composition and a Method of preparing the same - 201741004414
8. Soya Based Phenolic Adhesive Composition and a Method of preparing the same – 201741004536

3. Training and Education

Training is an integral part for upgrading quality parameters. 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 specialized plywood. However, from the beginning of the decade 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 2261 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 adhesives 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 Products Technology:**
   During the year, 27th 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 30 candidates completed the course successfully and 100% placement was arranged through Campus selection process. Training course for 28th batch was already started and the course is in progress wherein 33 candidates are undergoing training.

b) **Short term vocational training courses:**
   Various Short term vocational training courses have been conducted during the year 2016-17 for technical personnel from industry to improve their skill in the specialized field of interest such as veneer peeling, resin manufacture, panel/ sheet manufacture, bamboo housed housing system, defects & remedial measures in plywood manufacture, development of composites from wood waste, testing and standardization as well as specific training in the mode of transfer of technologies. 15 Nos. of 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.

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 products purchased. IPIRTI has laboratories 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. All these labs 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 with 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, 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 4 feet spindle less peeling lathe glue dosing system for MDF 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 located throughout 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)

09.03.2017: A Memorandum of Understanding (MoU) was signed and exchanged between Dr. B.N. Mohanty, IFS, Director IPIRTI and Dr. Subhash Ashutosh, IFS, Dy. CEO MBDA, Meghalaya Shillong, Govt. of Meghalaya for Establishment of Common Facility Centres (CFCs) for Bamboo Development in Meghalaya State.

MoUs were signed by Dr. B.N. Mohanty, IFS, Director, IPIRTI for Technology Transfer of Fire Retardant Door and the Consultancy Projects on Evaluation of fire rating of Fire rated door shutters are as follows:


04.05.2016: CP/ 44/ Testing/ 2016: Technology Transfer for manufacturing of fire retardant doors through construction method for 60 minutes and 120 minutes to M/s. Aditya Industries, Chikhli, Gujarat.
16.05.2016: CP/48/Testing/2016: Evaluation of fire rating of door shutter with fire rating of 120 minutes received from M/s. Bull Dog protection, UK.

19.05.2016: CP/40/Testing/2016: Evaluation of fire rating of door shutter with fire rating of 60 minutes received from M/s. Shreeji Wood Craft Pvt. Ltd., Borivali, Maharashtra.

01.06.2016: CP/42/Testing/2016: Evaluation of fire rating of door shutter with fire rating of 120 minutes received from M/s. Anisha Arjun Hardasaki, Andheri, Mumbai.

07.06.2016: CP/43/Testing/2016: Evaluation of fire rating of door shutter with fire rating of 120 minutes received from M/s. Ashish Enterprises, Navsari, Gujarat.

22.06.2016: CP/41/Testing/2016: Evaluation of fire rating of door shutter with fire rating of 120 minutes received from M/s. Shri Ram Panels Pvt. Ltd., Fatehgarh Sahib, Punjab.


02.08.2016: CP/45/Testing/2016: Evaluation of fire rating of door shutter with fire rating of 60 minutes received from M/s. Greenply Industries Ltd., Udham singh nagar, Uttarakhand.


06.01.2017: CP/50/testing/2016: Evaluation of fire rating of door shutter with fire rating of 120 minutes received from M/s. A.K. Panels, Mangalore, Karnataka.

12.01.2017: CP/51/Testing/2016: Evaluation of fire rating of door shutter with fire rating of 120 minutes received from M/s. Pragathi enterprise, Surat, Gujarat.

02.02.2017: CP/52/Testing/2016: Evaluation of fire rating of door shutter with fire rating of 60, 90 and 120 minutes received from M/s. Shobha Interiors, Bangalore, Karnataka.


07.03.2017: CP/57/Testing/2017: Evaluation of fire rating of door shutter with fire rating of 60 minutes received from M/s. Promat, Malaysia.

23.03.2017: CP/54/Testing/2017: Evaluation of fire rating of door shutter with fire rating of 60 minutes received from M/s. MSBC Secure India, Ahmedabad, Gujarat.
31.03.2017: CP/58/Testing/2017: Evaluation of fire rating of door shutter with fire rating of 120 minutes received from M/s. Doors and Doors, Andheri, Maharashtra.

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

Following 7 Research Reports have been published during the year:

<table>
<thead>
<tr>
<th>R.R. No.</th>
<th>Project</th>
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<tbody>
<tr>
<td>RR 189</td>
<td>Development of UV &amp; Weather Resistant Coating for Wood based Panel products and Bamboo Composites.</td>
</tr>
<tr>
<td>RR 190</td>
<td>Study on the effect of Density Variation through thickness on Properties of Three Layer Particle Board</td>
</tr>
<tr>
<td>RR 191</td>
<td>Study on suitability of Melia dubia for Laminated Veneer Lumber (LVL) manufacturing</td>
</tr>
<tr>
<td>RR 192</td>
<td>Development of PUMF Resin for the Manufacture of Plywood</td>
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<tr>
<td>RR 193</td>
<td>Studies on Variation in Plantation Grown Melia dubia Including Selected Clones of Populus deltoids and its Suitability for Plywood Manufacturing</td>
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<tr>
<td>RR 194</td>
<td>Development of Bamboo Strand Lumber for Housing Application</td>
</tr>
<tr>
<td>RR 195</td>
<td>Development of Composite using Bamboo Saw Dust and Bamboo Fibers</td>
</tr>
</tbody>
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7. Statutory Meetings

Board of Governors Meeting and Research Advisory Committee Meeting were held as follows:

a) Board of Governors Meeting

125th Meeting of the Board of Governors (BoG) of IPIRTI was held on 27th May, 2016 at IPIRTI, Bengaluru. The Meeting was chaired by Shri. Ajay Narayan Jha, IAS, Secretary, Ministry of Environment, Forests & Climate Change, (MoEF&CC), Govt. of India & Chairman, IPIRTI BoG, New Delhi.

Dr. B. N. Mohanty, IFS, Director & Member Secretary convened the meeting.

b) Research Advisory Committee (RAC) Meeting

60th meeting of the Research Advisory Committee (RAC) of IPIRTI held on 07th June, 2016 in the Conference Hall at IPIRTI, Bangalore under the chairmanship of Shri. Sajjan Bhajanka, President, FIPPI, New Delhi. Dr. B.N. Mohanty, IFS, Director Co-Chaired the meeting and Dr. Manoj K. Dubey, Joint Director is the Convenor of the meeting.
II PRODUCTS RECENTLY DEVELOPED AT IPIRTI

Development of Medium density Fibre board (MDF) from Plantation grown timber species Casuarina

In the present scenario of sourcing timber for panel industry from agroforestry, it has become very important to study the suitability of timbers for various end use applications. As use of Plantation grown species for different panel production possess various challenges in processing due to inherent defects present in the plantation species. This study was conducted to determine the suitability of plantation grown timber Species Casuarina as a raw material for making Medium Density Fiberboard (MDF). Refining parameters with pressure of 5 Kg/cm² and 6 Kg/cm² at refining time of 4 and 7 minutes have been studied. Test panels of thickness 12 mm were made with urea formaldehyde resin. Physical and Mechanical properties were tested according to IS 12406-2003 Specification for Medium Density Fiber boards for General Purpose”. The results showed that the physical and mechanical properties of the panels were conforming to the requirements for MDF as specified in IS12406-2003 standards. These results indicate that MDF panels can be made from wood fibers derived from Casuarina. The study was limited to lab scale. Additional work is needed to ascertain the performance of MDF panels from this species through pilot and production scale trials.

Development of Composite using Bamboo Saw Dust and Bamboo Fibers (RR 195)

Bamboo saw dust composite and bamboo fiber bundle reinforced saw dust composite were developed without using any external resin/ adhesive. Bamboo saw dust was hot pressed to make
the panel product. The temperatures employed were 160°C, 180°C and 200°C at 4.5 MPa pressure of flat press. Samples were tested for mechanical and water absorption properties. The mechanical and water absorption properties improved with increasing temperature. From the results it was observed that after reinforcing bamboo saw dust with bamboo fiber bundles in unidirectional and bidirectional (orthogonal) at 200°C and 10 MPa pressure, both the mechanical and water absorption properties were further improved. The values obtained for tensile strength, modulus of rupture (MOR), modulus of elasticity (MOE), thickness swelling and water absorption were 6.03 N/mm², 10.37 N/mm², 1966 N/mm², 19.26% and 27.95% respectively. After reinforcement with bamboo fiber bundles, the tensile strength, MOR, MOE were improved by 327%, 463% and 155% respectively for samples with unidirectional fiber bundles reinforced composite. Both thickness swelling and water absorption reduced by 78% for bidirectional composite. Although, unidirectional fiber bundles reinforced composite has better mechanical properties than the bidirectional composite. But the bidirectional composite has better density and water resistance properties than the unidirectional composite.

**Exploratory study on suitability of Eucalyptus and Leucaenaleucocephala (Subabul)**

Studies on Peeling, Gluing characteristics of plantation timbers viz., Eucalyptus and Leucaena eucophala (Subabul) for making flooring tiles was carried out. Flooring tiles were made with Ply and LVL construction. Few test methods were identified and testing was carried out as per requirements for flooring. Prototype flooring tiles with tongue and groove joint were made and handed over to the sponsor ITC Life Science & Technology Centre, Bengaluru.
III 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.

A. IN-HOUSE PROJECTS

The following In-House Projects were completed during the year and the draft report/ vetting is under process:

1. WC/86/ FR/ CFS/ 2011: Development of durable fire retardant cum preservative coating for wood based panel products and bamboo composites

2. WC/96/ FR/ 2011: Innovative and Competitive technology for manufacture of Fire retardant adhesive for wood based panel products
3. WC/97/Door/2011: Manufacture of Flush Door with Engineered Core Infill
4. WC/108/Panel/2012: Development of light weight composite panel products
5. WC/117/Extender/2013: Development of New and improved extender for plywood adhesive having Extender-Scavenger dual function to make less toxic and more eco-friendly
6. NW C/109/MDF/2012: Development of Medium density fiber board- Phase I- Wheat Straw
7. WC/110/Resin/2012: Keratin Modified Urea formaldehyde resin for particle board and plywood and study on the durability of panel products

In-House Projects (Progress Report)

1. WC/112/Panel/2014: Development of fire retardant composite products

In all the metropolitan cities the firefighting services is not adequately equipped to fight fire eventualities in High rise buildings beyond 15 storeys. Demand for such products in High rise buildings will go up in the near future. Stingent rules for using fire retardant composites have been necessitated when high rise building is beyond 15 storeys.

The present invention is directed to the development of fire retardant composite having satisfactory structural integrity and strength for widespread application which would facilitate for safe adoption in high rise buildings. This would help us to avoid the damages caused by fire accidents in the buildings and also save the timber.

All categories of Fire retardant panel products developed at IPIRTI under various projects viz., fire retardant plywood, particle board, fire retardant coating composites made for doors were evaluated for thermal behaviour using TGA, toxicity index and limited oxygen index value. Process for the procurement of cone calorimeter is kept pending due to budget constraints. Further studies will be continued immediately after the procurement of cone calorimeter.

2. NWC/116/PB/2013: Development of Particle board and Medium density fibre board from Cassava stem

The project is focused to utilize the discarded material after crop harvesting for value added products. The discarded agro wastes of Cassava stem stalks were collected from the farmers after the harvest crop.

Particle boards made with cassava stem particle alone and also in combination with wood particles. Boards were tested as per the relevant IS standard. From 50 % of wood particles with cassava stem particle showing encouraging results.

Raw material has to be collected for further studies.
3. ESL/ 118/ Biocide/ 2013: Evaluation of Multicomponent biocide for protection of plywood and other panel products

Samples exposed for borer and termite attack were observed. Observation revealed that particle board samples does not have termite attack after 36 months exposure period. Whereas plywood samples with lower concentration had termite attack but no borer attack.

Project work is completed. Draft report prepared for vetting.

4. LP/ 119/ Anatomy/ 2013: Anatomical evaluation of adhesive penetration of timber

Qualitative characterization based on anatomical features of the selected species i.e. Silver Oak (Grevillea robusta), Poplar (Populus sp.), Mango (Mangifera indica), Birch (Betula sp.) and Gurjan (Dipterocarpus sp.) completed. Bondline morphology and interphase determination of all the selected species has been done. Result and data of each species have been shown in presentation. Image Analysis Software purchased and installed successfully in the biology lab. Gross quantitative analysis of all anatomical parameters of the selected species for intra specific variation calculation is under progress.

5. NWC/ 120/ Panel/ 2014: Development of composites from agro residues

With the development of construction and improvement of life standard a high demand for wood is being created. There is a deficit of 61.3 million cubic metre in the supply and demand for wood. To overcome this deficit and have a sustainable development of composite industry in India, there is a need to find new replaceable agro resources and develop innovative products.

Manufacture of boards of rice straw blended with other lignocellulosic material has been optimized for laboratory scale. Wheat straw composites with different adhesive system and with different biomaterial are being made. Work is limited to laboratory scale due to budget constraints.

6. NWC/ 122/ Bamboo strip/ 2013: Development of bamboo strip based composites with epoxy resin

The main objective of the project is to development of bamboo strip based composites with epoxy resin. Phenolic resin has been optimized for the epoxy resin synthesis. Epoxy equivalent weight has been determined for the hardener percentage. The board has been prepared.

The epoxy resin molar ratio has been optimized for the plywood panels. Epoxy resin viscosity has been determined with the help of Ostwald Viscometer. Further studies are under progress.
7. NWC/124/Composite/2014: Development of wood plastic composite

Wood-plastic composites are still new materials relative to the long history of natural lumber as a building material. The most widespread use of WPCs is in outdoor deck floors, but it is also used for railings, fences, landscaping timbers, cladding and siding, park benches, molding and trim, window and door frames, and indoor furniture. The wood particles are susceptible to fungal attack to some extent and the polymer component is vulnerable to UV degradation. Research in development of wood plastic composite by overcoming above problems are much needed.

Utilization of natural fibres/thermoplastic waste as reinforcing element in thermoplastic composites, in a cost effective manner, has become an attractive feature for developing such composites for a wide gamut of applications.

Discussions were held with the executive director of CIPET, Chennai for the fabrication of suitable extruder machine for making wood plastic composites of large panel size. A technical specification for the fabrication/procurement of extruder is being worked out by holding discussion with the fabricators. The procurement of extruder is pending awaiting release of grants.

8. NWC/127/Preservative/2014: Investigation on the susceptibility of various panel products to wood-deteriorating biological agents

The objective of this project is investigating the susceptibility of various wood composite panels to wood-deteriorating fungi. Five wood-attacking fungi (three mould fungi: Trichoderma sp., Aspergillus sp., and Penicillium sp., one brown-rot fungus: Tyromyces palustris; one white-rot fungus: Phanerochaete chrysosporium) were inoculated into four types of commercial wood composite panels (Plywood, Particle Board and Medium Density Fibre Board). The attacking patterns of the fungi in each panel were observed by weight basis and final result will be reported.

One set of samples were prepared and some more set of samples is under preparation. Six months exposure studies completed.

9. NWC/133/MDF/2015: Development of Medium density Fibre board (MDF) from Plantation grown timber Species Melia dubia

The species namely Melia Dubia is available in sufficient quantity in and around Karnataka. The lops and tops of tree can be used for MDF. The studies on processing parameters of these species will help the industry to venture in to starting of production of MDF. Study on refining parameters for the manufacture of fibres completed. Optimization of pressing parameters to produce lab scale panels of size 0.3 m x 0.3 m to meet testing requirements are completed.

Project work is Completed. Draft report is being prepared.
10. WC/134/Wood/2015: To establish a scarf jointing line for training and study the suitability of plantation grown timbers for producing face veneers

As suggested in previous 60th RAC, enquiries were made for scarf jointing machines. It was found that the scarf joints could not be used for face veneers. However face veneers could be produced finger joining. Suitability of Silver oak, Melia dubia etc. could be studied for production of face veneers through finger jointing techniques. Project kept in abeyance due to lack of funds.

11. NWC/135/BSL/2015: Establishment of facility for bamboo strand lumber for training and research purposes

Project will be initiated after receipt of adequate funds from MoEF&CC. Funds awaited under Skill India Mission.

12. NWC/137/Bamboo/2015: Study on the effect of nanoparticles on fire resistance and smoke suppression properties of bamboo strand lumber and plywood

The objective is to study the effect of calcium and magnesium nanoparticles on the flame retardant and smoke suppression properties of bamboo scrimber and plywood. Study is under progress.

13. NWC/138/Panel/2015: Development of particle board from Lantana Camara

The invasive weed Lantana camara can be converted as the value added product which will reduce the pressure on the natural forest. Raw material procured. Lab scale trials in process. Lantana camara was collected from nearby institute. Particles were prepared for board making. Laboratory studies are yet to be started.

14. NWC/139/Study/2015: Natural and accelerated weathering studies on wood and bamboo based composite materials

Natural weathering exposure for Plywood, BMB and BMCS are in progress. Accelerated weathering studies are delaying due to non-working condition of the Accelerated weather meters. M/s. Nano Scientific Instruments Pvt Ltd has completed the inspection of the UV and Xenon Weather meters and found that both machines are not in working condition. After the rectification of the problem the exposure studies will resume.

15. NWC/140/Study/2015: Estimation and Forecasting of Import of wood and wood products in India

Import of wood and wood products data were collected (quantity and value) from DGCIS, Kolkata and other different sources for the years 1988-89 to 2014-15. Data
sorting and tabulation are under progress. Visit to ICFRE has been planned for expert discussion and consultations.

16. IP/ 141/ WC/ Nano/ RY/ 2016: Development of low formaldehyde emitting plywood panels by Nano particle reinforcement

Work Initiated. Equipment has been purchased on Feb last week and comparative statement of chemical and glassware has been sent to IPIRTI Bangalore for approval.

17. IP/ 142/ WC/ Modified PFR/ SS/ 2016: Development of fast curing modified phenol formaldehyde resin for manufacture of plywood at lower curing temperature

The pressing temperature is a crucial parameter of plywood processing, since it strongly affects the quality of the plywood and production cost due to high utility consumption etc. Faster curing PF resins could potentially allow wood to be bonded at higher moisture contents and at lower press temperatures. Potential savings in energy use could be realized from the reduced extent of wood drying and the lower temperatures required for adhesive cure. Therefore be of great benefit to provide a curing process which would lead to curing at low temperatures and pressures with reasonable cure time to provide highly cross-linked resins without voids or air pockets. Such a process would be highly beneficial and convenient in the preparation of phenol-formaldehyde resin products. The conventional Phenol formaldehyde resol are cured at temperature about 140 - 145°C to produce highly cross linked resin under pressure. This study relates to a method to forming highly cross linked resin at a moderate temperature. Methyl formate and propelene carbonate were used as latent catalyst in the system of the instant study to initiate cross linking. The latent catalyst was used because of its capability to form more methelene bridge with phenol formaldehyde enabling fast curing at reduced temperature. The catalyst used more than 1% shows curing at reduced temperature. FTIR, DSC-TGA studies was carried out.12 mm plyboard and bonding properties of the adhesive study as per IS:848 are under progress manufactured at a temperature range from 100-120°C. Gel time and pot life study was carried. More laboratory trial is going on to optimize the process.

