

CPRI NEWS

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CENTRAL POWER RESEARCH INSTITUTE

(Government of India Society, Ministry of Power)

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In the News

❖ LED Test Facility was inaugurated at CPRI, Bangalore by Shri Ajay Kumar Bhalla, IAS, Secretary (Power), MoP, in the presence of Shri Sanjiv Nandan Sahai, IAS, Additional Secretary, MoP, Shri Vivek Kumar Dewangan, IAS, Joint Secretary & FA, MoP, Shri Raj Pal, IES, Economic Adviser, MoP, Shri Abhay Bakre, Director General, BEE and DG-CPRI, on 27th November 2018.



Inauguration of LED Test Facility

Realising the importance of the LED lighting System would play in the immediate future, the LED lighting system test at CPRI, Bengaluru was established under grants of the Ministry of Power.

This full-fledged laboratory can now undertake testing as per the following Indian Standards.

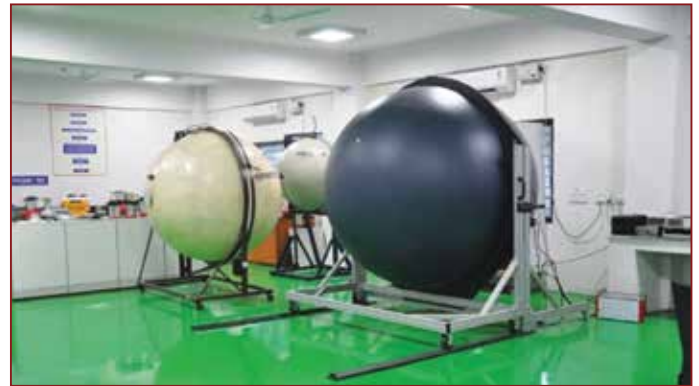
1. IS 16102:2012-part-I: Self-Ballasted LED lamps for General Lighting Services-Safety Requirements
2. IS 16102:2012-part-II: Self-Ballasted LED lamps for General Lighting Services-Performance Requirements
3. IS 16106:2012: Method of Electrical and Photometric measurements of solid state Lighting (LED) products
4. IS 14700(part 3/Sec2):1999: Electromagnetic Compatibility Part 3: limits, Sec 2: Limits for harmonic current emissions

The Major equipments added for the LED Lighting Facility are the Gonio-Photometer, The Full Moon Sphere, The Half Moon Sphere with Spectrometer for Light and colour measurements. Safety equipment Viz., Torsion tester, high voltage tester, glow wire tester, Angular displacement tester, Endurance tester and various temperature Chambers are installed .

Luminaries of all sizes, including 4 feet tube lights can be tested in this facility.



Gonio Photo Meter



Full moon Sphere

❖ Inauguration of Grid Tied Inverter and SPV Module Test facility at CPRI, Bangalore by Shri Sanjiv Nandan Sahai, IAS, Additional Secretary, Ministry of Power, on 1st October 2018.



Inauguration of Grid TIED inverter and SPV Module test Facility

Grid tied-inverter testing facility has been established in CPRI at Energy Efficiency and Renewable Energy Division (ERED). The division can now undertake all testing which are mandatory for inverter manufacturers for registration under Bureau of

Indian Standards (BIS). Grid tied inverters of rating up to 500 kVA can be tested at this facility based on operation, internal circuitries, method of conversion etc. Inverters are classified into different categories. However, from the practical point of view, classification based on operation is widely used in most of the areas. This operational behavior divides inverters into two categories as follows:

1. Grid tied Inverter
2. Standalone Inverter



Grid tied Inverter test facility

❖ Director General-CPRI chaired the 21st meeting of the Electro-Technical Divisional Council (ETDC) of BIS, held at CBIP, Malcha Marg, New Delhi, on 19th December 2018.

❖ Shri Abhay Bakre, Director General, Bureau of Energy Efficiency, New Delhi visited CPRI, Bangalore, on 9th November 2018. He visited Refrigerator Laboratory and Air Conditioner Laboratory of Electrical Appliances Technology Division (EATD). Detailed discussion was held about the check testing program of BEE at CPRI.