18. IP/ 143/ WC/ Modified PFR/ SS/ 2016: Development of PMDI/ UF modified resin for interior plywood manufacturing having better water resistance and rheological properties

In order to improve water resistance of Urea-Formaldehyde resin (UF), an adhesive commonly used in the manufacture of wood-based materials is modified first with water resistant melamine-formaldehyde (MF) or phenol-formaldehyde (PF) OR melamine urea formaldehyde adhesives. The aim of the study was another direction leading to
an enhancement of water resistance in amino resins is their modification with pMDI (polymeric 4, 4 methylenediphenyl isocyanate) to improve the water resistance since Polymeric diphenylmethane-4, 4’-diisocyanate (pMDI) resin adhesive used in wood-based composites is regarded as a non-formaldehyde-based adhesive with outstanding bond strength owing to high reactivity of the NCO group in the resin.

In this study laboratory trial was carried to modify UF resin with locally available polymeric isocyanates, since PMDI resin Desmodur purchasing is under progress. Since PMDI resin cannot be used directly during plywood manufacturing due to its high reactivity towards – OH group, hence it was added to modified UF resin during methylolation reaction for deactivation of – NCO group, Properties of the resin like viscosity, PH, gel time was carried out. However the addition of polyurethane powders to urea-formaldehyde (UF) resins improves markedly the performance of the panels prepared with these resins. Laboratory trial is under progress and to be carried with PMDI resin Desmodur to optimize the process.


Literature survey and material preparation for histological study is under progress. Microscope CCD camera DP 27 purchase is under progress (Order has been placed). Anatomical characterization of bamboo is under progress. Mechanical property analysis of Dendrocalamus strictus is under progress.

20. IP/145/Bamboo/Anatomy/RTS/2016: Laboratory testing methodologies for panel products against termite resistance.

20 wood species collected as per Indian standard for laboratory trial and graveyard test. Collected species exposed for the graveyard test. Trials for establishment of test culture in the lab is under progress. Identification of termite species available in the test site is under progress.


Objective of this study is to develop data on sound absorption coefficient and thermal conductivity of low density panels made out from agro residues to make its use in interior applications viz; slabs, roofing, false ceiling, surface panelling, partitions etc; and make designers to use the products confidently in end use applications.

Boards from wheat straw and coir were prepared and tested and evaluated for thermal and acoustic properties. Manufacture of boards from bagasse and rice straw is under progress.

Plantation grown timber species namely Melia dubia (Malia Vembu – Tamil, Kadbevu or Hebbevu – Kannada) is a promising tree highly suitable for farm forestry and agro forestry. It is a fastest growing tree and the wood from this tree is used in plywood industries. Due to its fast growing nature this species is being taken up for plantations in huge quantity in south India. This Timber is found to be suitable for manufacturing plywood, laminated veneer lumber (LVL), particleboard and medium density fiberboard (MDF). It is proposed to study the suitability of this timber for flush door and block board manufacturing as it can yield straight battens with minimal defects after sawing.

Procurement of Melia dubia logs is in progress.

23. IP/148/WC/Nano BB/KVR/2016: Preparation of block board with fire retardant nano chemicals

The objective of the study is Preparation of fire retardant Block board by using Nano Chemicals and Examine fire-retardant properties of Block board as per standards.

Preparation of Block board by using suitable Nano chemicals is done for both control and treated samples. Characterizations of fire retardant properties need to be done.

24. IP/149/WC/Bamboo/UDN/2016: Development of technique for production of decorative Bamboo Face Veneers from Sympodial Bamboo

Currently the decorative veneers are being produced by the industry from imported logs or flitches. The sources of supply of these imported species are getting depleted drastically, day by day. Hence there is an urgent need to find out alternate methods of making decorative face veneers from alternative green materials to meet the challenges posed by the shortage of decorative face quality veneers and it is very much necessary for continuing the production of decorative panels in the industry without disruption.

Design of Lateral Pressure exerting system is completed and is being fabricated and installed to the existing BVH press for making Bamboo laminates.

25. IP/150/Bamboo/HCP/AN/2016: Development of honeycomb panels using bamboo slivers

Panels were prepared from bamboo slivers as core (honeycomb structure) and veneers/BMB as skin. Testing is under progress.

26. IP/151/Bamboo/Weathering/VKC/2016: Accelerated weathering study on Bamboo Composites Viz. Bamboo Lumber or bamboo laminates

Prolonged exposure of any wood to natural weathering causes significant degradation of lignin (Kalinins 1966; Feist, Hon 1984) and de-polymerization of cellulose (Derbyshire,
Miller 1981), An early experiment on wood showed that after only 100 hours of exposure to natural sunlight, the surface layer of any lignocellulosic layer of wood / Hardwood was substantially di-lignified and there were indications that cellulose was also depolymerized (Richter 1935). However, the extent to which lignin and particularly cellulose are degraded at softwood surface by short period of exposure to severe natural weathering has received little further attention. So Bamboo Lumber is also a substitute of wood and need to study the following property after Accelerated weathering effect on Mechanical, Physical, colour change and fungus growth study to know the property of Bamboo Lumber.

Weathering study is a new field to judge the life cycle of Lignocellulosic materials. Bamboo composite products are also come under this category. Such kind of study will help us to predict the life of products in natural weather. We do not have data of weathering study on Bamboo laminates.

Study on Accelerated Weather (Through UV Weatherometer) treated and untreated sample for Physical Property, Mechanical Property as per Indian Standard IS 1708 will be undertaken. Color change and fungus growth study on Bamboo Lumber tested according to US standard ASTM G 154 (ASTM-G154 2006) on both untreated and treated sample will be undertaken.

Currently, outsourcing the Accelerated Weathering chamber is being explored.

27. IP/152/Bamboo/Housing/AS/2016: An experimental approach on development of alternate walling system for housing using bamboo and other materials

This study involves development of alternate walling system by half split bamboo and suitable sheathing material with cold setting adhesives for application in housing system. In this study, bamboo suitable for wall panelling system has been collected from local market and testing has been done as per IS: 6874:2008. Bamboo of length 20 ft and diameter 75mm to 80mm has been splitted into two halves. Cold setting adhesives was developed in laboratory and 2ft x 2ft size wall panel has been prepared by anchoring the half split bamboo on both the sides of suitable sheathing material (here shuttering plywood of 12mm has been used) in between the bamboo’s and clamped together with a nut and bolt. Evaluation of strength properties of the panel are in progress. Study will be done using different sheathing material (BMB/plywood) with different thickness and adhesive system.


Vacuum hot air oven is purchased. Installation work is under process.
29. IP/ 154/ WC/ MWCNT/ KVR/ 2016 : Development of Particle Board using Carbon NanoTubes (CNT) to improve physical and Mechanical Properties

This project is started in November 2016. Purchase of equipment enquiries under progress and Purchase of raw materials enquires is under progress.

B. SPONSORED PROJECTS

The following Sponsored Projects were completed during the year and some of the projects are already submitted to sponsor & others are under report preparation:

1. **SP/ 100/ Bamboo/ 2012**: Harvest Management Techniques and Storage of Bamboo Culms viz, Bamboo spp. for the development of Bamboo based MDF - Phase-I

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

3. **SP/ 110/ Resin/ 2014**: Polyurethane based adhesives for Bonding wood based products

4. **SP/ 113/ Compreg/ 2015**: Upgradation of the technology on the development of 50mm compregs using dyed veneers of plantation species (Densified Laminated Lumber) on commercial unit

5. **SP/ 115/ WC/ FRD/ VKC/ 2016**: Detailed manufacturing technology for the manufacture of FRD for 30 minutes rating (grade-C)

6. **SP/ 116/ Bamboo/ VertiLami/ VKC/ 2016**: Development of Vertical laminates for high end application products for housing application

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

8. **SP/ 106/ Wood/ 2014**: Weathering studies on solid wood-phase III

9. **SP/ 114/ Study/ 2015**: Efficacy study of the Powder resin (U F, M R & BR) by mixing with amino resins to increase the solid content of amino resin adhesive during manufacturing of M R & BW R plywood

10. **SP/ 119/ WC/ FlooringTiles/ U DN/ 2016**: Exploratory study on suitability of Eucalyptus and Leucaena leucocephala (Subabul)

11. **SP/ 126/ FII/ 2014**: Testing and Evaluation of properties of Acacia mangium and Melia dubia

12. **SP/ 121/ WC/ Colouring Veneers/ Sarda/ 2017**: Development of a technology for colouring of veneers with relevance to Gurjan, Beech and Eucalyptus species.
Progress on Sponsored Projects (ongoing):

1. **SP/97/Preservative/2013**: Modification and efficacy study of wood protector, the Eco friendly wood preservative for glue line treatment during manufacture of plywood sponsored by M/s. Wood Cure Enterprises, Kolkata

   The objective was to evaluate the wood protector, an eco-friendly wood preservative using naturally available plant by-products, CSNL with anti-termite, anti-fungus and anti-borer materials having less toxicity to human being but high toxic to wood destroying organism, as a suitability as wood preservative in plywood industries. 12mm Plywood samples at different concentration (0.5 to 5%) preservative were manufactured randomly by using wood protector as a glue line preservative with combination of different species. These samples have been evaluated to find out the effectiveness as wood preservatives against decay fungi and termites. From the results obtained in this study it can be concluded that 1.5% or more concentration of the preservative can be utilized in plywood manufacture which can resist against wood destroying organism. Concentrations below 1.5% of preservative make the samples prone to termite and borer attack. Therefore, 1.5% to 2.5% are the feasible concentrations to be used for plywood manufacture. The result of MoE, MoR test at 1.5% to 3% concentrations also show satisfactory limit of acceptance. 36 months exposed samples to be evaluated and thermal degradation analysis is under progress.

2. **SP/99/Preservative/2013**: Utilization of radiation technology to increase the preservation quality of wood by inhibition of wood rotting fungi and insects sponsored by BARC (Bhabha Atomic Research Centre)

   After initial PI Smt. Aparna Kalawate was transferred, letter was sent to BARC on 18.06.2015 for further continuation of the project work at IPIRTI. BARC communicated that they will visit to our Institute for further discussion and continuation of the project work. A visit was undertaken by BARC officials and they have suggested to continue the project. However, awaiting written reply from BARC.

3. **SP/103/Preservative/2014**: A study on efficacy of Nano Inorganic Antimicrobial material in manufacture of panel products as wood preservative sponsored by M/s. G.T.Z. Pvt. Ltd., Kolkata

   Plywood constructed with mango and poplar veneer for all concentration ranging from 0.25% to 2% of Nano Inorganic Antimicrobial material using PF and UF resin has been evaluated after 24 months and 30 months. No borer attack has been observed in
plywood for all the concentration after 27 months of exposure. Solid timber of mango and poplar treated with Nano Inorganic Antimicrobial material for all concentration ranging from 1% to 5% of material. No borer attack has been observed in timber samples for all the concentration after 27 months of exposure. Particle board samples for all concentration in the ranging from 0.25 to 2% of concentration of Nano Inorganic Antimicrobial preservative using UF resin has been attacked by termite. Borer studies for plywood and timber are in progress for next 30 months and 36 months respectively. Study against fungus exposure are in progress.

4. **SP/ 108/ PB/ 2014: To study the Techno-Economic Feasibility for the Development and Commercialization of Particle Board from Jute Sticks sponsored by National Jute Board, Kolkata**

The Jute stick particles sizes were optimized to standard sizes for face < 1mm and for core particles > 1 ≤ 3mm. The sizing of the particles required hammering/crushing rather than the usual chipping of particles and then sent to the pulverizer for converting into required size for face and core separately.

The parameters in the industrial oven for drying was standardized to bring down the moisture to 3-4%. The moisture content of the particles were analyzed on online moisture meter as higher moisture creates problem while bonding i.e., steam pockets are formed in the central layer. The UF resin was blended with the particles and the adhesive formation have been optimized for making multi layered particle board of density 700-850 kg/m³. The hot press parameter for manufacturing 3 layered/multilayered particle boards were worked out i.e., hot press temperature of 165±5°C, specific pressure of 25 kgs/cm² for 6 minutes in compression cycle and 12 kgs/cm² for 6 months for curing cycle for a board of 12 mm thickness. The boards were free of any visual defects. The panels were then stabilized for 24-48 hrs. to attain equilibrium moisture. After stabilizations the panels were trimmed and cut to sizes for evaluating the physical and mechanical properties as per IS:3087 Specification for Medium Density Particle Board multilayered grade 2. The properties of the board conforms to the requirements of IS:3087. The same formulations were repeated for checking the consistency in the results and observed that the results obtained were consistent and meets the requirement of grade 2 multilayered medium density particle board as per IS:3087.

Development of resin formulation and process parameter for manufacture of Jute Sticks Particle Board on lab scale and pilot scale and to test the boards as per IS specification has been carried out.
5. **SP/ 109/ BL/ 2014: Establishment of common facility centre for preliminary processing of bamboo for value addition at foot hills of Shivalik, Talwara forest (Hoshiarpur)-Punjab**

It was planned to establish a Common Facility Centre at Talwara which will improve infrastructure facilities for Bamboo development at Talwara and can serve as a training centre for the artisans and others interested in the field. The centre can cater to the need for training a group of artisans who can in turn act as trainer in different parts of the state where many more processing centre of bamboo can be established at latter date.

Primary bamboo processing machines transferred to Punjab. Installation of Bamboo machines is under progress. Performance trial work and training of Forest Officials/Staff carried out.

6. **SP/ 111/ Preservative/ 2015: Evaluation of Agenda 25 EC (Fipronil) wood preservative chemical against wood borer and termites for plywood and solid wood sponsored by M/s. Bayer Environmental Science, Maharashtra**

Plywood samples were prepared with 1%, 1.5%, 2% and 2.5%, exposed for termite and borer study. 21 months exposure studies were undergoing. 18 months a progress report was prepared and submits to sponsor.

Project work is under progress.

7. **SP/ 112/ Weathering/ 2015: Weathering studies on solid wood (Phase II & Phase III)**

This is the continuation of the Phase I project. Accelerated weathering studies were conducted on the given treated samples. UV weather o meter was used for this study. Color changes were recorded in every stages of the program. Exposed samples were submitted to the sponsor.

Phase III is yet to start due to delay in supplying the samples that needs to be exposed from the sponsor.

8. **SP/ 117/ Bamboo/ CFC-Ranchi/ VKC/ 2016: Establishment of Bamboo Common Facility Centre and treatment unit at IFP, Ranchi**

Procurement of Bamboo Processing machines and treatment plant is under progress.

Planned Steps for next three months:
- To Procure the Bamboo Processing machines and treatment plant
- To Install and to take trial run of machines at Jadua Nursery, Bihar
- To Plan/ Steps for next three months.

Particle board samples have shown resistance to termite attack for period of six months. MDF samples were prepared and exposed. Fungus exposure test is under progress.

10. SP/123/Bamboo/Bijapur/2017: Opening a Sub-centre/Unit for Bamboo Development at Bijapur (CG)

Procurement of Bamboo processing machines is under progress.

C. CONSULTANCY PROJECTS:

The consultancy projects given below have also been completed in this year:


04.05.2016: CP/44/Testing/2016: Technology Transfer for manufacturing of fire retardant doors through construction method for 60 minutes and 120 minutes to M/s. Aditya Industries, Chikhli, Gujarat.

16.05.2016: CP/48/Testing/2016: Evaluation of fire rating of door shutter with fire rating of 120 minutes received from M/s. Bull Dog protection, UK

19.05.2016: CP/40/Testing/2016: Evaluation of fire rating of door shutter with fire rating of 60 minutes received from M/s. Shreeji Wood Craft Pvt. Ltd., Borivali, Maharashtra.

01.06.2016: CP/42/Testing/2016: Evaluation of fire rating of door shutter with fire rating of 120 minutes received from M/s. Anisha Arjun Hardasani, Andheri, Mumbai.

07.06.2016: CP/43/Testing/2016: Evaluation of fire rating of door shutter with fire rating of 120 minutes received from M/s. Ashish Enterprises, Navsari, Gujarat.
22.06.2016: CP/41/Testing/2016: Evaluation of fire rating of door shutter with fire rating of 120 minutes received from M/s. Shri Ram Panels Pvt. Ltd., Fatehgarh Sahib, Punjab.


02.08.2016: CP/45/Testing/2016: Evaluation of fire rating of door shutter with fire rating of 60 minutes received from M/s. Greenply Industries Ltd., Udham Singh Nagar, Uttarakhand.


06.01.2017: CP/50/testing/2016: Evaluation of fire rating of door shutter with fire rating of 120 minutes received from M/s. A.K. Panels, Mangalore, Karnataka.

12.01.2017: CP/51/Testing/2016: Evaluation of fire rating of door shutter with fire rating of 120 minutes received from M/s. Pragathi enterprise, Surat, Gujarat.

02.02.2017: CP/52/Testing/2016: Evaluation of fire rating of door shutter with fire rating of 60, 90 and 120 minutes received from M/s. Shobha Interiors, Bangalore, Karnataka.


07.03.2017: CP/57/Testing/2017: Evaluation of fire rating of door shutter with fire rating of 60 minutes received from M/s. Promat, Malaysia.

23.03.2017: CP/54/Testing/2017: Evaluation of fire rating of door shutter with fire rating of 60 minutes received from M/s. MSBC Secure India, Ahmedabad, Gujarat.

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.

a. 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, 27th 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 30 candidates completed the course successfully and 100% placement was arranged through Campus selection process. Training for 28th Course for One year Post-graduate Diploma in Wood and Panel Products Technology for graduates in Science and Engineering was started and the course is in progress wherein 33 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.
As a part of PGDC, a study tour was arranged for the trainees during 19.09.2016 to 23.09.2016 in order to acquaint them with the manufacturing processes in wood based industries like M/s. Maheshwari Plywood, Mysore, M/s. Kanara Wood & Plywood Industries, Mangalore, M/s. Yenopoya Resins, Mangalore, M/s. Kanachur Seasoning Industries, Mangalore, M/s. Akolite Synthetic Resins, Mangalore and M/s. Expertise Industries Pvt. Ltd., Mangalore.

Valedictory Function

Valedictory function of 27th Batch of PGDC trainees was conducted on 09.11.2016. Valedictory address was given by Dr. M.H. Swaminath, IFS (Retd.) and former APCCF & Secretary to Govt. of Karnataka, Bangalore. Medals & Diploma Certificates were awarded to successful trainees by the Chief Guest Dr. M.H. Swaminath, IFS (Retd) and Dr. B.N. Mohanty, Director, IPIRTI.

b. 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.

15 number of short term vocational training courses have been conducted during the year 2016-2017 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.

**Short Term Training Courses conducted during the year:**

11.04.2016-13.04.2016: A training course on “Testing of Block Board and Flush Door as per IS: 1659 & IS: 2202 (Part-I) was conducted for six candidates sponsored from plywood industries at IPIRTI-Centre, Mohali.

02.05.2016 - 02.06.2016: One month training programme on “Plywood Manufacturing Technology” was conducted for six candidates at IPIRTI Field Station, Kolkata. Shri. Amitava Sil, Officer-In-Charge, IPIRTI Field Station, Kolkata, accompanied the trainees for demonstration at M/s. Century Plyboards (P) Ltd, Kolkata on 28.05.2016 as a part of the training programme.

20.06.2016-24.06.2016: A training course on “Testing of Plywood and Flush door as per IS: 303, 710 1328, 4990 & 2202” was conducted for four candidates from plywood industries at IPIRTI, Bengaluru.

18.07.2016-22.07.2016: A training course on Plywood Manufacturing Technology-I was conducted for five candidates from plywood industries at IPIRTI, Bengaluru.

25.07.2016-29.07.2016: A training course on Plywood Manufacturing Technology-II was conducted for ten candidates from plywood industries at IPIRTI, Bengaluru.

01-03.09.2016: One Month training course on “Plywood manufacturing technology” was conducted for six candidates at IPIRTI Field Station, Kolkata. Shri. Amitava Sil, Scientist, Officer In-charge, IPIRTI, Field Station, Kolkata, accompanied the trainees for demonstration at M/s. Century Plyboards (P) Ltd, Kolkata on 29.09.2016 as a part of the training programme.

19-23.09.2016: A training course on “Low cost and special resin manufacturing” was conducted for two candidates at IPIRTI Field Station, Kolkata.

09.01.17-13.01.17: A training course on “Testing of Plywood, Block Board and Flush Door” was conducted for three candidates at IPIRTI Field Station, Kolkata.
06.02.17-10.03.17: One month training course on “Plywood manufacturing technology” was conducted for two candidates at IPIRTI Field Station, Kolkata. As a part of the training course, Shri. Amitava Sil, Officer-In-Charge, IPIRTI Field Station, Kolkata visited M/s. Century Plyboards (P) Ltd, Kolkata by accompanying trainees for demonstration on 10.03.2017.

29.03.17-31.03.17: A training course on “Resin Manufacturing” was conducted for three candidates at IPIRTI Field Station, Kolkata.

**Special Training Courses:**

Two-days training workshop for IFS officers on the theme of “Live Demonstration at Factories” for 21 IFS officers from all over India was conducted at IPIRTI, Bangalore during 28-29 April, 2016.

Five days training programme on “Flush Door manufacturing” was conducted for 6 candidates sponsored from plywood industries by Dr. Vipin K. Chawla, Scientist at IPIRTI, Bangalore during 20-24 June, 2016.

One week refresher training course for IFS Officers on the theme of “Bamboo Resource Development for addressing Livelihood Concerns of Communities” for 21 IFS officers from all over India was organized by Dr. B.N. Mohanty, IFS, Director for during 11-15 July, 2016 at IPIRTI Bengaluru. Dr. Manoj K. Dubey, Joint Director as a Course Director and Shri. K. Thanigai, Scientist as a Course-coordinator assisted the team. As a part of training course, the IFS Officers visited to M/ s. Grow More, Hosur and M/ s. INFOSYS for Bamboo Plantation in their campus.

“Demonstration-cum-Hands on Exercise with Bamboo Primary Processing Machines for Bamboo Skill Development during North East Festival events” from 01st to 10th December, 2016

IPIRTI in collaboration with Ministry of Development of North Eastern Region (DoNER), Nagaland Bamboo Development Agency (NBDA) and Nagaland State Forest Department organized 10 days training programme under the leadership of Dr. B. N. Mohanty, IFS, Director, IPIRTI on Bamboo Processing during 1st - 10th December, 2016 at the Hornbill festival, Kisama hill, Kohima, Nagaland. The demonstration and training was conducted by Scientists and technical staff of IPIRTI with the help of the functionaries of Nagaland State Bamboo Missions-Nagaland Bamboo Development Agency and Nagaland State Forest Department.
Under this programme, training was imparted to the various delegates from Bamboo based Industry, Forest Department officials, NBDA staff, Entrepreneurs, Local Youths and Artisans and awareness was generated about usage of Bamboo Processing Machines in making of Bamboo artifacts and further dovetailing to high end industrial products for employment and prosperity. About 185 participants were undergone training. Besides display to general public was also arranged during this festival in order to propagate and promote the bamboo technologies to improve the utilization of the materials and to create awareness about the use of bamboo as an alternative to wood composites thereby conserving the forest.
Training group from Nagaland Industry and Commerce Department

Training group from Working Plan division - Nagaland Forest Department

Local youths from Nagaland
Artisans from Nagaland

Coverage in Print Media

Our thanks are due to Ministry of DoNER for funding the training, PCCF Nagaland, Nagaland Bamboo Development Agency for their help and support towards successful organization of aforesaid training.

Training on “Primary Processing of Bamboo” at Central Academy for State Forest Service (CASFoS), Burnihat, Assam during 19th to 23rd December, 2016

IPIRTI has already became a nodal centre for development of industrial product from bamboo. Bamboo based composites provide promising linkages between organised sector (resin bonded boards) and un-organised sector (hand woven mats). Thus, it has significant potential to uplift the economy of bamboo growing areas by generating awareness, skill up-gradation, technology transfer where IPIRTI has been playing a key role. IPIRTI in collaboration with Ministry of DoNER, had organized 5 days training programme on bamboo processing at CASFoS, MoEF&CC, Burnihat, Assam during 19th to 23rd December, 2016.
The training module consisted of theory classes for three hours with power point presentation featuring key points are as follows:

a) Bamboo – Introduction and basic properties
b) Processing of Bamboo with special emphasis on primary processing with machineries
c) High end products from bamboo and then two and half hours of practicals based on demonstration cum training in bamboo processing machineries.

The hands on exercise on bamboo processing machines that were familiarized among the trainees during the training course are as follows:

(a) Bamboo Cross Cutting Machine
(b) Bamboo Radial Splitter Machine
(c) Bamboo External Knot Removal Machine
(d) Bamboo Thick Slicer Machine
(e) Bamboo Thin Slicer Machine
(f) Bamboo Round Stick making machine
(g) Bamboo stick polishing machine
(h) Bamboo stick sizing machine

Shri. Roshan Horo, Principal, CASFoS and Shri. N. Luikam, Lecturer, Dr. B. N. Mohanty, IFS, Director, Dr. Manoj Kumar Dubey, Joint Director, Shri. Amitava Sil, Scientist, Dr. Pradeep Kushwaha and Shri. S. C. Sahoo, Scientist’s were present on the opening day of the five days training programme. Shri. Arvind Madhav Singh, IFS, APCCF, Dept. of Environment and Forest, Govt. of Assam addressed the trainees on the second day and gave a short presentation on “Present status of Bamboo in Assam”. Shri. S. Ashutosh, IFS, Addl, PCCF, Forest and Environment, Govt of Meghalaya was present on the fourth day of the training programme and also addressed the trainees. Shri. Vikram Thapa, Addl PCCF, Dept of Environment and Forest, Govt. of Assam was also present on the fourth day.

Dr. B.N. Mohanty, IFS, Director, Dr. Manoj Kumar Dubey, Joint Director, Shri. Amitava Sil, Shri. S. C. Sahoo, Dr. Pradeep Kr. Kushwaha, Scientists, Shri. Akash Anand Solanki, Technical Assistant and Shri. Kalyan Chakravarthy, Technical Staff conducted 5 days training programme on Primary processing of bamboo for sliver and round stick making under “Demonstration-cum-Hands-on Exercise with Bamboo Primary Processing Machines”. Approximately 278 nos. of youths from Assam Forest School, Jalukbari, Assam; Ri-bhoi Area Welfare, Meghalaya; CBTC, Assam; CASFoS, Burnihat, Assam; Dept. of Environment and Forest, Silviculture Division;
Central Institute of Plastics Engineering & Technology, Guwahati; Dept. of Environment and Forest, FRS Division, Assam; Forest and Environment Department, Govt. of Meghalaya and M. B. D. A., Shillong, Meghalaya participated in the training programme at Central Academy for State Forest Service (CASFoS), Burnihat, Assam.

Trainees from Assam Forest School, Jalukbari with faculty of IPIR

Trainees from Assam Forest School, Jalukbari during demonstration session

Trainees from CIPET, Guwahati

Shri S. Ashutosh, IFS, Addl, PCCF, Forest and Environment, Govt. of Meghalaya addressing the trainees
Trainees from CASFoS, Burnihat, Assam, with IPIRTI Faculty

Trainees from CASFoS, Burnihat, Assam, attending Theory Session

Trainees from CASFoS, Burnihat, Assam, with IPIRTI Faculty

Trainees from CASFoS, Burnihat, Assam, attending Theory Session

The Kannada Learning Classes for PGDC trainees and Non-Kannadiga staff of IPIRTI was inaugurated by Dr. B.N. Mohanty, IFS, Director on 03.01.2017 at IPIRTI, Bangalore. Shri. Ramesh, Language Facilitator from Kannada and Cultural Department, Govt. of Karnataka was appointed as Master for teaching Kannada for a period of 3 months.

Dr. B.N. Mohanty, IFS, Director addressing inaugural function of Kannada learning classes.
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.

795 samples of wood and wood based panels including resin and chemicals received from outside agencies were tested as per relevant standards (FY 2016-17) are as follows:

<table>
<thead>
<tr>
<th>Type of the material</th>
<th>No. of Samples tested</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plywood</td>
<td>221</td>
</tr>
<tr>
<td>Block board and flush door</td>
<td>175</td>
</tr>
<tr>
<td>Particle and fiberboard</td>
<td>24</td>
</tr>
<tr>
<td>Resin and chemicals</td>
<td>93</td>
</tr>
<tr>
<td>Wood and veneers</td>
<td>239</td>
</tr>
<tr>
<td>Others</td>
<td>43</td>
</tr>
<tr>
<td>Total</td>
<td>795</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 the 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 subcommittees 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 4313 books on forestry, wood science, polymer science, polymers and allied subjects, journals including international journals and 2912 back volumes are available for ready reference and during the year 2016-17, 15 books (in Hindi) added. The library facilities are extensively used by the scientists and trainees, and are also open to industry personnel and researchers from other institutes.

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 internet. 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
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 Published:**
Following Research Reports have been published during the year:

1. Development of UV & Weather Resistant Coating for Wood based Panel products and Bamboo Composites : RR 189
2. Study on the effect of Density Variation through thickness on Properties of Three Layer Particle Board : RR 190
3. Study on suitability of Melia dubia for Laminated Veneer Lumber (LVL) manufacturing : RR 191
4. Development of PUMF Resin for the Manufacture of Plywood : RR 192
5. Studies on Variation in Plantation Grown Melia dubia including Selected Clones of Populus deltoids and its Suitability for Plywood Manufacturing: **RR 193**

6. Development of Bamboo Strand Lumber for Housing Application: **RR 194**

7. Development of Composite using Bamboo Saw Dust and Bamboo Fibers: **RR 195**

**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.

IPIRTI initiated action for strengthening of E-Governance/IT activities of the Institute. And in order to automate the day to day activities and to cater to the needs of different divisions, we have successfully implemented ERP Solution having different modules like Account, HR Ms, Training, etc.

The institute has its Internet portal at www.ipirti.gov.in for public access which contains details of various activities of our institute including details of Membership, Training Calendar and Testing Charges. The Hindi version of the website is at the same web address and we working towards making all the pages bilingual. The Institute is having another portal www.bamboocomposites.com which is exclusively for bamboo related activities at IPIRTI.

IPIRTI has setup a Client/Server network and providing the following services to both the staff and the PGDC Trainees.

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

5.1 Transfer of Technology

**MoU SIGNED**

**09.03.2017:** A Memorandum of Understanding (MoU) was signed and exchanged between Dr. B.N. Mohanty, IFS, Director IPIRTI and Dr. Subhash Ashutosh, IFS, Dy. CEO MBDA, Meghalaya Shillong, Govt. of Meghalaya for Establishment of Common Facility Centres (CFCs) for Bamboo Development in Meghalaya State.

MoUs were signed by Dr. B.N. Mohanty, IFS, Director, IPIRTI for Technology Transfer of Fire Retardant Door and the Consultancy Projects on Evaluation of fire rating of Fire rated door shutters are as follows:

**07.04.2016:** CP/36/Testing/2016: Evaluation of fire rating of door shutter with fire rating of 60 minutes received from M/s. Space wood Furnishers Pvt. Ltd., Nagpur, Maharashtra.

**21.04.2016:** CP/37/Testing/2016: Evaluation of fire rating of door shutter with fire rating of 60 minutes received from M/s. Ardor Fire & Safety systems, Mumbai, Maharashtra.

**25.04.2016:** CP/38/Testing/2016: Evaluation of fire rating of door shutter with fire rating of 120 minutes received from M/s. VK Patel & Co., Thane, Maharashtra.

**04.05.2016:** CP/44/Testing/2016: Technology Transfer for manufacturing of fire retardant doors through construction method for 60 minutes and 120 minutes to M/s. Aditya Industries, Chikhli, Gujarat.

**16.05.2016:** CP/48/Testing/2016: Evaluation of fire rating of door shutter with fire rating of 120 minutes received from M/s. Bull Dog protection, UK.

**19.05.2016:** CP/40/Testing/2016: Evaluation of fire rating of door shutter with fire rating of 60 minutes received from M/s. Shreeji Wood Craft Pvt. Ltd., Borivali, Maharashtra.

**01.06.2016:** CP/42/Testing/2016: Evaluation of fire rating of door shutter with fire rating of 120 minutes received from M/s. Anisha Arjun Hardasani, Andheri, Mumbai.

**07.06.2016:** CP/43/Testing/2016: Evaluation of fire rating of door shutter with fire rating of 120 minutes received from M/s. Ashish Enterprises, Navsari, Gujarat.

**22.06.2016:** CP/41/Testing/2016: Evaluation of fire rating of door shutter with fire rating of 120 minutes received from M/s. Shri Ram Panels Pvt. Ltd., Fatehgarh Sahib, Punjab.


**02.08.2016:** CP/45/Testing/2016: Evaluation of fire rating of door shutter with fire rating of 60 minutes received from M/s. Greenply Industries Ltd., Udham singh nagar, Uttarakhand.


06.01.2017: CP/50/testing/2016: Evaluation of fire rating of door shutter with fire rating of 120 minutes received from M/s. A.K. Panels, Mangalore, Karnataka.

12.01.2017: CP/51/Testing/2016: Evaluation of fire rating of door shutter with fire rating of 120 minutes received from M/s. Pragathi enterprise, Surat, Gujarat.

02.02.2017: CP/52/Testing/2016: Evaluation of fire rating of door shutter with fire rating of 60, 90 and 120 minutes received from M/s. Shobha Interiors, Bangalore, Karnataka.


07.03.2017: CP/57/Testing/2017: Evaluation of fire rating of door shutter with fire rating of 60 minutes received from M/s. Promat, Malaysia

23.03.2017: CP/54/Testing/2017: Evaluation of fire rating of door shutter with fire rating of 60 minutes received from M/s. M SBC Secure India, Ahmedabad, Gujarat.

31.03.2017: CP/58/Testing/2017: Evaluation of fire rating of door shutter with fire rating of 120 minutes received from M/s. Doors and Doors, Andheri, Maharashtra.

Patent

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 already obtained 5 Patents and 8 filed to be patented from Patent office, Government of India as per details given below:

Patented

1. Cardanol Phenol Formaldehyde Resin - 146025
2. A Method of Manufacturing Bamboo Splints - 199046
3. A Process for the Manufacture of Bamboo Mat Moulded Skin Boards for Doors - 242299
4. A Process for Producing Comregs from Bamboo Mats/ Veneers of Plantation Timber or a combination thereof - 245157
5. Bamboo Mat Corrugated Sheets (BMCS) – 266054
**Applied and awaiting to be patented**

1. A Method of Manufacture of Bamboo Mat Ridge Cap for Roofing with Bamboo Mat Corrugated Sheets - 639/ CHE/ 2009 A
2. A Method of Manufacture of Flooring Tiles from Bamboo Strips - 2277/ CHE/ 2009
3. Wood Preservatives and a Method for Protecting Wood and Wood based Panel Products - 3393/ CHE/ 2012
4. Fire Retardant Door Assembly - 4468/ CHE/ 2015
5. Method of Manufacturing of Rice Straw Medium Density Fibre Board – 201641004352
6. Method of Manufacturing of Rice Husk Particle Board – 201641015011
7. Polyurethane Based Adhesive Composition and a Method of preparing the same - 201741004414
8. Soya Based Phenolic Adhesive Composition and a Method of preparing the same - 201741004536

**5.2 Meeting/ Seminars/ Workshops/ Conference**

08.04.2016-10.04.2016: Dr. B.N. Mohanty, IFS, Director and Dr. Manoj K. Dubey, Joint Director attended Global Bamboo Summit at Brilliant Convention Centre, Indore, Madhya Pradesh and made two presentations on “Value-addition Technologies in Bamboo treatment & Processing” and “Affordable Bamboo Housing” in the Technical Session No.3 and No.5 respectively.

06.05.2016: Dr. B.N. Mohanty, IFS, Director visited Kerala State Bamboo Corporation Ltd., Angamaly, Kochi for review of previous collaborative projects and prospect of future joint venture.

17.05.2016: Dr. B.N. Mohanty, IFS, Director visited CASFoS and Bamboo Technology Park, Burnihat, for exploring the possibilities of organizing Skill Development Training with the existing infrastructure of CASFoS.

19.05.2016: Dr. B.N. Mohanty, IFS, Director had meeting with Shri. Sunil Joshi, Vedha India and Shri. Sanjeev Karpe of CIBART about the prospects of Bamboo Development and future collaboration.

20.05.2016: Dr. Ranjana Yadav, Scientist, Officer In-charge, IPIRTI-Centre, Mohali attended the “International Conference on Recent Trends and Developments in Environment Sustainability” at National Institute of Technical Teachers Training & Research (NITTTR), Chandigarh.

08.06.2016: Dr. B.N. Mohanty, IFS, Director participated in the “Brain-Storming Session” on “Promoting Marketing of Bamboo” organized by Tribal Co-Operative Marketing Development Federation of India Limited (TRIFED), New Delhi.

17.06.2016: Dr. B.N. Mohanty, IFS, Director attended the presentation and discussion with Dr. Arun Gupta, Associate Professor, Department of Wood Composites, University of Pahang, Malaysia.

21.06.2016: Dr. B.N. Mohanty, IFS, Director attended a meeting regarding Forestry Skill Development Programme under the Chairmanship of Director General of Forests & Special Secretary, MoEF&CC at Indira Paryavaran Bhawan, New Delhi.

28.06.2016: Dr. B.N. Mohanty, IFS, Director addressed one day Wood Industry Meet at IWST, Bangalore as Chief Guest. Dr. Manoj K. Dubey, Joint Director and Ms. Sujatha D., Scientist participated in the meet.

28.06.2016: Shri. Amitava Sil, Scientist, Officer-In-Charge, IPIRTI Field Station, Kolkata attended conference on Smart Living “Building Smart-Living Green” organized by Indian Chamber of Commerce at ITC Hotel, Sonar Bangla, Kolkata and gave presentation on “Bamboo Structured Green Building” in a Technical Session on “Energy and Water Efficiency in Green Building”.