Visit of Director General - BEE to ERED Lab, CPRI

News on Research & Development (R&D)

1. MoU was signed with Nine (9) Implementing Organizations viz. IISc-Bangalore, IIT-Madras, NIT-Srinagar, NIT-Meghalaya, NIT-Warangal, Pondicherry University, Karunya Institute of Technology, RKDF University and CSIR-CMET for execution of new R&D Projects. The R&D projects are related to topics such as CO₂ sequestration, Development of graphene super-capacitors for storage of power from RES, Development of Solid-state Hybrid-energy Storage Device, Development of RF sensors for identification and localization of incipient discharges in GIS, Development of a Grid-connected Pumped Hydro System employed with Sensor-less PMLDCM, Development of Computational Packages for power electronics design. Further, some of the projects are related to Design of Transmission Towers, Development of alternate electrolyte, cathode and anode materials for SOFC, Development of new control algorithms for multi-functional inverters for supply of ancillary and intelligent services such as fault ride-through, reactive power compensation, harmonic reduction etc. Total Outlay of the projects is Rs. 3.38 Crore and the first installment of grant-in-aid released for the said projects is Rs. 2.27 Crores.

2. CPRI in collaboration with BEE is taking steps to initiate R&D on Electric cooking / Solar cooking /Solar based electric-cooking, so as to come out with improved designs and systems suiting Indian Kitchen.

3. NITI Ayog had organized a meeting on Indian R&D Eco System on 7th December 2018 at New Delhi. Shri. R. A. Deshpande, Additional Director, R&D Management Division, attended this meeting.

News on Research Center Activities

1. Shri Puneeth Bhurat, JRF received Provisional Degree Certificate for M.Sc (Engg.) by Research. The title of his thesis is "*Insulation Coordination Studies on 200 kV Transmission System*".

2. Shri Dundru Sridhar, JRF received Provisional Degree Certificate for M.Sc (Engg.) by Research. The title of his thesis is "*Right-of-Way Requirements of a 765kV transmission line passing through forest/ plantation area*".

3. Final Viva-Voce Examination was conducted for Four (4) JRFs and One (1) SRF for the award of M.Sc (Engg.) by Research and Ph.D. degree respectively. Pre-Ph.D Comprehensive Viva-Voce Examination was conducted for Two (2) SRFs and necessary suggestions were put-forth for refining the specific objectives and problem statement. Open Seminar / Doctoral Committee Examination were conducted for One (1) SRF and necessary suggestions were provided for effective thesis writing.

Power Systems Studies & Testing Facilities

K.S. Meera, Additional Director & Head, Power Systems Division

Power Systems Division (PSD) with its state-of-the-art facilities and latest software tools provides consulting services and testing to power utilities and industries. The division has been conducting studies for more than two and half decades for utilities, manufacturers, industries with dedicated team of power system engineers. Consultancy services offered include both grid connected and industrial system studies encompassing various simulation time frames from nanoseconds to that of several seconds. To carry out consultancy studies the division possesses unique facilities such as Real Time Digital Simulator (RTDS), Opal RT simulator, Phasor Measurement Unit (PMU) calibration system and various internationally reputed off-line power system analysis software packages such as PSSE, ETAP, NEPLAN, SIMPOW, HIWAVE etc. All the consultancy services are ISO 9001:2015 certified and the testing activities of the division are NABL accredited. The division has the experience of handling important R&D projects in thrust areas of smart grid, renewable integration and wide area measurement systems.

PSD has provided excellent power system consultancy services to major clients like APERC, MERC, MSETCL, SRPC, NRPC, PFC, ADANI POWER, DELHI TRANSCO, SIEMENS, HINDALCO etc; Third party protection audit for major utilities like PGCIL, UPPTCL, BBMB, RRVPNL, PSTCL, OPTCL etc; IED and power system controllers testing on RTDS to industries like BHEL, GE, ALSTOM, ABB, SIEMENS etc. PSD has also been facilitating the research activities of PhD and M.Tech students registered under VTU.