09.07.2016: Dr. B.N. Mohanty, IFS, Director, IPIRTI attended the meeting of Parliamentary Committee on Papers Laid on the Table of Lok Sabha which visited Bengaluru and presented the activities of IPIRTI and status of papers laid on the table of Houses. Dr. Manoj K. Dubey, Joint Director coordinated for the visit and all the scientists of the Institute attended the meeting.

19.07.2016: Dr. B.N. Mohanty, IFS, Director attended the meeting at MoEF&CC, New Delhi and made presentation before the Committee on Environment Education, Training and R&D constituted by MoEF&CC for evaluation of the Plan Schemes.

25-27.07.2016: Dr. Ranjana Yadav, Scientist, Officer In-charge, IPIRTI-Centre, Mohali attended training on Measurement uncertainty at BIS, Chandigarh.

27-28.07.2016: Dr. B.N. Mohanty, IFS, Director attended the Conference of Central Autonomous Bodies (CABs) organized by Pension Fund Regulatory & Development Authority (PFRDA) at India Habitat Centre, New Delhi.

28.07.2016: Dr. Manoj K. Dubey, Joint Director participated in the Stakeholders meeting at Institute of Wood Science & Technology (IWST), Bengaluru.

12.08.2016: Dr. B.N. Mohanty, IFS, Director as Central Government Nominee attended Selection Committee Meeting of Kerala Cadre for the Select List of 2013 & 2014 for the promotion of SFS Officers to IFS at Kochi.
30.08.2016: The periodic meeting of Internal Committee for Sexual Harassment in work places was convened at IPIRTI, Bengaluru. Dr. B.N. Mohanty, IFS, Director chaired the meeting and Dr. Manoj K. Dubey, Joint Director and other ICC committee Members attended the meeting.

08.09.2016: Dr. B.N. Mohanty, Director & Dr. Manoj K. Dubey, Joint Director participated in a Centre for Science and Environment meeting on “Status of Wood Production and Consumption in India” held at Institute of Wood Science & Technology (IWST), Bengaluru.

09.09.2016: Dr. Manoj K. Dubey, Joint Director was invited as the Chief Guest to deliver an inaugural address during the two days National level seminar on “Technological Advancements in Fuel Cell Research” at Sri. Ventakateswara College of Engineering, Chennai.

20-23.09.2016: Dr. Manoj K. Dubey, Joint Director attended the training programme on “Laboratory Management System & Internal Audit as per IS/ ISO/ IEC 17025:2005 & NABL requirements” at Electronics Test and Development Centre (ETDC), Bengaluru.

22.09.2016: Dr. B.N. Mohanty, IFS, Director attended the Press Meet at Bengaluru Press Club about Bamboo Cultural Festival in IWST, Bengaluru.

24-25.09.2016: Dr. B.N. Mohanty, IFS, Director participated in the Bamboo Cultural Fest’ 2016 organized to celebrate World Bamboo Day by Bamboo Society of India at IWST Bengaluru and presented paper during Valedictory Session. Dr. Manoj K. Dubey, Joint Director co-ordinated as a collaborator for the cultural fest and Dr. Vipin K. Chawla, Scientist assisted in the fest. During the festival Shri. K. Thanigai, Scientist exhibited the Bamboo Products developed at the institute.

Dr. B N Mohanty, Director, Dr. Manoj K. Dubey, Joint Director & Shri. K Thanigai, Scientist in IPIRTI Stall at IWST, Bengaluru

27-28.09.2016: Dr. B.N. Mohanty, IFS, Director attended the Conference organised by Ministry of Development of North Eastern Region (DoNER) to discuss various issues pertaining to
optimal use of bamboo as a critical product for the development of North Eastern Region (including Bamboo Transportation and Taxation issues within the North Eastern Region) in Hotel Ashoka, New Delhi.

03.10.2016: Dr. B.N. Mohanty, IFS, Director attended and participated in the discussion held at Research Advisory Group (RAG) Meeting of Institute of Wood Science & Technology (IWST), Bengaluru.

06.10.2016: Shri. Kiran M.C and Smt. Mamatha B.S., Scientists visited Central Coir Research Institute (CICT), Bengaluru to have discussion on the project “Study on Acoustic and Thermal efficiency of panels made from Agro residues”.

18.10.2016: Dr. B.N. Mohanty, IFS, Director attended the meeting with officials of ICFRE, IGNFA, IIFM and DFE under the Chairmanship of Director General of Forest & Special Secretary, MoEF&CC in Krishna Conference Hall, MoEF&CC, New Delhi for review of progress of research activities.

20.10.2016: Shri. Amitava Sil, Scientist/ Officer-In-Charge, IPIRTI, Field Station Kolkata attended National Seminar on “Standards Build Trust” on the occasion of World Standards Day at Hotel, Stadel, Kolkata.

25.10.2016: Dr. Manoj K. Dubey, Joint Director participated in Stakeholder Consultation Workshop on Draft Forest Management Certification Standard developed by Network for Certification and Conservation of Forest (NCCF) at Institute of Wood Science & Technology (IWST), Bengaluru.

08.11.2016: Dr. B.N. Mohanty, IFS, Director participated in the National Convention on “Innovation in Green Highways” organised by the National Green Highways Mission, National Highways Authority of India at Madhyanchanl Bhawan, Vasant Kunj, New Delhi and Co-chaired a Session on “Green Highways, Livelihoods and Entrepreneurship Development”.

21-25.11.2016: Dr. Ranjana Yadav, Scientist/ Officer-In-Charge, IPIRTI Centre Mohali attended the 5 days training program on Nanomaterials: Characterizations and Applications at NITTTR, Chandigarh.

23.11.2016: Shri. Anand Nandanwar, Scientist attended Twenty first meeting of Civil Engineering Division Council (CEDC) as a Member at Bureau of Indian Standards (BIS), New Delhi.

30.11.2016: Dr. Manoj K. Dubey, Joint Director participated and discussed at Foremen Training Institute (FTI), Bengaluru to conduct International Seminar on Skill Development with Jawaharlal Nehru University, New Delhi.

05.12.2016: Shri. Amitava Sil, Scientist/ Officer-In-Charge, IPIRTI, Field Station Kolkata attended Assam Invest Road Show on “Food Processing, Plastic & Bamboo” inaugurated by Shri.
Chandra Mohan Patowary, Hon’ble Minister of Industries & Commerce, Govt. of Assam at Hotel Oberoi Grand, Kolkata which was organized by Confederation of Indian Industry (CII), Kolkata. He also attended B2B discussion on “Potential Chain - Bamboo” during the parallel session.


04.01.2017 to 06.01.2017: Dr. Manoj K. Dubey, Joint Director, Ms. Sujatha D. and Shri. Anand Nandanwar, Scientists visited Gandhinagar and Kutch (Gandhidham) for examining feasibility of opening field station at Gujarat. They met Shri. D.K. Sharma, APCCF Gujarat; representatives of M/ s. Kandla Timber Association (KTA); Shri. A.O. Sharma, CCF and Shri. A.C Patel, DCF Kutch.

10.01.2017: Dr. Manoj K. Dubey, Joint Director delivered a lecture on “Bamboo as Green Gold” during one week IFS training course on “Advances in Wood Production & Utilization” conducted by Institute of Wood Science & Technology (IWST), Bengaluru.

17.01.2017: Dr. B.N. Mohanty, IFS, Director and Shri. Anand Nandanwar, Scientist had meeting with Shri. Ashish, Representative of M/ s. IKEA regarding possible collaborations in the field of wood and panel products at IPARTI, Bangalore.

31.01.2017: Dr. B.N. Mohanty, IFS, Director visited Odisha and had meeting with PCCF, Odisha & other officials about setting up of Bamboo Development Centres for primary processing in different villages of the State.

02.02.2017-03.02.2017: Dr. Manoj K. Dubey, Joint Director participated and delivered presentation on “Major Characteristics of wood affecting plywood production” in the National Conference on Tree Improvement Research in India: Current Trends and Future Prospects at Institute of Wood Science & Technology (IWST), Bengaluru.

03.02.2017: Shri. Amitava Sil, Officer-In-Charge, IPARTI, Field Station Kolkata and Shri. S.C. Sahoo, Scientist, attended National Seminar on “Recent Advances on Multifunctional Materials - RA2M - 2017” at Haldia Institute of Technology, Haldia, West Bengal and delivered lectures on “Building houses with Bamboo” and “Non-formaldehyde bio-adhesive for wood composites” respectively.
17.02.2017: Dr. B.N. Mohanty, IFS, Director visited Odisha Forest Development Corporation (OFDC) and had meeting with Managing Director & other officials and discussed about possible collaboration for Panel Development out of Plantation timbers including Bamboo.

23.02.2017-24.02.2017: Dr. Manoj K. Dubey, Joint Director participated in the conference on Bamboo for Sustainable Development and presented a paper on “Technologies for Bamboo processing for value added products” at Dr. BNCA Auditorium, Karvenagar, Pune.

28.02.2017: The 21st Meeting of the Wood and other ligno-cellulosic products Sectional Committee, CED 20 in joint session with its subcommittees, CED 20:1 and CED 20:6 of BIS held at IPIRTI Bengaluru under the chairmanship of Dr. B.N. Mohanty, IFS, Director. Dr. Manoj K. Dubey, Joint Director, Ms. Sujatha D., Shri. Anand Nandanwar and Shri. Narasimha Murthy, Scientists attended the meeting as CED Committee Members.

02.03.2017: Dr. Ranjana Yadav, Scientist, Officer-In-Charge, IPIRTI Centre Mohali attended the State Level Committee meeting of wood based industry in Haryana Forest Department, Panchkula.

07.03.2017: Dr. B.N. Mohanty, IFS, Director attended the “Innovation Scholars in-residence programme” held at Rashtrapati Bhavan, New Delhi and interacted with Bamboo innovators from Nagaland and Gujarat.

08.03.2017: Dr. B.N. Mohanty, IFS, Director attended the Meeting of Hindi Salahkar Advisory Committee under the Chairmanship of Hon’ble Minister, MoEF&CC in Teesta Conference Hall of Indira Paryavaran Bhawan, New Delhi.

11.03.2017: Shri. S.C. Sahoo, Scientist, IPIRTI Field Station, Kolkata attended National Seminar on “Recent Advances on Multifunctional Materials - RA2M-2017” at Haldia Institute of Technology, Haldia, West Bengal and presented a paper entitled “A study on aluminium oxide as nano additive to enhance the rheological properties of aminoplastic resin used for manufacturing wood composites”.

11.03.2017-14.03.2017: Shri. Narasimha Murthy, Scientist participated in the National Seminar on “Bamboo Log” at Uravu Indigenous Science and Technology Centre, Wayanad, Kerala and made a presentation on “Preservative Treatment Methods and Grading of Bamboo”.

### 5.3 Visit to Industries


04.05.2016: Dr. Ranjana Yadav, Scientist, Officer-In-charge, IPIRTI-Centre, Mohali visited M/s. Pooja Machine (P) Ltd, Pathankot to solve floor level problem in plywood manufacturing.
06.05.2016: Dr. B.N. Mohanty, IFS, Director visited M/ s. Plystone Plywoods Private Limited and other Industries at Perumbavoor, Ernakulam for understanding use of Rubber wood for plywood and other panel products.

10.05.2016: Shri. S.C. Sahoo, Scientist, IPIRTI Field Station, Kolkata visited M/ s. Ashish Enterprises, Bilmora, Gujarat to improve the quality of the plywood and to solve the floor level problem faced by them during manufacturing of plywood.

11.05.2016: Shri. S.C. Sahoo, Scientist, IPIRTI Field Station, Kolkata visited M/ s. Willmore Plywood Industries, M/ s. Laxmi Industries, M/ s. Teerth Plywood, Gandhidham, Gujarat and had discussion regarding membership of IPIRTI Society.


17.05.2016: Dr. B.N. Mohanty, IFS, Director and Shri. Amitava Sil, Scientist, Officer-In-Charge, IPIRTI Field Station, Kolkata visited Central Academy for State Forest Service (CASFoS), MoEF&CC, Burnihat, Assam and had discussion with Shri. Roshan Horo, IFS, Principal and Shri. N. Luikham, IFS, Lecturer, CASFoS regarding future work on Bamboo Technology Park on the land given to NEC in association with IPIRTI.

17.05.2016: Dr. B.N. Mohanty, IFS, Director and Shri. Amitava Sil, Scientist, Officer-In-Charge, IPIRTI Field Station, Kolkata visited Cane and Bamboo Technology Park at Burnihat, Assam which is developed under implementing agency Cane and Bamboo Training Centre of NEC and had discussion with Shri. Tamriyo Longvah, Assistant Manager (Marketing) and Shri. Paramanada Mali, Research Officer regarding facilities developed at the bamboo technology park. They also visited, M/ s. Cent Ply, Palasbari, Assam and had discussion with Shri. Y.K. Chaudhry, Unit Head regarding recent development on research work carried out by IPIRTI.

07.06.2016-08.06.2016: Shri S.C. Sahoo, Scientist, IPIRTI Field Station, Kolkata visited M/ s. Shree Bhabani Plywood, Assam to improve the quality of the plywood and to solve the floor level problems faced by them during manufacturing.
13.06.2016-15.06.2016: Dr. B.N. Mohanty, IFS, Director, Shri. Uday D.N., Scientist and Dr. Ranjana Yadav, Scientist, Officer-In-charge, IPIRTI-Centre, Mohali visited Kurali, Yamunanagar and surrounding areas for shooting of documentary film on “Eucalyptus and Poplar Agro Forestry for Plywood: A huge success in North-West India” along with DFO Mohali. They also visited the following industries: M/s. Shri Ram Panels, Khanna, M/s. Kalyan Industry, M/s. United Timber, M/s. Galaxy Plywood (P) Limited, M/s. Haryana Industry, Yamuna Nagar.

13.06.2016-17.06.2016: Dr. K.Ch. Varada Rajulu, Scientist visited M/s. Aditya Industries, Chikhli, Gujarat for Technology Transfer of Fire Retardant Doors through construction method for 60 minutes and 120 minutes.

18.06.2016: Dr. K.Ch. Varada Rajulu, Scientist, visited M/s. Iraj Evolution Design Company Pvt. Ltd., Udaipur, Rajasthan and had discussion about Technology Transfer of Fire Retardant Doors through construction method for 60 minutes and 90 minutes.

23.06.2016-25.06.2016: Dr. B.N. Mohanty, IFS, Director visited Gujarat had discussion with Dr. Dinesh Mishra, PCCF (HOF), Gujarat about the progress of setting up of IPIRTI Centre at Gandhidham, Kutchh and had meeting with Addl. PCCF (Research & Training) and Shri. Tinu Gandhi, President, M/s. Kandla Timber Association. He also, visited the Plywood and Panel Products Industries in Ahmedabad and Gandhidham, Gujarat along with Shri. S.C. Sahoo, Scientist, IPIRTI Field Station, Kolkata.

28.06.2016-29.06.2016: Shri. Anand Nandanwar, Scientist, IPIRTI, Bangalore visited IPIRTI-Centre, Mohali and presented activities of the centre to the team from Gujarat consisting of Dr. D.K. Sharma, APCCF Gujarat; Gujarat Forest officers & Shri. Tinu Gandhi, President, M/s. Kandla Timber Association (KTA) and other representatives of KTA at IPIRTI Centre-Mohali.

Shri. Anand Nandanwar, Scientist also attended meeting with PCCF, Punjab; APCCF Gujarat; Gujarat Forest officers; President North Indian Plywood Manufacturers Association (NIPMA); President, M/s. Kandla Timber Association (KTA) and other representatives of KTA at Punjab Forest Department office and visited M/s. Shriram Panels, Khanna, Punjab. Shri. Ramesh Karri, Technical Staff, IPIRTI Centre Mohali co-ordinated for the team visit.

06-08.09.2016: Shri. S.C. Sahoo, Scientist, IPIRTI Field Station, Kolkata visited M/s. Saraswati Plywood Industries, Yamunanagar to improve the pre-press qualities of the plywood and to solve the floor problem faced by them during manufacturing.

21.09.2016: Ms. Sujatha D., Shri. Uday D.N., Dr. Vipin Kumar Chawla, Mrs. Mamatha B.S. and Shri. Prakash V., Scientists visited M/s. Karnataka State Forest Industries Corporation Ltd. (KSFIC), Bengaluru to study the production line of Flush Door/Block boards and suggest improvement with reference to the process/ machinery/ chemical/ treatment/ Resin/ Seasoning.


10.11.2016-11.11.2016: Dr. B.N. Mohanty, IFS, Director, Dr. Vipin Chawla, Scientist and Shri. Amitava Sil, Officer-In Charge, IPIRTI, Field Station Kolkata visited to review the
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preparation at Palace Ground, Imphal, Manipur and had discussion with Shri. Prithvi Nath Prasad, PCCF (HoFF) and Shri. Brajamani Sharma, Mission Director, State Bamboo Mission, Manipur regarding Demonstration-cumHands on Exercise with Bamboo Primary Processing Machines in Sangai Festival, Manipur.


27.11.2016-02.12.2016: Dr. V.K. Upadhyay, Scientist visited Kandla Port Custom Office and met Shri. P.V.R. Reddy, Principal Commissioner & Statistical wings Shri Sai Sashtri, Statistical Officer for collection of import data on wood and wood products at Kandala Port. He visited Kandla Timber Association and met Shri. Shantilal Parekh, President and Shri. Tinu Gandhi and discussed about import of wood products and collected 27 years import of logs data. He also visited wood based panel industries at Moti Chrai and met Shri. Vivek Aggarwal, General Manager and Dr. Purshotam Sharma, M/ s. Century Plywood Industry and discussed about raw material availability, production, import of wood logs etc.

20.02.2017-26.02.2017: Dr. V.K. Upadhyay, Scientist visited Directorate General Commercial Intelligence and Statistics, Kolkata and met Dr. Amitava Saha, Director (Dissemination) for collection of import data of wood and wood products. He visited Federation of Indian Plywood and Panel Industry, New Delhi and met Shri. Anthony Fernandes to discuss on the numbers of panel industries existed in India, status and trends of panel industries.

He also visited Century Plywood Industry, Kolkata and discussed about raw material availability, production, import of wood logs and Excise duty of wood and wood products etc. with Dr. C.N. Pandey (Ex. Director, IPIRTI) and discussed about panel Industries trends with Dr. S.K. Nath (Ex. Joint Director, IPIRTI). He also visited Green Ply, Kolkata and discussed with Shri Sabyasachi Malik, Production Manager on panel industries productions, trend and raw material import and possibilities for future import of raw materials. Along with Shri. Amitava Sil, Officer-In-charge, Field Station, Kolkata he visited M/ s. B.S. Progressive Pvt. Ltd., Kolkata and had discussion with Shri. Dipak Ranan Gantait, Production Manager regarding collection of data for raw materials used in their factory and about production and trained manpower situation in that area.

22.02.2017: Shri. S.C. Sahoo, Scientist IPIRTI Field Station Kolkata visited M/ s. Khandelwal Saw Mill, Assam to solve the floor level problem faced by them.

24.02.2017: Shri. S.C. Sahoo, Scientist, visited M/ s. ARCL, Kolkata and had discussion with Shri. S.R. Mundhra Chairman regarding submission of sponsored project on powder PF resin and fire retardant adhesive.
09.03.2017: Dr. B.N. Mohanty, IFS, Director visited State Forest Department, Meghalaya and had meeting with Dy. CEO, Megalaya Basin Development Authority and Development Commissioner at Shillong, Meghalaya and signed MoU in front of Chief Secretary, Meghalaya for setting up Bamboo CFCs in the State.


5.4 Overseas Activities:

(a) Training of Scientists

Shri. Prakash V. and Dr. Pradeep Kumar Kushwaha, Scientists, IPIRTI, Bangalore have been deputed to attend the “2016 Training Course on Bamboo Industry Development for ITTO Member Countries” sponsored by Ministry of Commerce of China (MOFCOM) and organized by China National Bamboo Research Center (CBRC) from 23rd May, 2016 to 10th July, 2016 at Hangzhou, Zhejiang province of China.
Indian Plywood Industries Research & Training Institute (IPIRTI), Bengaluru, India and MoEF&CC, New Delhi jointly organized the Session 87: “Innovation in the Panel Industry: Outlook and Concerns” during IUFRO Asia-Oceania Conference (24-27 October, 2016) at Beijing, China. The session was hosted on 26th October at China National Convention Center (CNCC) for deliberation about the latest advancements in the field of Panels and Composites from all sort of lignocellulosic materials including short-rotation plantation timbers, bamboo and other Agro and Forest residues. Current scenario and trends of wood based industries in Asian context were also discussed. Indeed that discussion will not only help in substituting the ever increasing demand on Wood/Timber from natural forests but also provide the appropriate remedial technology to address the issues of Climate Change in our Planet. Renowned scholars, delegates from all over the globe participated and shared their experiences. A four member delegation led by Dr. B.N. Mohanty, IFS, Director, IPIRTI with Dr. Suneesh Buxy, Dy. I.G.F (RT), MoEF&CC, Smt. Sujatha D. and Shri. Uday D.N., Scientists of IPIRTI participated in the Congress hosted at Beijing, China and organized the Technical Session on Innovations in the Panel Industry: Outlook and Concerns.
Apart from the congress, the delegation visited International Network for Bamboo and Rattan (INBAR) Headquarters at Beijing on 25.10.2016 and had fruitful discussions with Dr. Hans Friederich, Director General of INBAR in respect of the promotion of Bamboo based technologies worldwide.

The individual papers presented during the session are as follows:

**Paper-1: Technological Advancement in Wood and Wood based Panel Products** (Dr. B.N. Mohanty, IFS, Director, IPIRTI, Bengaluru)

**Paper-2: Wood-Strand Sandwich Panels for Building & Transportation Applications** (Dr. Vikram Yadama, Washington State University, Pullman, USA)

**Paper-3: Panel Industry Scenario in India** (Mr. Uday D.N., Scientist, IPIRTI, Bengaluru)

**Paper-4: Panel Wood Industry of Bangladesh: Future Scenarios Applying Climate Change** (Dr. Mohammed Al-Amin, University of Chittagong, Bangladesh)

**Paper-5: Mechanical Performance of Poplar LVL (Laminated Veneer Lumber) Reinforced by Bamboo Scrimber** (Mr. Zhaopeng Tian, Chinese Academy of Forestry, Beijing)

**Paper-6: Innovations in the Field of Adhesives for Panel Products** (Ms. Sujatha D., Scientist, IPIRTI, Bengaluru)

(c) APAFRI Meeting

Dr. B.N. Mohanty, IFS, Director also attended the 21st Executive Committee Meeting of Asia Pacific Association of Forest Research Institutes (APAFRI) on 25.10.2016 in Beijing, China on behalf of IPIRTI which was being organized as a parallel event in Beijing, China.
5.5 DIGNITARIES VISITS


13.04.2016: Dr. Mohan Verghese, Scientist, ITC visited IPIRTI, Bangalore and had meeting with Dr. B.N. Mohanty, IFS, Director about Collaborative Research Project on Panel Products from Plantation Wood.

27.04.2016: The representatives of Ecole Superieerus Bois (ESB), Mr. Antoine LEBEAU (Head International Relations) and Mr. Mark IRLE (Director - Research) from the Pays de la Loire Region of France and Ms. Kamala Govindarajan, Director - Office of the Pays de la Loire Region, in India (Chennai) visited IPIRTI, Bangalore and had meeting with Dr. B.N. Mohanty, IFS, Director, Joint Director, all Scientists and the trainees of PGDC of IPIRTI. Discussed about the possible collaborations between IPIRTI - PLR and the ESB in France, Research and Training Opportunities between both the establishments and about opportunities for IPIRTI students in ESB and vice versa.

06.06.2016: Forestry Students of TNAU, Mettupalyam visited IPIRTI, Bangalore. Dr. B.N. Mohanty, IFS, Director addressed about the prospect of Plantation wood and other Lignocellulosic materials for Panel Products as wood substitute.

21.06.2016: Dr. A.K. Behera, Technical Head, M/s. ARCL, Kolkata had visited IPIRTI Field Station, Kolkata and had a discussion with Shri S.C. Sahoo, Scientist regarding sponsorship of fire retardant adhesive project with the institute.

30.06.16: Shri. Biswapati Saha, Director (Technical), M/s. Adhunik Infrastructures (P) visited IPIRTI Field Station, Kolkata and had discussion with Shri. Amitava Sil, Officer-In-Charge on the testing facilities available at the Institute.

05.07.2016: The highest functionaries of Karnataka State Forest Industries Corporation (KSFIC) viz. Shri. T. Ishwar, Chairman, Shri. K.S. Sugur, PCCF & Managing Director & Shri. Markandeya, Executive Director, KSFIC visited IPIRTI, Bengaluru and had meeting with Dr. B.N. Mohanty, IFS, Director.

02.08.2016: Trainees Forest Rangers of Tamil Nadu Forest Academy (TNFA), Coimbatore visited IPIRTI, Bengaluru. Dr. B.N. Mohanty, IFS, Director addressed the trainees about value addition of Forest products for alternative to traditional timber. Dr. Manoj K. Dubey, Joint Director also addressed the gathering.

04.08.2016: Students of College of Forestry, Ponnampet visited IPIRTI, Bengaluru. Dr. B.N. Mohanty, IFS, Director addressed the students about the exposure on Panel products from plantation species.
10.08.2016: Shri. Sanjay Patwan and Shri. J.M. Shah, NGO from Gujarat visited IPIRTI, Bengaluru and had meeting with Dr. B.N. Mohanty, IFS, Director about prospects of plantation timber for plywood & panel products.

01.09.2016: Ms. Alexa Bednarz, Fellow Gates Foundation visited IPIRTI, Bengaluru and had meeting with Dr. B.N. Mohanty, IFS, Director & Dr. Manoj K. Dubey, Joint Director and discussed about Bamboo Housing, BMCS & Solid-state microcellular plastic scale-up.

09.09.2016: Dr. Ajay Mahapathra, Managing Director, IFS, Orissa Forest Development Corporation and Shri. Ajit Bharthuar, State Mission Director (NABM), Office of the Project Director, Orissa Bamboo Development Agency visited IPIRTI, Bengaluru and had meeting with Dr. B.N. Mohanty, IFS, Director and discussed about collaborative project on Plywood, Panel Products and Bamboo Development.


21.09.2016: Dr. Sudip Nath, Manager, R&D, M/s. United Nanotech Products, Kolkata visited IPIRTI Field Station, Kolkata and had discussion with Shri. Amitava Sil, Scientist, Officer In-charge, regarding sponsorship of a project of their developed nano preservative.

22.09.2016: Mr. Ulrich Tente, Divisional Manager, M/s. PROMAT, Belgium visited IPIRTI, Bengaluru and had meeting with Dr. B.N. Mohanty, IFS, Director, Dr. Manoj K. Dubey, Joint Director, Shri. Anand Nandanwar & Dr. K Ch Varadarajulu, Scientists about assembly and testing of Fire Retardant Doors.

19.01.2017: Shri. S.S. Srivastava, IFS Principal Chief Conservator of Forests (HoFF), Bhubaneswar, Odisha visited IPIRTI, Bengaluru and had discussion with Dr. B.N. Mohanty, IFS, Director for study on forest residues for preparation of ply & panel products and different training modules for capacity building of artisans & field staff.

23.01.2017: 35 Nos. of RFO Trainees from Kundal Academy of Development, Administration & Management, Maharashtra visited IPIRTI, Bengaluru. Dr. B.N. Mohanty, IFS, Director addressed the trainees and briefed about panel products from plantation timbers including Bamboo.

27.01.2017: Shri. S.R. Mundhra, CMD, M/s. ARCL Organics Ltd., Kolkata along with Shri. U. S. Panda, Marketing Head visited IPIRTI Field Station, Kolkata to finalize the sponsored project of PF powder resin.

23.02.2017: Shri. Prasanta Kumar Majumdar, Proprietor, M/s. Prasanti Herbal, Kolkata visited IPIRTI Field Station, Kolkata regarding setting up of Bamboo cottages at their land by using the technologies developed at IPIRTI.
25.02.2017: Shri. Chandrakant Deo and Shri. Prosenjit Ganguly, M/s. Wood Cure Enterprises visited IPIRTI Field Station, Kolkata to discuss the final report of the sponsored project titled “Modification and efficacy study of wood protector, the eco-friendly wood preservative for glue line treatment during manufacture of plywood”.

30.03.2017: Shri. Rajesh Mittal, Managing Director, M/s. Green Ply Ltd., Kolkata visited IPIRTI, Bengaluru and had meeting with Dr. B.N. Mohanty, IFS, Director & discussed about issues of Plywood Manufacturers in different parts of the country.

5.6 Exhibitions

**12th Jatiya Sanhati Utsav - O - Bharat Mela-2016 during 14th-18th December 2016**

Shri. Amitava Sil, Officer-In-Charge, Shri. S.C. Sahoo, Scientist, Shri. A.A. Solanki, Shri. H. Mondal, Shri. D. Pal, Shri. C.S. Raut, Staff of IPIRTI Field Station Kolkata participated in 12th Jatiya Sanhati Utsav - O - Bharat Mela-2016, National Exhibition Cum Fair & Seminar organized by Bangiya Seva Samity, Sonarpur Kolkata and exhibited a stall in the exhibition. The main theme of the exhibition was “Make in India through Science & Technology”. The stall of IPIRTI was visited by Smt. Satabdi Roy, Hon’ble Member of Parliament, Lok Sabha where she appreciated the work done by IPIRTI related to Bamboo.

**01.03.2017-04.03.2017:** Dr. B.N. Mohanty, IFS, Director and Shri. K. Thanigai, Scientist participated in the Delhi Wood 2017 at India Expo Centre and Mart, Greater Noida, Uttar Pradesh.
06.03.2017-08.03.2017: Shri. K. Thanigai, Scientist, IPIRTI Bengaluru, Dr. Ranjana Yadav, Scientist, Officer-In-Charge, IPIRTI Centre Mohali and Shri. Ramesh Karri, STA participated in Destination North East 2017 at Chandigarh.

5.7 Review and Audit activities

**Performance Review of IPIRTI**

04.10.2016-06.10.2016: The Performance Review of IPIRTI as per Rule 208 of GFR relating to Autonomous Bodies was carried out under the Chairmanship of Dr. Amritphale, Chief Scientist, CSIRAMPRI, Bhopal.

**NABL audits**

i. NABL Re-assessment Audit was conducted during 28th - 29th May, 2016 at IPIRTI-Centre, Mohali.

ii. NABL desktop surveillance audit of testing labs was conducted during November 2016.

**BISAudit**

BIS Renewal Audit of Mechanical and Chemical testing laboratories was held during 30-31 March, 2017 at IPIRTI, Bengaluru.
Ph.D Programme

IPIRTI is a nodal centre for pursuing research leading to award of Ph.D by Forest Research Institute (FRI) Deemed University, Dehradun (Link: http://www.ipirti.gov.in/phdprogram.html)

The following candidates were awarded Ph.D through Nodal Centre IPIRTI, Bengaluru:

Shri. Purosottam Sharma, M.Sc.,


Shri. Purosottam Sharma has been awarded Ph.D. by FRI Deemed University, Dehradun through the Ph.D. Nodal Centre IPIRTI, Bengaluru of FRI, Dehradun on 23.09.2016, for the work done on the topic entitled “To assess the suitability of bamboo fibre for manufacturing Medium Density Fibreboard” under the guidance of Dr. S. K. Nath, Ex-Joint Director, IPIRTI Bengaluru.

Shri. Ganesh Gopal T.M. has also been awarded Ph.D by FRI Deemed University, Dehradun through the Ph.D. Nodal Centre IPIRTI, Bengaluru of FRI, Dehradun on 26.02.2017 for the work done on the topic entitled on “MDI Resins in wood panel products” under the guidance of Dr. S.K. Nath, Ex-Joint Director, IPIRTI, Bengaluru.

5.8 National/ Social Activities

Vigilance Awareness Week

31.10.2016-05.11.2016: Vigilance Awareness Week was observed at the Institute by displaying Banners and Posters on the theme “Public participation in promoting Integrity and eradicating Corruption”. Both the Vigilance Pledge and Integrity Pledge were administered in English and Hindi by Dr. B. N. Mohanty, IFS, Director and Dr. Manoj K. Dubey, Joint Director respectively among all the staff and students of IPIRTI on 01.11. 2016.
Observance of Constitution Day
26.11.2016: IPIRTI observed the 125th Birth Anniversary Year of Dr. B.R. Ambedkar by observing “Constitution Day” through display of Banners and Posters in the Institute. “Preamble to the Constitution of India” was administered in English and Hindi by Dr. B.N. Mohanty, IFS, Director and Dr. Manoj K. Dubey, Joint Director respectively to all the staff and students of IPIRTI. Also a small quiz competition was conducted about “Constitution of India” among the PGDC trainees.

23rd All India Forest Sports Meet
Dr. B.N. Mohanty, IFS, Director and some of the Scientists & Staff members from IPIRTI, Bangalore and IPIRTI Field Station Kolkata participated in the 23rd All India Forest Sports meet held during 07-11 January 2017 at Hyderabad, Telengana. Dr. K. Ch. Varadarajulu, Scientist was the Nodal Officer of the sports meet.

Shri. Anirban Dey, Library Assistant won the Silver Medal in Table Tennis. A felicitation function was organized to Shri. Anirban Dey for winning the Silver Medal in Table Tennis on 16.01.2017 at the Institute.

Observance of National Productivity Week
National Productivity Week from 12th - 17th February 2017 was observed at IPIRTI, Bengaluru during which a “Poster Competition 2017” on the theme “Reduce, Recycle, Reuse from waste to Profit” was also conducted on 20.02.2017 under the guidance of Dr. B.N. Mohanty, IFS, Director.
World Environment Day 2016

“World Environment Day 2016" was celebrated on 05.06.2016 at IPIRTI, Bangalore by planting saplings in the Institute campus by Dr. B.N. Mohanty, IFS, Director along with Joint Director and other Scientists and Staff of IPIRTI.

Swachh Bharat Mission

Under Swachh Bharat Mission, Swachhata drive has been initiated in this Institute on 28\textsuperscript{th} March, 2016 and observing as Swachhata Day on last friday of every month. All the staff members including PGDC trainees actively participated under the supervision of Dr. B.N. Mohanty, IFS, Director, IPIRTI.

Celebration of Independence Day

70\textsuperscript{th} Independence Day of the Nation was celebrated in the Institute on 15\textsuperscript{th} August 2016 with full enthusiasm. Dr. B. N. Mohanty, IFS, Director hoisted the National Flag and addressed the staff members. Dr. Manoj K. Dubey delivered a speech on this occasion. Cultural programmes were organized and all the staff members were actively participated by performing patriotic oriented drama, singing patriotic songs and delivering speech etc.
**International Yoga Day**

“International Yoga Day Celebration” was organized on 21.06.2016 at IPIRTI Bangalore for all the staff of the Institute under the guidance of representatives of Art of Living.

**Major Hindi activities**

**Hindi Workshop**

A Hindi Workshop was organized at IPIRTI, Field Station Kolkata on 30.08.2016 under the chairmanship of Smt. Manju Shirin, Assistant Director, Hindi Rajbhasha Department, Kolkata.
**Hindi Divas celebration**

Hindi Divas was celebrated at IPIRTI, Bangalore on 27.09.2016 under the chairmanship of Dr. Manoj K. Dubey, Joint Director IPIRTI. Various programmes and competitions for the students and staff were organized such as Hindi Essay, Hindi quiz and Hindi song competition.

Similarly IPIRTI, Field Station Kolkata celebrated Hindi Divas on 23.09.2016 under the chairmanship of Smt. Manju Shirin, Assistant Director, Hindi Rajbhasha Department, Kolkata. On this occasion, Essay writing competition and Hindi quiz were organized.

**Other Hindi activities**

Meeting of Hindi Committee were organized at IPIRTI, Bangalore on 17.06.2016, 09.09.2016, 09.12.2016 & 03.03.2017 and progress of Hindi related activities were reviewed.
6. STATUTORY MEETINGS

Following Statutory Meetings (BoG and RAC) of IPIRTI were held:

6.1 BOARD OF GOVERNORS (BoG) MEETING OF IPIRTI:

125th Meeting of the Board of Governors (BoG) of IPIRTI was held on 27th May, 2016 at IPIRTI, Bengaluru. The Meeting was chaired by Shri. Ajay Narayan Jha, IAS, Secretary, Ministry of Environment, Forests & Climate Change, (MoEF&CC), Govt. of India & Chairman, IPIRTI BoG, New Delhi.

Dr. B. N. Mohanty, IFS, Director & Member Secretary convened the meeting.

6.2 RESEARCH ADVISORY COMMITTEE (RAC) MEETING

60th meeting of the Research Advisory Committee (RAC) of IPIRTI held on 07th June, 2016 in the Conference Hall at IPIRTI, Bangalore under the chairmanship of Shri. Sajjan Bhajanka, President, FIPPI, New Delhi. Dr. B.N. Mohanty, IFS, Director Co-Chaired the meeting and Dr. Manoj K. Dubey, Joint Director is the Convenor of the meeting.
Highlights:

Dr. B.N. Mohanty, IFS, Director IPIRTI, welcomed Shri. Sajjan Bhajanka, Chairman and other RAC members and scientists present in the 60th RAC Meeting of IPIRTI.

Shri. Sajjan Bhajanka, Chairman of RAC, thanked the Director, all RAC members and scientists gathered for their self-introduction. He expressed his pleasure that this time IPIRTI has identified projects which are the need of the hour in the field of Nanotechnology, alternative adhesives, energy saving methods, reduction of pressing temperature, low curing time with low energy consumption and particularly the laboratory method to measure termite resistance which is a very good initiative.

Dr. Manoj Kumar Dubey, Joint Director, IPIRTI initiated the technical discussions. A powerpoint presentation on the progress of work of IPIRTI since last RAC meeting was made which also included an overview of research and training activities during the reporting period since last RAC.