Testing facilities at Power System Division

- ❖ Closed Loop Testing of Power System Protection Relays
- ❖ Closed Loop Testing of Power System Controllers
- ❖ Type Testing of Protection Relays
- ❖ Testing of Phasor Measurement Units (PMU's)

Major Consultancy services offered to utilities, manufacturers and industries

- ❖ Transmission planning and power evacuation studies
- ❖ Load flow studies
- ❖ Short circuit studies
- ❖ Transient stability, dynamic stability & voltage stability studies
- ❖ Subsynchronous resonance (SSR) studies
- ❖ HVDC transmission system studies
- ❖ Insulation co-ordination studies/Overvoltage studies
- ❖ Fixed and dynamic reactive power compensation studies

- ❖ Grid Integration studies of Renewables – Wind & Solar
- ❖ Islanding studies
- ❖ Harmonic analysis and Filter Design
- ❖ Third party protection audit studies
- ❖ Protection co-ordination (Over current and Earth fault relays, Distance relays)
- ❖ Equipment Protection setting calculations (Generators, Motors, transformers etc.)

Simulation Facilities

- ❖ Real Time Digital Simulator

The Real Time Digital Simulator from RTDS Technologies, Canada established at the Power Systems Division of CPRI allows accurate and reliable simulations of three-phase electromagnetic and electromechanical transient phenomenon in electric networks both for closed loop equipment testing and off-line simulation studies. The RTDS operates in continuous real time to provide solutions to power system equations fast enough, with a typical time step of 50 μ s to accurately represent conditions in the actual power system. In addition, with the small time step feature it is possible to achieve time step as small as 2.5 μ s to model high frequency switching devices. The real time features facilitate interfacing of physical devices like power system controllers and protective relays to the simulator and test them under realistic power system conditions. Highly powerful three phase voltage and current Amplifiers provides the secondary level (PT and CT level) voltage and currents required for interfacing protection relays for dynamic testing,



RTDS facility

- ❖ OPAL-RT Simulator

The OPAL-RT simulator a PC/FPGA-based real-time power system simulation facility supplied from OPAL RT Technologies, Canada is well suited for study of three-phase electro-magnetic and electromechanical transients, Hardware-in-the-Loop (HIL) testing of equipment, Rapid Control Prototyping (RCP)

of systems to design, test and optimize control and protection systems used in power grids and industries. It allows the Phasor domain simulation of power system networks. It provides continuous real time simulation of power system models at time steps in the range of 10 to 50 microseconds with a capability to further reduce the time step (almost to 1 microsecond). The real time features facilitates interfacing of physical devices i.e. IEDs, controllers, PMUs and protective relays etc. to the simulator and operate them under real time conditions.



OPAL RT Simulator facility

❖ PMU Calibration System 6135A/PMUCAL

Fluke make 6135A/PMUCAL Phasor Measurement Unit Calibration system facilitates steady state and dynamic testing of M-class and P-class PMU's as per IEEE C37.118.1-2011, IEEE C37.118.1a-2014, IEEE C37.242.2013, IEEE Synchrophasor Measurement Test suite Specification-Version 2-2015 and IEEE/ IEC 60255.118.1.



6135A PMU Calibrator Test facility

6135A/PMUCAL can be used to calibrate a wide variety of electrical power test instruments like AC voltmeters, AC

ammeters, Current transformers, Flicker meters, Phase angle meters, Power factor meters, Power analyzers, Power recorders, Power transducers, Relay testers, VA meters, VAR meters, Voltage transformers and Wattmeters.

Testing Assignment for Overseas Customers

1. Ability to withstand the dynamic effects of short circuit for 1 MVA, 11/0.4 kV. Three-phase Transformer carried out for M/s. Eurogulf Transformer FZE, Sharjah, United Arab Emirates at High Power Laboratory, CPRI, Bangalore, on 30th October 2018.
2. Seismic test on 2500A, ENERSYS-M Switchgear & Control gear panel mounted on triaxial shake table for M/s. Larsen & Toubro Limited, Daman, Saudi Arabia carried out at Earthquake Engineering & Vibration Research Centre, CPRI, Bangalore

Participation in Exhibitions

E3-2018 Kolkata: - CPRI participated in E3-2018 exhibition, held at Nicco Park, Big Lawn, Kolkata, from 14th to 16th December 2018. CPRI stamped its presence by setting up a stall and showcased CPRI services at the Exhibition. Footfalls to CPRI stall were more than 150 visitors including Manufacturers, Students, Customers, VIPs etc. Deputy Chief Minister of Tripura and Principal Chief Engineer of Energy & Power Department, Sikkim visited the CPRI stall and expressed their interest on CPRI testing activities.