Dr. Dubey briefed about the major focused areas of research as follows:

- Emphasis is on to meet R & D need of the industries
- Develop wood alternatives from bamboo and other lignocellulosic material such as agro waste, forest residue
- Process and product development with mass employment generation potential
- Environmentally benign and green technologies

He also highlighted following major thrust areas for the new project proposals:

- Development of Panel products from fast grown plantation wood, bamboo and agro-wastes
- Development of block board from Melia dubia,
- Study of acoustic & thermal properties of agroresidue boards, Decorative bamboo veneer production.
- Improved and efficient adhesive technologies: Development of PMDI/UF resin for interior plywood, Fast curing PF resin system, Anatomical evaluation of adhesive penetration.
- Development of adhesive system with reduced emission: Polyurethane based system; nano particle reinforcement.
- Application of novel technologies for wood composites: Block board with fire retardant nano chemicals, honeycomb panels using bamboo slivers, Decorative bamboo veneer production, Particle board from thermally modified wood & bamboo fibers.
New Institute Project (approved by RAC)

1. Development of low formaldehyde emitting particle panels by Nano particle reinforcement.
2. Development of fast curing modified phenol-formaldehyde resin for manufacture of plywood at lower curing temperature.
4. Evaluation of the adhesive penetration in bamboo based on anatomy and its effect on performance of the product.
5. Laboratory testing methodologies for panel products against termite resistance.
6. Study on Acoustic and Thermal efficiency of panel products made from agro residues.
7. Study of suitability of *Melia dubia* for block board and flush door manufacturing.
8. Preparation of block board with fire retardant nano chemicals.
10. Development of honeycomb panels using bamboo slivers.
12. An experimental approach on development of alternate walling system for housing using bamboo and other materials.
14. Development of Particle Board using Carbon Nano Tubes (CNT) to improve physical and Mechanical Properties.

The meeting concluded with a vote of thanks by Dr. Manoj Kumar Dubey to the Chairman, members and other participants in the meeting.
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 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

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

The vision of IPIRTI is to be an apex institution of international repute for knowledge generation and carry out Research & Development.

To achieve this vision IPIRTI 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.
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.

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. The lab is also accredited by NABL.

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.
ORGANIZATIONAL STRUCTURE

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

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 Sawdoctoring
- Product Application
- Information Technology

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

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

ANNEXURE II
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/UNPD/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 saw mill 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 717-1 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.

Stereo microscope

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 m x 1.4 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 ULTRAFILTRATION 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.

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.

A view of Paper Impregnation Plant

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.

A view of Fire Door Testing Equipment

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.

Refriner
TOXICITY MEASURING INSTRUMENT

Toxicity measuring instrument installed at IPIRTI, Bangalore has the capability to precisely analyze 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 were 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.
HOT PRESS
120 tones hydraulic hot press of platen size 600mmx600mm 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.

4 FEET SPINDLE PEELING LATHE

In order to utilize the small girth plantation grown timbers for veneer production for both R & D and Training Purpose, a spindle less peeling line with inbuilt clipper was established during the year 2015-2016. This machine is capable of peeling the small girth logs. Since the logs are held by rollers instead of spindles, these logs can be peeled to core as small as 1 inch in diameter.

FIBRE ANALYSER

An automatic fibre size analyzer from Optest equipment Inc. Canada is installed in the Institute to study the morphology, i.e. the structural appearance, of fibers i.e.: length, width, coarseness, kink, and curl.
GLUE DOSING SYSTEM FOR MDF

Glue Blender was designed so as to atomize resin and spray designated quantity of resin into the air stream which carries dried fibres. The system was designed so that uniform mixing of fibres and resin takes place.

THERMO GRAVIMETRIC ANALYSER (TGA)

Thermo Gravimetric Analyser (TGA) is used to determine selected characteristics of materials that exhibit either mass loss or gain due to decomposition, oxidation. It helps us to know the thermal damage behaviour or the thermal stability of the wood based composites.

RHEOLOGY METER

Rheology meter finds wide application to characterize the properties of the resin and its behavior at various temperature. To study the characteristics of the polyurethane and to understand the rheology of adhesive this instrument is used.

NEW INFRASTRUCTURE FACILITIES ADDED DURING THE YEAR 2016-17

Vacuum Hot air Oven (Vacucell EVO-22 from MMM Germany) and Portable colour spectrophotometry (Portable NS810 Colorimeter Color Spectrophotometer) was purchased under the institute project.
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.
## ONGOING IN-HOUSE PROJECTS

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Project Title</th>
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<tbody>
<tr>
<td>1</td>
<td>Manufacture of Flush Door with Engineered Core Infill</td>
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<tr>
<td>2</td>
<td>Development of light weight composite panel products</td>
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<td>3</td>
<td>Development of New and improved extender for plywood adhesive having Extender-Scavenger dual function to make less toxic and more eco-friendly</td>
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<td>4</td>
<td>Evaluation of Multicomponent biocide for protection of plywood and other panel products</td>
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<td>5</td>
<td>Anatomical evaluation of adhesive penetration of timber</td>
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<td>6</td>
<td>Development of fire retardant composite products</td>
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<td>7</td>
<td>Development of composites from agro residues</td>
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<td>8</td>
<td>Development of Medium density fiber board- Phase I- W heat Straw</td>
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<td>9</td>
<td>Keratin Modified Urea formaldehyde resin for particle board and plywood and study on the durability of panel products</td>
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<tr>
<td>10</td>
<td>Development of Particle board and Medium density fibre board from Cassava stem</td>
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<td>11</td>
<td>Investigation on the susceptibility of various panel products to wood-deteriorating biological agents</td>
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<tr>
<td>12</td>
<td>Development of Medium density Fibre board (MDF) from Plantation grown timber Species Melia dubia.</td>
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<td>13</td>
<td>Establishment of facility for bamboo strand lumber for training and research purposes</td>
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<td>14</td>
<td>Study on the effect of nanoparticles on fire resistance and smoke suppression properties of bamboo strand lumber and plywood</td>
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<tr>
<td>15</td>
<td>Development of particle board from Lantana Camara</td>
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<td>16</td>
<td>Natural and accelerated weathering studies on wood and bamboo based composite materials</td>
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<td>17</td>
<td>Estimation and Forecasting of Import of wood and wood products in India</td>
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<td>18</td>
<td>Study on Acoustic and Thermal efficiency of panel products made from agro residues</td>
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<td>Development of technique for production of decorative Bamboo Face Veneers from Sympodial Bamboo</td>
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<td>22</td>
<td>Development of honeycomb panels using bamboo slivers</td>
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<tr>
<td>23</td>
<td>Accelerated weathering study on Bamboo Composites viz. Bamboo Lumber or bamboo laminates</td>
</tr>
<tr>
<td>24</td>
<td>Evaluation of resistance to biological degradation and dimensional stability of thermally modified wood and bamboo based particle boards</td>
</tr>
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## SHORT-TERM COURSES CONDUCTED

<table>
<thead>
<tr>
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<tr>
<td>1</td>
<td>A training course on “Testing of Block Board and Flush Door as per IS: 1659 &amp; IS: 2202 (Part-I) was conducted for six candidates sponsored from plywood industries at IPIRTI-Centre, Mohali.</td>
<td>11.04.2016-13.04.2016</td>
</tr>
<tr>
<td>2</td>
<td>Onemonthtrainingprogrammeon“PlywoodManufacturing Technology” was conducted for six candidates at IPIRTI Field Station, Kolkata.</td>
<td>02.05.2016-02.06.2016</td>
</tr>
<tr>
<td>3</td>
<td>Five days training course on “Testing of Plywood and Flush door as per IS: 303, 710 1328, 4990 &amp; 2202” was conducted for four candidates from plywood industries at IPIRTI, Bengaluru.</td>
<td>20.06.2016-24.06.2016</td>
</tr>
<tr>
<td>4</td>
<td>A training course on Plywood Manufacturing Technology-I was conducted for five candidates from plywood industries at IPIRTI, Bengaluru.</td>
<td>18.07.2016-22.07.2016</td>
</tr>
<tr>
<td>5</td>
<td>A training course on Plywood Manufacturing Technology-II was conducted for ten candidates from plywood industries at IPIRTI, Bengaluru.</td>
<td>25.07.2016-29.07.2016</td>
</tr>
<tr>
<td>6</td>
<td>One Month training course on “Plywood manufacturing technology” was conducted for six candidates at IPIRTI Field Station, Kolkata.</td>
<td>01.09.2016-03.09.2016</td>
</tr>
<tr>
<td>7</td>
<td>A training course on “Low cost and special resin manufacturing” was conducted for two candidates at IPIRTI Field Station, Kolkata.</td>
<td>19.09.2016-23.09.2016</td>
</tr>
<tr>
<td>8</td>
<td>A training course on “Testing of Plywood, Block Board and Flush Door” was conducted for three candidates at IPIRTI Field Station, Kolkata.</td>
<td>09.01.2017-13.01.2017</td>
</tr>
<tr>
<td>9</td>
<td>One month training course on “Plywood manufacturing technology” was conducted for two candidates at IPIRTI Field Station, Kolkata.</td>
<td>06.02.2017-10.03.2017</td>
</tr>
<tr>
<td>10</td>
<td>A training course on “Resin Manufacturing” was conducted for three candidates at IPIRTI Field Station, Kolkata.</td>
<td>29.03.2017-31.03.2017</td>
</tr>
<tr>
<td>No.</td>
<td>Special Training Courses:</td>
<td>Dates</td>
</tr>
<tr>
<td>-----</td>
<td>---------------------------------------------------------------------------------------------------------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>11</td>
<td>Two-days training Workshop for IFS officers on the theme of “Live Demonstration at Factories” for 21 IFS officers from all over India was conducted at IPIRTI, Bangalore</td>
<td>28.04.2016-29.04.2016</td>
</tr>
<tr>
<td>12</td>
<td>Five days training programme on “Flush Door manufacturing” was conducted for 6 candidates sponsored from plywood industries at IPIRTI, Bengaluru</td>
<td>20.06.2016-24.06.2016</td>
</tr>
<tr>
<td>13</td>
<td>One week refresher training course for IFS Officers on the theme of “Bamboo Resource Development for addressing Livelihood Concerns of Communities” for 21 IFS officers from all over India was conducted at IPIRTI Bengaluru.</td>
<td>11.07.2016-15.07. 2016</td>
</tr>
<tr>
<td>14</td>
<td>“Demonstration-cum-Hands on Exercise with Bamboo Primary Processing Machines for Bamboo Skill Development during North East Festival events” for State Forest Department, Nagaland and Bamboo Development Agency was conducted for 185 candidates at the Hornbill festival, Kisama hill, Kohima, Nagaland.</td>
<td>01.12.2016-10.12.2016</td>
</tr>
<tr>
<td>15</td>
<td>Training on “Primary Processing of Bamboo” was conducted for 238 candidates at Central Academy for State Forest Service (CASFoS), Burnihat, Assam</td>
<td>19.12.2016-23.12.2016</td>
</tr>
</tbody>
</table>
LIST OF RESEARCH ADVISORY COMMITTEE (RAC) OF IPIRTI FOR THE YEAR 2016-2017

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 - 110008.</td>
<td>Chairman</td>
</tr>
<tr>
<td>2</td>
<td>Director, IPIRTI, Bangalore - 22</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-110002.</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>7</td>
<td>The Director or Nominee Institute for Socio-Economic Change, P.O. Nagarbhavi, Bangalore – 560072.</td>
<td>Member</td>
</tr>
<tr>
<td>8</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>
<td>Member</td>
</tr>
<tr>
<td></td>
<td>Name and Details</td>
<td>Role</td>
</tr>
<tr>
<td>---</td>
<td>------------------------------------------------------------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>9</td>
<td>DIGF (RT), Ministry of Environment, Forests &amp; Climate Change, Room No. A-356, 3rd Floor, Agni Block, Indira Paryavaran Bhawan, Jor Bagh Road, Aliganj, New Delhi - 110 003.</td>
<td>Member</td>
</tr>
<tr>
<td>10</td>
<td>Joint Director, IPIRTI, Bangalore - 22</td>
<td>Convener</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th></th>
<th>Name and Details</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>The Principal Chief Conservator of Forests (HoFF) or Nominee, Aranya Bhawan, 18th Cross, Malleswaram, Bangalore - 560 003.</td>
<td>Member</td>
</tr>
<tr>
<td>12</td>
<td>The Principal Chief Conservator of Forests (HoFF), or Nominee Government of Punjab, Department of Forests &amp; Wildlife Preservation, Forest Complex, Sector-68, Ajitgarh (Mohali)-160 062.</td>
<td>Member</td>
</tr>
<tr>
<td>13</td>
<td>The Managing Director, Tripura Forest Development &amp; Plantation Corporation Ltd. Abhoynagar, Agartala - 799 005.</td>
<td>Member</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th></th>
<th>Name and Details</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>Shri. S.P. Mittal, Chairman, M/s. Greenply Industries Ltd., 15A, Shakespeare Soveam, New B.K. Market, 2nd Floor, Kolkata, West Bengal.</td>
<td>Member</td>
</tr>
<tr>
<td>15</td>
<td>Shri. Pushpendra Mohan, M.D. M/s. Shiv Hari Plywood Limited, 4th Mile Stone, Jaspur – 244 712, Dist. Udham Singh Nagar, Uttarakhand.</td>
<td>Member</td>
</tr>
<tr>
<td>16</td>
<td>Shri. Moiz Wagh, M.D. M/s. Hunsur Plywood Works (P) Ltd. P.O. Bag No. 2, Hunsur – 571105, Karnataka.</td>
<td>Member</td>
</tr>
<tr>
<td>17</td>
<td>Managing Director, M/s. ARCL Organics Ltd., 13, Camac Street, 2nd Floor, Kolkata – 700017.</td>
<td>Member</td>
</tr>
<tr>
<td>No.</td>
<td>Name and Position</td>
<td>Address</td>
</tr>
<tr>
<td>-----</td>
<td>--------------------------------------------------------</td>
<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>18</td>
<td>Ms. D. Sujatha, Scientist E, IPIRTI, Bangalore.</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Officer-in-Charge, IPIRTI, Field Station, 2/2, Biren Roy Road West, Sarsuna, Kolkata-700 061</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Officer-in-Charge, IPIRTI Centre, Govt. Industrial Development cum Quality Marketing Centre (Engg.), B-65, Phase 7, Geological Lab, Industrial Area, Mohali (Pb.), Chandigarh.</td>
<td></td>
</tr>
</tbody>
</table>

Invitees: All Scientists of IPIRTI
ANNEXURE VII

IPIRTI REPRESENTATION ON COMMITTEES / SUB-COMMITTEES OF BIS

1. Dr. B. N. Mohanty, Director
   Chairman, Wood Products Sectional Committee CED 20
   Principal member, Timber Sectional Committee CED 9

2. Shri. Anand Nandanwar, Scientist E
   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.

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

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

5. Shri. Narasimha Murthy, Scientist D
   Alternate 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
   Alternate member, Sub-Committee, Plywood CED 20:1
6. **Dr. Vipin Chawla, Scientist E**
   Alternate member, Sub-Committee, timber terminology, conversion, seasoning, preservation, grading and testing CED 9:1

7. **Shri. M. C. Kiran, Scientist D**
   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.
SERVICES OFFERED BY IPIRTI TO MEMBER INDUSTRIES

1. Preference in providing trained man power 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.
INDIAN PLYWOOD INDUSTRIES RESEARCH & TRAINING INSTITUTE
AUDITORS REPORT

We have audited the Balance Sheet of “Indian Plywood Industries Research & Training Institute” # 2273, Tumkur Road, Bangalore -22, as at 31st March 2017 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

The Executive Committee Members of Indian Plywood Industries Research & Training Institute is 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 of 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 Association’s 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 2017.

For M.R.V Krishna & Co. Chartered Accountants
Firm registration No: 001642S

Sd/-

R.K. Senthil Kumar
Partner
Membership No: 029870

Place: Bangalore
Date: 12.07.2017
ANNEXURE I

TO THE AUDIT REPORT DATED 12TH July 2017

1. Accounts are generally maintained on Accrual Basis.

2. Institute has during the year ended 31st March 2017 received grants from Government of India of Rs. 5,00,00,000/- and Rs. 2,80,00,000/- towards Plan and Non Plan Expenditure respectively.

For M.R.V Krishna & Co.
Chartered Accountants
Firm registration No: 001642S

Sd/-
R.K. Senthil Kumar
Partner
Membership No: 029870

Place: Bangalore
Date: 12.07.2017
Annexure - II

INDIAN PLYWOOD INDUSTRIES
RESEARCH & TRAINING INSTITUTE, BANGALORE -560022

STATEMENT OF FORMING PART OF THE ACCOUNTS
AS AT 31ST MARCH - 2017

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

GOVERNANCE
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. Interest on term Deposits held as investments is recognized on accrued basis.
   b. 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, Training 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 Expentifiable 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.17,37,91,106/- and other investments to Rs. 3,00,93,400/- towards R & D Growth Fund & Rs.63,79,195/- Training 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 not disclosed.

Provision, Contingent Liabilities and Contingent Assets are reviewed at each Balance Sheet date.

NOTES FORMING PART OF ACCOUNTS AS ON 31-03-2017

1. The balances as reflected in the Balance Sheet as at 31st March 2017 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. 46,19,981/- provided for the year.

5. The Director/Administrative Officer has assessed the Fixed Assets for any impairment as on 31.03.2017 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. Verification of Fixed Assets was carried out by the statutory auditor from 2007-08 to 2016-17 (10 years).

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.

Place: Bangalore
Date: 12.07.2017

For M.R.V. KRISHNA & CO.
Chartered Accountants

For INDIAN PLYWOOD INDUSTRIES RESEARCH TRAINING INSTITUTE

Sd/-
R.K.SENTHIL KUMAR
Partner, Membership No. 029870

Sd/-
Dr.B.N.Mohanty
Director
<table>
<thead>
<tr>
<th>CORPUS/ CAPITAL FUND AND LIABILITIES</th>
<th>SCHEDULE</th>
<th>CURRENT YEAR</th>
<th>PREVIOUS YEAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>CORPUS/ CAPITAL FUND</td>
<td>1</td>
<td>342,952,291</td>
<td>330,007,696</td>
</tr>
<tr>
<td>RESERVES AND SURPLUS</td>
<td>2</td>
<td>204,699,055</td>
<td>204,699,055</td>
</tr>
<tr>
<td>EARMARKED/ ENDOWMENT FUNDS</td>
<td>3</td>
<td>44,317</td>
<td>50,941</td>
</tr>
<tr>
<td>SECURED LOANS AND BORROWINGS</td>
<td>4</td>
<td>27,167,003</td>
<td>28,165,060</td>
</tr>
<tr>
<td>UNSECURED LOANS AND BORROWINGS</td>
<td>5</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>DEFERRED CREDIT LIABILITIES (Deposit Received)</td>
<td>6</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>CURRENT LIABILITIES AND PROVISIONS</td>
<td>7</td>
<td>4,818,723</td>
<td>4,587,732</td>
</tr>
<tr>
<td><strong>TOTAL LIABILITIES AND PROVISIONS</strong></td>
<td></td>
<td><strong>579,681,389</strong></td>
<td><strong>567,510,484</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ASSETS</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIXED ASSETS</td>
</tr>
<tr>
<td>INVESTMENTS- FROM EARMARKED/ ENDOWMENT FUNDS</td>
</tr>
<tr>
<td>INVESTMENTS- OTHERS</td>
</tr>
<tr>
<td>CURRENT ASSETS, LOANS, ADVANCES ETC</td>
</tr>
<tr>
<td>MISCELLANEOUS EXPENDITURE (to the extent not written off or adjusted)</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
</tr>
</tbody>
</table>

**SIGNIFICANT ACCOUNTING POLICIES**

**CONTINGENT LIABILITIES AND NOTES ON ACCOUNTS**

for INDIAN PLYWOOD INDUSTRIES RESEARCH & TRAINING INSTITUTE

IN TERMS OF OUR REPORT ATTACHED FOR M.R.V. KRISHNA & CO.