CPRI Officers along with delegates at the stall at E3-2018 Exhibition

Workshop / Training Programme / Seminars conducted for Utilities

❖ Mechanical Engineering Division, CPRI, Bangalore has organised a National Seminar on “Developments and Wrecks in Overhead Transmission line Components and Accessories”, 12th October 2018. The transmission lines are the vital links between the generating stations and distribution systems. The transmission line system has not only to expand in capacity but also to be more flexible and have greater margin to enable integration of various power sources. The required corridor for new conductor transmission lines and increased demand for power can be met by Up-rating or Up-grading the existing transmission lines with suitable modifications especially with the development and use of High temperature low sag conductors, which are also called the next generation conductors in transmission lines.

The Seminar has helped the delegates to understand a cost effective design and testing practices. The right choice of the components, their quantity, optimal locations was discussed based on terrain and environmental conditions. The confabulations in the Seminar would have certainly benefitted the participants. The feedback received through various delegates during the seminar was very encouraging.



National Seminar on “Developments and Wrecks in Overhead Transmission line Components and Accessories” held at CPRI, Bangalore, on 12th October 2018

❖ RTL, NOIDA has organized One day Seminar on Recent Trends on Condition Monitoring in Power Equipment at Scope Complex, New Delhi, on 12th October 2018. The objective of the workshop to exchange knowledge, experience and concerns on the topics related to trends in condition monitoring of power equipment like transformers, Isolators, CT’s, CVT’s & Cables etc to provide diagnostic tools to manufacturers, utilities, Industries and academic institutions. The workshop provide a common platform to review the recent advances and futuristic trends, share operational experiences and discuss requirements of reliable power equipment of world class quality.

Topics : Emerging Technologies, Design / Processing / Manufacturing, Testing & Quality Assurance, Erection / Commissioning / Site testing, Condition Monitoring and Diagnostics. Best practices in Operation and maintenance, Failure Analysis.



Inauguration of One day Seminar on Recent Trends on Condition Monitoring in Power Equipment, held at Scope Complex, New Delhi, on 12th October 2018

❖ Material Technology Division, CPRI Bangalore has organized the National Seminar on “RLA of Hydro Power Plant Components”, held on 6th and 7th December 2018. The hydropower plants in India are installed during late 60’s and these power plants are still under continuous service. Over a period of time, the equipment of these power plant undergo degradation due to various reasons such as frequent startups and shutdown of plant, operating above design limits, materials degradation like corrosion, erosion, growth of flaws etc. Condition assessment of such critical power plants components including civil structures plays a vital role in enhancing the performance and availability of the plants. The Renovation and Modernization program of aged units has been taken up by various utilities since last decade. The condition assessment of the plant components through RLA studies has an important role. The rapid change scenarios in the area of inspection technologies and its applications will influence on diagnosis techniques and condition assessment programs are highly challenging and needs the experience sharing platform.



Delegates of the National Seminar on “RLA of Hydro Power Plant Components”, held at CPRI, Bangalore

❖ One day seminar on “Testing and Evaluation of Instrument Transformers” was organized by STDS, CPRI, Bhopal, on 7th December 2018. Various topics were discussed during the program like Testing of Instrument Transformers, Importance

and Significance of Testing, Detection and Failure Analysis, Design aspects and case studies related to failure of Instrument Transformers.

About 60 delegates from various parts of country participated in the program. 8 papers were presented during the seminar. During closing session participants got the opportunity to interact with MPMKVCL's GM (Procurement) and both sides had a discussion about problems faced by them during various stages of supplies of Instrument Transformers. Participants appreciated the program very well and thanked STL, STDS, CPRI for providing such a forum.