Sd/-
Director
Chartered Accountants
Firm Registration No. 001642S

Sd/-
Administrative Officer
R.K. SENTHIL KUMAR
Partner, Membership No 029870
### Income and Expenditure Account for the Year Ended 31.03.2017

#### Income

<table>
<thead>
<tr>
<th>Schedule</th>
<th>Current Year</th>
<th>Previous Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income from Sales/Services</td>
<td>12</td>
<td>10,139,829</td>
</tr>
<tr>
<td>Grants/Subsidies (Plan &amp; Non Plan)</td>
<td>13</td>
<td>78,000,000</td>
</tr>
<tr>
<td>Fees/Subscriptions</td>
<td>14</td>
<td>2,719,466</td>
</tr>
<tr>
<td>Income from Investments (Income on Investment from earmarked/ endow. Funds transferred to Funds)</td>
<td>15</td>
<td>-</td>
</tr>
<tr>
<td>Income from Royalty, Publication etc</td>
<td>16</td>
<td>-</td>
</tr>
<tr>
<td>Interest Earned</td>
<td>17</td>
<td>22,300,779</td>
</tr>
<tr>
<td>Other Income</td>
<td>18</td>
<td>1,252,080</td>
</tr>
<tr>
<td>Increase/(decrease) in stock of Finished Goods and Work-in-Progress</td>
<td>19</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total Income (A)</strong></td>
<td></td>
<td>114,412,154</td>
</tr>
</tbody>
</table>

#### Expenditure

<table>
<thead>
<tr>
<th>Schedule</th>
<th>Current Year</th>
<th>Previous Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establishment Expenses</td>
<td>20</td>
<td>61,611,794</td>
</tr>
<tr>
<td>Other Administrative Expenses (Plan &amp; Non Plan)</td>
<td>21</td>
<td>15,936,488</td>
</tr>
<tr>
<td>Expenditure on Grants, Subsidies etc.</td>
<td>22</td>
<td>-</td>
</tr>
<tr>
<td>Interest</td>
<td>23</td>
<td>23,919,277</td>
</tr>
<tr>
<td>Depreciation (Net total at the year end- corresponding to Schedule 8)</td>
<td>23</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total Expenditure (B)</strong></td>
<td></td>
<td>101,467,559</td>
</tr>
</tbody>
</table>

Balance being excess of Expenditure over Income (A-B) | 12,944,595 | (12,229,821) |

Transfer to / from General Reserve | - |
Transfer to Special Reserve (R&D Growth Fund) | - |
Transfer to Special Reserve (upgradation of Sci Skills) | - |

**Balance Being Surplus/Deficit Carried to Corpus/ Capital Fund** | 12,944,595 | (12,229,821) |

**Significant Account Policies** | 24 |
**Contingent Liabilities and Notes on Accounts** | 25 |

**Grand Total** | 12,944,595 | (12,229,821) |

---

For Indian Plywood Industries Research & Training Institute

Sd/- Director

Sd/- Administrative Officer

Chartered Accountants

Firm Registration No. 001642S

Sd/-
R.K.Senthil Kumar
Partner, Membership No 029870
**FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATION)**

**INDIAN PLYWOOD INDUSTRIES RESEARCH AND TRAINING INSTITUTE**

**SCHEDULES FORMING PART OF BALANCE SHEET AS AT 31.03.2017**

<table>
<thead>
<tr>
<th>SCHEDULE1 - CAPITAL FUND:</th>
<th>31.03.2017</th>
<th>31.03.2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance as at the beginning of the year</td>
<td>297,404,101</td>
<td>309,633,922</td>
</tr>
<tr>
<td>Add: Contribution to Corpus/ Capital Fund</td>
<td>12,944,595</td>
<td>(12,229,821)</td>
</tr>
<tr>
<td>Add/ (Deduct): Balance of net income(expenditure transferred from the Income and Expenditure Account)</td>
<td>310,348,696</td>
<td>297,404,101</td>
</tr>
</tbody>
</table>

**CORPUS FUND**

<table>
<thead>
<tr>
<th></th>
<th>31.03.2017</th>
<th>31.03.2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance as at the beginning of the year</td>
<td>32,603,595</td>
<td>32,506,069</td>
</tr>
<tr>
<td>Add: Contribution to Corpus/ Capital Fund</td>
<td>97,526</td>
<td>-</td>
</tr>
<tr>
<td>Add/ (Deduct): Balance of net income(expenditure transferred from the Income and Expenditure Account)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Add : Interest</td>
<td>32,603,595</td>
<td>32,603,595</td>
</tr>
</tbody>
</table>

**BALANCE AS AT THE YEAR END**

| | 342,952,291 | 330,007,696 |

<table>
<thead>
<tr>
<th>SCHEDULE2- RESERVES AND SURPLUS</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>6,379,195</td>
<td>5,782,532</td>
</tr>
<tr>
<td>Add: Contribution to Corpus/ Capital Fund</td>
<td>-</td>
<td>596,663</td>
</tr>
<tr>
<td>Add/ (Deduct): Balance of net income(expenditure transferred from the Income and Expenditure Account)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6,379,195</td>
<td>6,379,195</td>
</tr>
</tbody>
</table>
4. a) General Reserve: Entrance Fee Fund
   - As per last Account: 66,600
   - Addition During the year: 66,600
   - Less: Deductions during the year: 66,600
   - TOTAL D: 66,600

4 b) General Reserve: Special Land Acquisition
   - (Based on Metro Compensation): 198,253,260
   - (Based on Metro Compensation & TDS thereon Subject to realisation): 198,253,260
   - TOTAL D: 204,699,055
<table>
<thead>
<tr>
<th>&quot;SCHEDULE3-EARMARKED/ENDOWMENT FUNDS&quot;</th>
<th>FUND-WISE BREAK UP</th>
<th>TOTALS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dr. Narayana Murthy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mr. Keith Baddley</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Citabul Endowment</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Arunachal Pradesh</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shivhari Plywood India</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Alumni Association</td>
<td></td>
</tr>
<tr>
<td></td>
<td>IPIRTI Old Student</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&quot;Current Year&quot;</td>
<td>&quot;Previous Year&quot;</td>
</tr>
<tr>
<td>a) Opening balance of the funds</td>
<td>8244</td>
<td>50941</td>
</tr>
<tr>
<td>b) Additions to the Funds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i. Donations/ grants</td>
<td>6420</td>
<td>50941</td>
</tr>
<tr>
<td>ii. Income from investments</td>
<td>6377</td>
<td>50941</td>
</tr>
<tr>
<td>iii. Other additions (specify nature)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>TOTAL (a+b)</td>
<td>8244</td>
<td>50941</td>
</tr>
<tr>
<td>c) Utilisation/Expenditure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>towards objectives of funds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i. Capital Expenditure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Fixed Assets</td>
<td>872</td>
<td>6624</td>
</tr>
<tr>
<td>- Others</td>
<td>710</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1582</td>
<td>6624</td>
</tr>
<tr>
<td>ii. Revenue Expenditure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Salaries, Wages and allowances etc</td>
<td>688</td>
<td></td>
</tr>
<tr>
<td>- Rent</td>
<td>1135</td>
<td></td>
</tr>
<tr>
<td>- Other Administrative expenses (Plan &amp; Non Plan)</td>
<td>3219</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>3633</td>
<td>6624</td>
</tr>
<tr>
<td>NET BALANCE AS AT THE YEAR END (a+b+c)</td>
<td>7372</td>
<td>44317</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></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>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>2016-17</th>
<th>2015-16</th>
</tr>
</thead>
<tbody>
<tr>
<td>GSLI payable</td>
<td>50330</td>
<td></td>
</tr>
<tr>
<td>Running Projects</td>
<td>23,179,810</td>
<td>24,295,735</td>
</tr>
<tr>
<td>Deposit Received</td>
<td>3,936,863</td>
<td>3,869,325</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>27,167,003</strong></td>
<td><strong>28,165,060</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>
</tbody>
</table>

**TOTAL**

Note: Amounts due within one year

<table>
<thead>
<tr>
<th></th>
<th>CURRENT YEAR</th>
<th>PREVIOUS YEAR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### 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>
</tbody>
</table>

**TOTAL**

Note: Amounts due within one year
<table>
<thead>
<tr>
<th>SCHEDULE7- CURRENT LIABILITIES AND PROVISIONS</th>
<th>CURRENT YEAR</th>
<th>PREVIOUS YEAR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. CURRENT LIABILITIES</strong></td>
<td></td>
<td></td>
</tr>
<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>150,000.0</td>
<td>270,000</td>
</tr>
<tr>
<td>b) Others</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Advances Received</td>
<td>102,000</td>
<td>62,587</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>47,834</td>
<td>72,033</td>
</tr>
<tr>
<td>b) Others</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Other Current Liabilities</td>
<td>(101,092)</td>
<td>62,463</td>
</tr>
<tr>
<td><strong>TOTAL (A)</strong></td>
<td>198,742</td>
<td>467,083</td>
</tr>
<tr>
<td><strong>B. PROVISIONS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Taxation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Gratuity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Superannuation/ Pension</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Accumulated Leave Encashment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Trade Warranties/ Claims</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Others (Specify)</td>
<td>4,619,981</td>
<td>4,120,649</td>
</tr>
<tr>
<td><strong>TOTAL (B)</strong></td>
<td>4,619,981</td>
<td>4,120,649</td>
</tr>
<tr>
<td><strong>TOTAL (A+B)</strong></td>
<td>4,818,723</td>
<td>4,587,732</td>
</tr>
</tbody>
</table>
## Schedule No. 8 Fixed Assets

<table>
<thead>
<tr>
<th>Assets Descriptions</th>
<th>Opening Balance</th>
<th>Additions</th>
<th>Deletions</th>
<th>Closing Balance</th>
<th>Rate</th>
<th>Depreciation Amount</th>
<th>WDV as on 31.03.2017</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ambassador Car</strong></td>
<td>76,252</td>
<td>0</td>
<td></td>
<td>76,252</td>
<td>15.00%</td>
<td>11,438</td>
<td>64,814</td>
</tr>
<tr>
<td><strong>Books and Publications (Bangalore)</strong></td>
<td>2,017,600</td>
<td>5,165</td>
<td>0</td>
<td>2,022,865</td>
<td>15.00%</td>
<td>303,428</td>
<td>1,719,427</td>
</tr>
<tr>
<td><strong>Books and Publications (Kolkata)</strong></td>
<td>158,718</td>
<td>2,899</td>
<td>1,124</td>
<td>160,488</td>
<td>15.00%</td>
<td>24,074</td>
<td>136,414</td>
</tr>
<tr>
<td><strong>Books and Publications (Mohali)</strong></td>
<td>1,452</td>
<td>0</td>
<td>0</td>
<td>1,452</td>
<td>15.00%</td>
<td>218</td>
<td>1,234</td>
</tr>
<tr>
<td><strong>Building (Bangalore)</strong></td>
<td>40,605,303</td>
<td>75,453</td>
<td>0</td>
<td>40,680,756</td>
<td>10.00%</td>
<td>4,068,076</td>
<td>36,612,680</td>
</tr>
<tr>
<td><strong>Building (Kolkata)</strong></td>
<td>6,298,484</td>
<td>976,823</td>
<td>0</td>
<td>7,275,257</td>
<td>10.00%</td>
<td>727,526</td>
<td>6,547,731</td>
</tr>
<tr>
<td><strong>Electrical Installations (Bangalore)</strong></td>
<td>2,783,846</td>
<td>0</td>
<td>0</td>
<td>2,783,846</td>
<td>10.00%</td>
<td>278,385</td>
<td>2,505,462</td>
</tr>
<tr>
<td><strong>Electrical Installations (Kolkata)</strong></td>
<td>1,734</td>
<td></td>
<td>0</td>
<td>1,734</td>
<td>10.00%</td>
<td>177</td>
<td>1,556</td>
</tr>
<tr>
<td><strong>Furniture and Fixtures (Bangalore)</strong></td>
<td>1,182,646</td>
<td>148,119</td>
<td>0</td>
<td>1,330,765</td>
<td>10.00%</td>
<td>133,077</td>
<td>1,197,689</td>
</tr>
<tr>
<td><strong>Furniture and Fixtures (Kolkata)</strong></td>
<td>384,774</td>
<td>0</td>
<td>0</td>
<td>384,774</td>
<td>10.00%</td>
<td>38,477</td>
<td>346,297</td>
</tr>
<tr>
<td><strong>Kitchen Equipment (Bangalore)</strong></td>
<td>95,455</td>
<td>0</td>
<td>0</td>
<td>95,455</td>
<td>15.00%</td>
<td>14,318</td>
<td>81,137</td>
</tr>
<tr>
<td><strong>Land (Bangalore)</strong></td>
<td>80,669</td>
<td>0</td>
<td>0</td>
<td>80,669</td>
<td>15.00%</td>
<td>144</td>
<td>86</td>
</tr>
<tr>
<td><strong>Land (Kolkata)</strong></td>
<td>143,559</td>
<td>0</td>
<td>0</td>
<td>143,559</td>
<td>15.00%</td>
<td>144</td>
<td>122,788</td>
</tr>
<tr>
<td><strong>Machine and Equipments</strong></td>
<td>961</td>
<td>0</td>
<td>0</td>
<td>961</td>
<td>15.00%</td>
<td>144</td>
<td>816</td>
</tr>
<tr>
<td><strong>MARUTI CIAZ</strong></td>
<td>419,966</td>
<td>366,072</td>
<td>0</td>
<td>786,037</td>
<td>15.00%</td>
<td>117,906</td>
<td>668,132</td>
</tr>
<tr>
<td><strong>Mini Bus</strong></td>
<td>143,856</td>
<td>0</td>
<td>0</td>
<td>143,856</td>
<td>15.00%</td>
<td>21,578</td>
<td>122,278</td>
</tr>
<tr>
<td><strong>Non Expandable Equipment</strong></td>
<td>4,410,597</td>
<td>0</td>
<td>0</td>
<td>4,410,597</td>
<td>15.00%</td>
<td>661,589</td>
<td>3,749,007</td>
</tr>
<tr>
<td><strong>(UNDP)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Non Expandable Equipment (IDRC)</strong></td>
<td>222,031</td>
<td>0</td>
<td>0</td>
<td>222,031</td>
<td>15.00%</td>
<td>33,305</td>
<td>188,727</td>
</tr>
<tr>
<td><strong>Office Equipment (Bangalore)</strong></td>
<td>387,057</td>
<td>46,500</td>
<td>0</td>
<td>433,557</td>
<td>15.00%</td>
<td>65,058</td>
<td>368,532</td>
</tr>
<tr>
<td><strong>Office Equipment (Kolkata)</strong></td>
<td>124,019</td>
<td>0</td>
<td>0</td>
<td>124,019</td>
<td>15.00%</td>
<td>18,603</td>
<td>105,416</td>
</tr>
<tr>
<td><strong>Office Equipment (UNDP)</strong></td>
<td>21,501</td>
<td>0</td>
<td>0</td>
<td>21,501</td>
<td>15.00%</td>
<td>3,225</td>
<td>18,276</td>
</tr>
<tr>
<td><strong>Plant and Machinery (Bangalore)</strong></td>
<td>59,646,462</td>
<td>6,892,072</td>
<td>0</td>
<td>59,646,462</td>
<td>15.00%</td>
<td>8,946,969</td>
<td>50,699,493</td>
</tr>
<tr>
<td><strong>Plant &amp; Machinery (K)</strong></td>
<td>160,320</td>
<td>0</td>
<td>0</td>
<td>160,320</td>
<td>15.00%</td>
<td>24,048</td>
<td>136,272</td>
</tr>
<tr>
<td><strong>Tools, Instruments &amp; Apparatus (Bangalore)</strong></td>
<td>39,073,411</td>
<td>6,892,072</td>
<td>0</td>
<td>45,965,483</td>
<td>15.00%</td>
<td>6,894,822</td>
<td>39,070,661</td>
</tr>
<tr>
<td><strong>Tools, Instruments &amp; Apparatus (Kolkata)</strong></td>
<td>5,680,741</td>
<td>948,871</td>
<td>0</td>
<td>6,629,612</td>
<td>15.00%</td>
<td>994,442</td>
<td>5,635,170</td>
</tr>
<tr>
<td><strong>Tools, Instruments &amp; Apparatus (Mohali)</strong></td>
<td>2,107,207</td>
<td>918,888</td>
<td>0</td>
<td>3,025,995</td>
<td>15.00%</td>
<td>453,839</td>
<td>2,571,156</td>
</tr>
<tr>
<td><strong>Tata Indigo Car</strong></td>
<td>140,424</td>
<td>0</td>
<td>0</td>
<td>140,424</td>
<td>15.00%</td>
<td>21,064</td>
<td>119,360</td>
</tr>
<tr>
<td><strong>Forklift</strong></td>
<td>423,427</td>
<td>0</td>
<td>0</td>
<td>423,427</td>
<td>15.00%</td>
<td>63,514</td>
<td>359,913</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>166,792,559</td>
<td>10,380,362</td>
<td>1,124</td>
<td>177,171,797</td>
<td></td>
<td>23,919,277</td>
<td>153,252,521</td>
</tr>
</tbody>
</table>
## SCHEDULE 9- INVESTMENTS FROM EARMARKED/ENDOWMENT FUNDS

<table>
<thead>
<tr>
<th>Investments</th>
<th>Current Year</th>
<th>Previous Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. In Government Securities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Other approved Securities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Shares</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Debentures and Bonds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Subsidiaries and Bonds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Others</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

## SCHEDULE 10- INVESTMENTS- OTHERS

<table>
<thead>
<tr>
<th>Investments</th>
<th>Current Year</th>
<th>Previous Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. In Government Securities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Other approved Securities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Shares</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Debentures and Bonds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Subsidiaries and Bonds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Others (to be specified)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed Deposits</td>
<td>221,650,897</td>
<td>183,984,611</td>
</tr>
<tr>
<td>Statutory Deposits with various Govt Organisation</td>
<td>533,093</td>
<td>533,093</td>
</tr>
<tr>
<td>UNESCO Coupons</td>
<td>1,661</td>
<td>1,661</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>222,185,651</strong></td>
<td><strong>184,519,365</strong></td>
</tr>
</tbody>
</table>
## FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATION)