Inauguration of Seminar on "Testing and Evaluation of Instrument Transformers" held at STDS-CPRI, Bhopal on 7th December 2018.

❖ Mechanical Engineering Division organized Two days National Conference on "Recent Trends in Overhead Transmission line towers & its accessories". The transmission lines are the connecting links between the generating stations and distribution systems, as well as links between transmission systems. Extensive transmission networks have come into existence for transporting bulk power from generating stations, many 400 kV AC and few 765 / 800 kV AC & 500 kV HVDC transmission systems are already working satisfactorily in our country. The 800 kV HVDC (Six conductor bundle configuration) transmission system is also in the process of implementation, plans are already afoot in the country to introduce 1200 kV AC (Eight conductor bundle configuration) transmission lines.

Identifying the demands of power industries & utilities CPRI established the unique facility of tower testing station in the year 1976. Since then more than four decades CPRI rendering uninterrupted services to the nation by testing more than 800 transmission line towers & tower like structures as per the requirements of National & International standards, about 35 % is for overseas customer across the globe utilized our facility. Based upon diversified knowledge gained through years of experience of testing different configurations with various

voltage levels of transmission line towers and its integration for analysis and design have prompted CPRI to promote recent trends in Design and testing of transmission line towers & its accessories. CPRI deems its privilege to share its knowledge due to significant increase in demand for power from 90 GW in 2004 to 175 GW as on 30th September 2018 (as per MOP). This huge demand envisages conservation of Right of Way (ROW) and development of compact transmission lines and optimized Power line support structures.



Delegates of the Two days National Conference on "Recent Trends in Overhead Transmission line towers & Its accessories" held at CPRI, Bangalore

❖ Short Circuit Laboratory has organized One day Seminar on 'Transformer Technologies, Best Design Practises, Standard and Testing Technics' held on 26th October 2018 at CPRI, Bangalore. Transformer is one of the most important assets in power system network. Failure of such vital component in the system leads to economic impact due to its high cost, long lead time in procurement, manufacturing and installation. The increase in demand for energy shall require enhancement of transformation capacity. Over a period of time, our country has proven technology and capacity to manufacture a wide range of power, distribution and special type of transformers for various applications in electrical network. Population of installed Distribution Transformers [DTRs] in India has reached approx. 4.24 million in numbers and demand is growing at compounded annual growth rate of about 10%. Proper design, best manufacturing practices, quality production, maintenance, stringent specifications from utilities and type testing as per national standards plays a vital role in improving longevity of transformers. Even though the existing technologies are supporting for life enhancement of transformers, advanced trend sincore materials, foil winding construction, synthetic ester oils etc., may still further improves transformer's performance. Many technical challenges in areas of specifications, design, residual life assessment, life extension and condition based maintenance etc. are yet to be addressed and resolved by the experts from electrical fraternity.



One day Seminar on “Transformer Technologies, Best Design Practices, Standards and Testing Techniques” was organized by Short Circuit Laboratory, CPRI, Bengaluru on 26th October, 2018

❖ Metering Utility Automation Division organized a one day Workshop on ‘Smart Grid Communications and Cyber Security Systems’ on 17th December 2018 at CPRI, Bangalore. As the automation and information technology usage along with advanced communications systems are increasing in the power utilities, cyber security awareness becomes essential

for utility engineers. As the power utility is one of the critical infrastructure and any adverse impact on utility operation will lead to catastrophic effect on many sectors like economic, health, injuries to human life etc. The workshop topics covered communication systems, basics of cyber security, security standards, smart grid technologies and other allied areas.



Workshop on Smart Grid Communications and Cyber Security Systems” held on 17th Dec, 2018 at CCAR, Bangalore.

Visit of Overseas Customers/Important Customers to CPRI

1. Mr. Andrey Shornikov and Mr. Pavel Kiryukhin of M/s. Massa LLC, Moscow visited UHVRL in connection with testing of 800 kV and 420 kV RIP Bushings on 27.12.2018.
2. Visit of Md. Shajjad Hossain- Assistant Engineer, Md. Oliur Rahman, Technician, Md. Babul Hossain-Technician & Md. Abdur Rahim-Technician for witnessing the Impulse test on 100kVA, 75kVA & 50kVA, 6.35/0.24kV Distribution Transformer of M/s. Confidence Electric Ltd, Dhaka, Bangladesh carried out at STDS-CPRI, Bhopal.
3. Visit of Mr. P.A. R. Raju & Mr. Abdul Mukeeth M/s. Eurogulf Transformer FZE Sharjah, U.A.E and Mr. Ahmed M Fayed &

Mr. Khalid Ahmed DEWA, Dubai for witnessing the Temperature-rise test & Determination of sound level tests carried out on 1000kVA 11/0.400kV Three Phase Distribution Transformer as per IEC 60076-2 & IEC 60076-10 for M/s. Eurogulf Transformer FZE, Sharjah, U.A.E. at Short Circuit Laboratory, CPRI, Bangalore, on 1st and 2nd November 2018.

4. Visit of Mr. Nilesh Gurjar, Manager (Test Field) and Mr. Rahim Rejab, Manager for witnessing Lightning Impulse Voltage withstand Test, Temperature rise test and Sound Level Measurement test carried out in STL-STDS-CPRI, Bhopal, lab on their 4000kVA, 33/0.433 kV cast resin 3 phase Distribution Transformer of M/s. SGB MY SDN BHD Malaysia

Power Station Related Field Services

S/N	Field Services	Organisation for which carriedout
1.	Protection Audit of 765/400/220 kV, 765/400 kV, 400/220 kV substations	<ul style="list-style-type: none"> • 765/400/220 kV Aurangabad substation • 765/400 kV Padghe substation For M/s PGCIL, WR-I
2	Failure/Chemical Analysis (LT-264)	M/s. Chandrapur Super Thermal Power Station, Chandrapur
3	Material Composition of samples & Hardness Measurement (LT-275)	M/s. FQAD, MSPGCL, Chandrapur Super Thermal Power Station Chandrapur
4	Deposit Analysis of 500MW Water treatment plant, Stage-3, LT-306	M/s.MSPGCLBhusawal Thermal Power Station, Bhusawal
5	Metallurgical Analysis/Material Composition and Hardness Test of Metal (LT-287)	M/s. MSPGCL, Unit No.5, Khaperkheda Thermal Power Station, Khaperkheda
6	Metallurgical Analysis of Failed SSH Tube (LT-280)	M/s. MSPGCL, Unit no.8 & 9,3x360 MW Koradi Thermal Power Station, Koradi
7	Metallurgical Analysis of Failed Reheater Tube (LT-272)	M/s. MSPGCL, Unit No.3, 210MWKhaperkheda Thermal Power Station, Khaperkheda
8	Inspection of Failed Tubes & Sec Failure during boiler tube leakage of Unit No.3 & Insitu Oxide Scale Measurement of Reheater Transition Loop Tubes of Unit No.3 (LT-272)	M/s. MSPGCL, Unit No.3, Khaperkheda Thermal Power Station Khaperkheda
9	Corrosion mapping of water wall tubes Unit-7, 500mw Boiler	M/s. NTPC, Ramagondam
10	Metallurgical Analysis of Economiser Tubes of Unit No.3, 250 MW (LT-297)	M/s. Paras Thermal Power Station Vidhyut Nagar, Dist. Akola
11	Metallurgical Analysis of failed water wall tubes, Unit No. 4, 500MW (LT-257)	M/s. Bhusawal Thermal Power Station, Bhusawal, Dist. Jalgaon
12	Fibrosopic Inspection of Unit No.9, 500MW header of Boiler & Mobilisation charges (LT-230)	M/s. Chandrapur Super Thermal Power Station, Chandrapur
13	Metallurgical Analysis of water wall tubes, of Unit No.6, 210MW (LT-276)	M/s. Koradi Thermal Power Station, Koradi
14	Insitue oxide scale measurement, microstructure replication, and fluorescent magnetic particle inspection at Unit No. # 1, 500 MW Boiler	M/s. NTPC, Rihand Super Thermal Power Station, Rihand
15	Corrosion mapping of water walls tubes	M/s. NSPCL Unit-1,Rourkela M/s. NTPC Unit-7,Ramagundam
16	Earth Resistance Measurement at the site of 1000mw Tehri HEP	M/s.Tehri HEP, Utrakhand
17	Soil Resistivity Measurement for the proposed Unit 526	M/s. NPCIL, Kaiga