**INDIAN PLYWOOD INDUSTRIES RESEARCH AND TRAINING INSTITUTE**

**SCHEDULES FROMING PART OF BALANCE SHEET AS AT 31.03.2017**

### SCHEDULE 11- CURRENT ASSETS, LOANS, ADVANCES ETC

<table>
<thead>
<tr>
<th>A. CURRENT ASSETS:</th>
<th>CURRENT YEAR</th>
<th>PREVIOUS YEAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Inventories</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Stores and Spares</td>
<td>587,803</td>
<td>531,311</td>
</tr>
<tr>
<td>b) Loose Tools</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c) Stock-in-trade</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Finished Goods</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work-in-Progress</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Raw Materials</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Sundry Debtors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Debts Outstanding for a period exceeding six months</td>
<td>20,437</td>
<td>20,437</td>
</tr>
<tr>
<td>b) Others from Metro-Special Land Acquisition Office</td>
<td>178,427,934</td>
<td>178,427,934</td>
</tr>
<tr>
<td>3. Cash Balances in hand (including cheques/ drafts and</td>
<td>264,622</td>
<td>172,566</td>
</tr>
<tr>
<td>imprest)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Bank Balances:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) With Scheduled Banks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- On Current Accounts</td>
<td>1,248,452</td>
<td>3,471,303</td>
</tr>
<tr>
<td>- On Deposit Accounts includes margin money</td>
<td>402,737</td>
<td>383,577</td>
</tr>
<tr>
<td>- On Savings Accounts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) With non- Scheduled Banks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- On Current Accounts</td>
<td>24,948</td>
<td>24,948</td>
</tr>
<tr>
<td>- On Deposit Accounts includes margin money</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- On Savings Accounts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IPIRTI Branch</td>
<td>1,845,397</td>
<td>1,329,035</td>
</tr>
<tr>
<td>5. Post Office Savings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL (A)</td>
<td>182,822,330</td>
<td>184,361,111</td>
</tr>
</tbody>
</table>
# Form of Financial Statements (Non-Profit Organisation)

## Indian Plywood Industries Research and Training Institute

### Schedules from Being Part of Balance Sheet as at 31.03.2017

<table>
<thead>
<tr>
<th>SCHEDULE 11 – CURRENT ASSETS, LOANS, ADVANCES ETC. (Cont.)</th>
<th>Current Year</th>
<th>Previous Year</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>B. LOANS, ADVANCES AND OTHER ASSETS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Loans:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Staff</td>
<td>970,544</td>
<td>1,387,104</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>2. Advances and other amounts recoverable in cash or in kind or for value to be received:</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></td>
<td></td>
</tr>
<tr>
<td>d) TDS for 14-15</td>
<td>20,450,344</td>
<td>20,450,344</td>
</tr>
<tr>
<td>3. Income Accrued:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) On Investments from Earmarked/ Endowments Funds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IPIRTI Benevolent 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>d) Others (includes income due unrealized - Rs......)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interest on FD Accrued</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Claims Receivable Grants Receivable</td>
<td></td>
<td>10,000,000</td>
</tr>
<tr>
<td>Service Tax</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL (B)</strong></td>
<td><strong>21,420,888</strong></td>
<td><strong>31,837,448</strong></td>
</tr>
<tr>
<td><strong>TOTAL (A + B)</strong></td>
<td><strong>204,243,218</strong></td>
<td><strong>216,198,559</strong></td>
</tr>
</tbody>
</table>
**FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATION)**

**INDIAN PLYWOOD INDUSTRIES RESEARCH AND TRAINING INSTITUTE**

**SCHEDULES FROM ING PART OF INCOME AND EXPENDITURE AS AT 31.03.2017**

<table>
<thead>
<tr>
<th><strong>SCHEDULE 12 - INCOME FROM SALES/ SERVICES</strong></th>
<th>Current Year</th>
<th>Previous Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Income from Sales</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Sale of Finished Goods</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) Sale of Raw Material</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c) Sale of Scraps</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2) Income from Services</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Testing Charges</td>
<td>9433135</td>
<td>5,319,940</td>
</tr>
<tr>
<td>i) Fire Testing charges 2015-16 - Rs.2657178</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ii) Fire Testing charges 2016-17 :- Rs. 3046109</td>
<td></td>
<td></td>
</tr>
<tr>
<td>iii) Testing charges :- Rs.3729848</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) Hostel &amp; Lodging Charges</td>
<td>166594</td>
<td>154,350</td>
</tr>
<tr>
<td>c) Professional / Consultancy Services</td>
<td>34500</td>
<td></td>
</tr>
<tr>
<td>d) Agency Commission and Brokerage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e) Maintenance Services(Equipment/ Property)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>f) GSLI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>g) Application fees</td>
<td>25600</td>
<td>24,750</td>
</tr>
<tr>
<td>Transfer of Technology</td>
<td>480000</td>
<td>150,000</td>
</tr>
<tr>
<td>Car Charges Recovered</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e) Others(Specify)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>10,139,829</td>
<td>5,649,040</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>SCHEDULE 13 - GRANTS/ SUBSIDIES</strong></th>
<th>Current Year</th>
<th>Previous Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Central Government Grants Receivable Plan</td>
<td>50,000,000</td>
<td>38,100,000</td>
</tr>
<tr>
<td>1) Central Government Grants Received Plan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) Central Government Grants Received Non Plan</td>
<td>28,000,000</td>
<td>25,000,000</td>
</tr>
<tr>
<td>2) State Government</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3) Government Agencies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4) Institutions/ Welfare Bodies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5) International Organisations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6) Others(Specify)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>78,000,000</td>
<td>63,100,000</td>
</tr>
<tr>
<td>TOTAL</td>
<td>78,000,000</td>
<td>63,100,000</td>
</tr>
</tbody>
</table>
**FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS)**

**INDIAN PLYWOOD INDUSTRIES RESEARCH AND TRAINING INSTITUTE**

**SCHEDULES FORMING PART OF BALANCE SHEET AS AT 31.03.2017**

<table>
<thead>
<tr>
<th>SCHEDULE 14 - FEES/ SUBSCRIPTION</th>
<th>Current Year</th>
<th>Previous Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Entrance Fees</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3) Seminar/ Program Fees</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4) Consultancy Fees (transfer of technology)</td>
<td>40,219</td>
<td>295,435</td>
</tr>
<tr>
<td>5) Others(specify)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vocational Training Fees</td>
<td>152,364</td>
<td>1,424,963</td>
</tr>
<tr>
<td>SPORTS AND CULTURAL ACTIVITIES(STAFF CLUB)</td>
<td>17,000</td>
<td>12,800</td>
</tr>
<tr>
<td>RTI INFORMATION</td>
<td>60</td>
<td>40</td>
</tr>
<tr>
<td>SBI,JALAHALLI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Testing Charges (Accruals)</td>
<td>19,539</td>
<td>90,345</td>
</tr>
<tr>
<td>AG(CGEGIS)BNM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contributions from Members</td>
<td>1,119,000</td>
<td>987,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2,719,466</strong></td>
<td><strong>2,810,583</strong></td>
</tr>
</tbody>
</table>

**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**

**TRANSFERRED TO EARMARKED/ ENDOWMENT FUNDS**

|                       | 0 | 0 |
## 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 31-03-2017**

### SCHEDULE 16 - INCOME FROM ROYALTY, PUBLICATION ETC.

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Current Year</th>
<th>Previous Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Income from Royalty</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2) Income from Publications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3) Others (specify)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

**Note** - Accounting Policies towards each item are to be disclosed

### SCHEDULE 17 - INCOME FROM ROYALTY, PUBLICATION ETC.

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Current Year</th>
<th>Previous Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) On Term Deposits:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) With Scheduled Banks</td>
<td>10406956</td>
<td>15371849</td>
</tr>
<tr>
<td>b) With Non-Scheduled Banks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c) With Institutions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d) Others</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2) On Savings Accounts:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) With Scheduled Banks</td>
<td>203083</td>
<td>203,189</td>
</tr>
<tr>
<td>b) With Non-Scheduled Banks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c) Post Office Savings Accounts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d) Others</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3) On Loans:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Employees/Staff</td>
<td>303544</td>
<td>109,165</td>
</tr>
<tr>
<td>b) Others</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4) Interest on Debtors and Other Receivables</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>5) Accrued Interest:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IPIRTI R &amp; D Growth Fund</td>
<td>Rs. 64,01,385.00</td>
<td></td>
</tr>
<tr>
<td>IPIRTI Training Fund</td>
<td>Rs. 4,53,363.00</td>
<td></td>
</tr>
<tr>
<td>Interest on Other F.D's</td>
<td>Rs. 45,32,448.00</td>
<td>11,387,196</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>22,300,779</td>
<td>15,684,203</td>
</tr>
</tbody>
</table>

**Note** - Tax deducted at source to be indicated
**SCHEDULE 18 - OTHER INCOME**

1) Profit on Sale/ disposal of Assets:
   a) Owned assets
   b) Assets acquired out of grants, or received free of cost
2) Export Incentives realized
3) Fees for Miscellaneous Services
4) Miscellaneous Income

<table>
<thead>
<tr>
<th></th>
<th>Current Year</th>
<th>Previous Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHD Scholar fees</td>
<td>1024080</td>
<td>21,004</td>
</tr>
<tr>
<td>House Rent Allowance</td>
<td>228000</td>
<td>120,000</td>
</tr>
<tr>
<td>Life Time Membership</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accrued Testing Charges</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C.P.F. Loan Written Back</td>
<td></td>
<td>189,161</td>
</tr>
<tr>
<td>Transfer of Technology</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>1,252,080</td>
<td>479,542</td>
</tr>
</tbody>
</table>

**SCHEDULE 19 - INCREASE/(DECREASE) IN STOCK OF FINISHED GOODS & WORK IN PROGRESS**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TOTAL</strong></td>
<td>1,252,080</td>
<td>479,542</td>
</tr>
</tbody>
</table>

**SCHEDULE 20 - ESTABLISHMENT EXPENSES**

<table>
<thead>
<tr>
<th></th>
<th>Current Year</th>
<th>Previous Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salaries and Wages (Non Plan)</td>
<td>14676611</td>
<td>13,824,909</td>
</tr>
<tr>
<td>Salaries and Wages (Plan)</td>
<td>34030050</td>
<td>30,022,236</td>
</tr>
<tr>
<td>Salaries, Wages (Accured) and other expenses</td>
<td>4245994</td>
<td>3,835,846</td>
</tr>
<tr>
<td>Allowances and Bonus</td>
<td>529555</td>
<td>215,297</td>
</tr>
<tr>
<td>Contribution to Provident Fund</td>
<td>2450422</td>
<td>2,776,704</td>
</tr>
<tr>
<td>Contribution to other Fund (specify) Contribution to Family</td>
<td>1784661</td>
<td>1,197,000</td>
</tr>
<tr>
<td>Staff Welfare Expenses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expenses on Employees' Retirement and Terminal Benefits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other (specify)</td>
<td></td>
<td></td>
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<tr>
<td>EDLIS Charges</td>
<td>20964</td>
<td>59,414</td>
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<tr>
<td>Reimbursement of Tuition Fees</td>
<td>890695</td>
<td>765,730</td>
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<td>Reimbursement of Telephone bills</td>
<td>109960</td>
<td>50,695</td>
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<tr>
<td>Gratuity</td>
<td>1007505</td>
<td>947,560</td>
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<td>Leave Salary</td>
<td>796866</td>
<td>728,730</td>
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<tr>
<td>LTC</td>
<td>329879</td>
<td>709,097</td>
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<tr>
<td>Liveries</td>
<td>2247</td>
<td>24,471</td>
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<tr>
<td>Medical Expenses</td>
<td>736385</td>
<td>1,334,502</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td>61,611,794</td>
<td>56,492,191</td>
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## SCHEDULE 21 - OTHER ADMINISTRATIVE EXPENSES ETC.

<table>
<thead>
<tr>
<th>Description</th>
<th>Current Year</th>
<th>Previous Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audit Fees</td>
<td>18,400</td>
<td>34,029</td>
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<tr>
<td>Bank Charges</td>
<td>8,658</td>
<td>15,002</td>
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<tr>
<td>Building Maintenance</td>
<td>137,347</td>
<td>274,983</td>
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<td>Admin Charges</td>
<td>17,558</td>
<td>15,586</td>
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<tr>
<td>Campus Maintenance</td>
<td></td>
<td>14,344</td>
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<tr>
<td>Electricity Charges</td>
<td>996,558</td>
<td>1,049,976</td>
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<td>General Expenses</td>
<td>267,398</td>
<td>161,136</td>
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<td>Inspection Charges on PF</td>
<td>419</td>
<td>442</td>
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<td>Internal Audit Fee</td>
<td></td>
<td>15,000</td>
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<tr>
<td>Meeting Expenses</td>
<td>37,501</td>
<td>56,261</td>
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<td>NABL Charges</td>
<td>218,364</td>
<td>788,580</td>
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<td>Overtime Allowance</td>
<td>6,558</td>
<td>9,949</td>
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<td>Paper and Periodicals</td>
<td>7,609</td>
<td>13,733</td>
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<tr>
<td>Postage &amp; Telegram</td>
<td>81,582</td>
<td>102,782</td>
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<tr>
<td>Printing &amp; Stationary</td>
<td>29,462</td>
<td>211,060</td>
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<tr>
<td>Rent and Taxes</td>
<td>16,657</td>
<td>16,632</td>
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<tr>
<td>Repairs and Renewals</td>
<td>37,964</td>
<td>24,697</td>
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<tr>
<td>GSLI BANGLR</td>
<td></td>
<td>93,565</td>
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<tr>
<td>HINDI RAJBHASHA</td>
<td>37,952</td>
<td>23,121</td>
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<tr>
<td>Telephone Charges</td>
<td>292,964</td>
<td>265,838</td>
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<tr>
<td>Travelling Expenses</td>
<td>394,000</td>
<td>802,202</td>
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<tr>
<td>TRAVER TRAVELLING ALLOWANCE (NON PLAN)</td>
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<td>14,345</td>
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<td>Vehicle Maintenance</td>
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<td>48,846</td>
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<td>Advertisement</td>
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<tr>
<td>Calibration Charges</td>
<td>68,855</td>
<td>111,484</td>
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<td>Security Services</td>
<td>1,152,146</td>
<td>1,427,572</td>
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<td>Water Charges- NPK</td>
<td>163,474</td>
<td>133,649</td>
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<td>Other Consumables</td>
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<td>26,079</td>
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<td>Lab Expenditure</td>
<td>153,704</td>
<td>86,419</td>
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<td>SUBSCRIPTION FROM MEMBERS</td>
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<td>17,410</td>
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<td>All India Sports Meets K</td>
<td>429,872</td>
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<td>LEGAL CHARGES</td>
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<td>69,838</td>
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<td>Parliamentary Committee Members</td>
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<td>MAINTAINENCE OF EQUIPMENTS FSM MOHALI</td>
<td>64,321</td>
<td>38,091</td>
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<td>Medical Reimbursement</td>
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<td>28,613</td>
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<tr>
<td>Pension Contribution</td>
<td>184,800</td>
<td>74,110</td>
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<td>sports and cultural</td>
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<td>7,860</td>
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<td>IFS Office Training NPB</td>
<td>339,800</td>
<td>5,000</td>
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<tr>
<td>WORKSHOP EXPD FSM</td>
<td>229,039</td>
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<tr>
<td>IPIRTI STAFF BENEVOLENT FUND</td>
<td>1,480</td>
<td>450</td>
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<tr>
<td>Electricity charges and security services accrued</td>
<td>328,572</td>
<td>305,256</td>
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<td>SERVICE TAX PAID</td>
<td>55,556</td>
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<tr>
<td>MSTC SERVICE CHARGE</td>
<td>74,115</td>
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<tr>
<td>Fire testing charges (FRD/44/TT/2017)</td>
<td>12,660</td>
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<tr>
<td>Fire testing charges (FRD ADITYA INDUSTRIES)</td>
<td>12,660</td>
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<tr>
<td>Fire testing - ARDOR FIRE AND SAFETY SYSTEMS</td>
<td>25,320</td>
<td></td>
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<tr>
<td><strong>TOTAL Non Plan Expenditure</strong></td>
<td><strong>6,012,194</strong></td>
<td><strong>6,669,092</strong></td>
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</tbody>
</table>

FROM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS)
SCHEDULES FORMING PART OF INCOME & EXPENDITURE FOR THE PERIOD/YEAR ENDED 31.03.2017
<table>
<thead>
<tr>
<th>Item</th>
<th>2016-17</th>
<th>2017-18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administration Charges on EDLIS</td>
<td>84,930</td>
<td>43,546</td>
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<tr>
<td>Advertisement Charges</td>
<td>757,548</td>
<td>457,251</td>
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<tr>
<td>Canteen Maintenance</td>
<td>52,396</td>
<td>87,978</td>
</tr>
<tr>
<td>Audit Fees</td>
<td>18,400</td>
<td>34,029</td>
</tr>
<tr>
<td>Building Maintenance-</td>
<td>829,197</td>
<td>1,252,743</td>
</tr>
<tr>
<td>Campus Maintenance</td>
<td>151,513</td>
<td>263,295</td>
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<tr>
<td>Electricity Charges</td>
<td>706,764</td>
<td>691,462</td>
</tr>
<tr>
<td>Hindi Rajbhasha</td>
<td>11,200</td>
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<tr>
<td>Hostel Maintenance</td>
<td>111,043</td>
<td>113,758</td>
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<tr>
<td>Information and Publicity</td>
<td>682,388</td>
<td>652,665</td>
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<tr>
<td>Inspection Charges on PF</td>
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<td>745</td>
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<tr>
<td>Internal Audit Fee-</td>
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<td>15,000</td>
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<tr>
<td>Maintenance of Equipment</td>
<td>1,268,983</td>
<td>1,275,593</td>
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<tr>
<td>Postage and Telegram</td>
<td>67,770.5</td>
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<td>Printing and Stationary</td>
<td>7,500</td>
<td>131,770</td>
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<td>Sundries</td>
<td>521,037</td>
<td>848,772</td>
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<td>Telephone Charges</td>
<td>215,969</td>
<td>228,935</td>
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<tr>
<td>Travellinge Expenses</td>
<td>2,241,327</td>
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<tr>
<td>Vehicle Maintenance -</td>
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<tr>
<td>Papers &amp; Periodicals</td>
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<tr>
<td>Patents</td>
<td>478,411</td>
<td>465,858</td>
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<tr>
<td>Honararium for Guest PB</td>
<td>74,000</td>
<td>7,000</td>
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<tr>
<td>Lab Expenses Bangalore PB</td>
<td>35,265</td>
<td>94,150</td>
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<td>Medical Reimbursement-Plan</td>
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<td>81,590</td>
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<td>Meeting Expenses Plan</td>
<td>553,270</td>
<td>425,542</td>
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<td>EGOVERNACE</td>
<td>511,162</td>
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<td>Water Charges</td>
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<tr>
<td>Other consumables</td>
<td>363,608</td>
<td>578,062</td>
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<tr>
<td>WORKSHOP/SEMINAR EXPENDITURE</td>
<td>23,000</td>
<td>649,124</td>
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<tr>
<td>Security accrued</td>
<td>64,954</td>
<td>69,892</td>
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<tr>
<td>STUDY TOUR</td>
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<tr>
<td>TOTAL Plan Expenditure</td>
<td>9,924,294</td>
<td>10,747,611</td>
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<tr>
<td>TOTAL Other Administrative Expenses</td>
<td>15,936,488</td>
<td>17,416,703</td>
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</table>
## 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 Institutions/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>