Research Papers Published / Presented

CPRI has published technical papers on the following topics during October – December 2018

Sl. No.	Topic / Title	Authors	Presented/Published in Conference/ Journal
1.	Effect of Coal Variability on Power Plant Performance and Application of Expert Systems	Dr. Saravanan V.	
2.	Energy Conservation through R&M of thermal power plants	Mallikarjuna Rao T. Dr. Kumar R. K. Arvind Kumar	
3.	Corrosion mapping of water wall Boiler tube	M. Janardhana Dr. Kumar R. K. Arvind Kumar	National Seminar on “Thermal Power Issues, Challenges and Way Forward”, held at Neyveli Lignite Corporation, Neyveli, on 26 th & 27 th October 2018
4.	Optimization of steam curing method for bulk utilization of bottom ash and fly ash	Kishore kumar G. Janardhana M.	
5.	Wear debris analysis of lubricants to predict condition of power plant components – case study	Kishore kumar G.	
6.	Remaining Life Assessment Studies for improvement of reliability and availability of Boilers	Dr. M Venkateshwara Rao, Janardhana M. & Arvind Kumar	
7.	Thermal ageing characteristics of Domain Refined Grain Oriented (DRGO) electrical steels	Kishore kumar G.	Seminar on “Recent trends on condition monitoring in power equipments”, held at Scope Complex, New Delhi, on 12 th October 2018
8.	Condition Monitoring (Mech) of Power Plant component	Mallikarjuna Rao T. Janardhana M.	
9.	Evaluation of prime, non-prime and used transformer core material of cold rolled grain oriented steels	Kishore kumar G.	
10.	Condition assessment Techniques for insulation diagnosis of oil filled Power Transformers	Dillip Kumar Puhan Rajat Sharma	
11.	Significance of Partial discharge Measurement on Dry Type Transformers	Meena K. P.	Seminar on “Transformer technologies, best design practices, Standards and testing techniques, held at CPRI, Bangalore, organised by Short Circuit Laboratory, CPRI, Bangalore, on 26 th October 2018
12.	Measurements and Analysis of Transformer Noise Levels with Substantial Interpretations and Considerations	Arjuna Rao S. Co-authored by Girija G. Vasudevamurthy B. R. Swaraj Kumar Das Deshpande R. A.	
13.	Analysis of Distribution Transformers Failures during Short-circuit Testing	Maheswara Rao N. Co-authored by Vasudevamurthy B. R. Swaraj Kumar Das Deshpande R. A.	
14.	Constructional Requirement of Transformer Tank	Girija G.	

Sl. No.	Topic / Title	Authors	Presented/Published in Conference/ Journal
15	Testing & Certification of MV Circuit Breaker	Yugal Agarwal	Published in Electrical India Magazine of Vol. No. 58, No.10, October, 2018
16	Behaviour of Insulator under various Mechanical Loads	Praful R. Dongre	National Seminar on "Developments and Wrecks in Overhead Transmission Line Components and Accessories" organised by Mechanical Engineering Division, CPRI, Bengaluru, at CPRI, Bangalore, on 12 th October 2018
17	Structural behavior of Assembly Modular Cantilever System: A case study	Ananthababu M. D.	
18	Qualification of Equipment for Seismic and Operational Vibration	Panneer Selvam R. Yamini Gupta Nagesh Babu D.	
19	Short Circuit Withstand Test for LT Panel with Failure Analysis	Maheswara Rao N. co-authored by Vasudevamurthy B. R. Swaraj Kumar Das	Published in the One day National Seminar on "Temperature Rise test on Transformers and Control Panels – Methodology and Findings, Environmental and its Significance on outdoor Panels", held at CPRI, Bengaluru, organized by Insulation Division and Heat Run Test Lab, CPRI, on 16 th November 2018
20	Effect of Esterification and Alkali Neutralization on Pongamia Insulating Oil	Ann Pamla Cruze Lokesh Kaggare	15 th IEEE India Council International Conference (INDICON 2018), held at Amrita Vishwa Vidyapeetham, Coimbatore, from 16 th to 18 th December, 2018
21	Preparation and Characterization of Nylon 11/CaCu ₃ Ti ₄ O ₁₂ (CCTO) Nanocomposites	Angalakurthy Ashokbabu Dr. Thomas P.	
22	High performance of Polypyrrole – CaCu ₃ Ti ₄ O ₁₂ nano composites for supercapacitor application	Padmini M. Dr. Thomas P.	International Meeting on Energy Storage Devices (IMSED 2018), held at IIT, Roorkee, from 10 th to 12 th December, 2018.
23	Fabrication and Electrochemical Performance of Low Cost Soluble Lead Redox Flow Battery using two different Carbon Electrodes	Kuldeep Rana Shivangi Kosta Sneha R.	
24	Design, fabrication and electrochemical performance of soluble lead redox flow battery system for energy storage	Kuldeep Rana Shivangi Kosta Sneha R.	20 th National Power System Conference (NPSC) – 2018, held at NIT, Tiruchirappalli, Tamil Nadu, from 14 th to 16 th December 2018
25	Quality Analysis of Ceramic Insulators under steep front impulse voltage	Marimuthu K. Vynatheya S. Dr. Vasudev N. Dr. Raja P.	
26	Measurement of Radio Interference Emission Around +/-100 MVAR STATCOM Valve Building Near 400/220 kV Substation	Rajamani P.	20 th National Power System Conference (NPSC) – 2018, held at NIT, Tiruchirappalli, Tamil Nadu, from 14 th to 16 th December 2018
27	A methodology for fault detection and classification using PMU measurements	Dr. Amit Jain	
28	Effects of Transformer oil Temperature on Amplitude and Peak Frequency of Partial Discharge Acoustic Signals	Dr. T. Bhavani Shanker Deepthi Antony, Student member, IEEE Gururaj S. Punekar Prof. NIT-K, Surathkal	IEEE Transactions on Power Delivery, Vol. 33, Issue No.6, December 2018

Sl. No.	Topic / Title	Authors	Presented/Published in Conference/ Journal
29	Importance of periodic Diagnosis & Condition Assessment of High Voltage Switchgear & Control gear in Capital Asset Management	Dr. Bhavani Shanker T. Vaidhyanathan V.	
30	Enhancing fault clearing capacity of Miniature Circuit Breaker (MCB)	Saumitra Pathak Mehra B. M. Himangshu Roy Prabhakaran T.	
31	12kV Load Break Switch – A unique testing facility at CPRI, Bhopal	Venkateshwarlu Yugal Agarwal Takkher M. S. Wadhvani M. K. Santhosh J.	
32	Seismic Qualification of High Voltage Switchgear	Panneer Selvam R. Nampoothiri A. N. N. Yamini Gupta	National Conference on “Switchgear and Control gear”, organized by High Power Laboratory, at CPRI, Bangalore, on 6 th & 7 th December 2018
33	Conditional Short-circuit Test Entails Stringent Designs for LV Switchgear & Controlgear Assemblies as per IEC 61439	Maheswara Rao N. Co-authors Vasudevamurthy Swaraj B. R. Kumar Das Deshpande R. A.	
34	Switchgear for Renewable Energy Power Systems (Reps): IEC Recommendations and Guidelines for Testing	Arjuna Rao S. Co-authors Girija G. Maheswara Rao N. Vasudevamurthy Swaraj B. R. Kumar Das Deshpande R. A.	
35	Temperature rise test and environmental effect on switchgear and control gear panels –Methodology and findings	Karunakara K. Rakesh K. G. Ashitha P. N. Moumita Naskar	
36	Difficulties and challenges in High Voltage Testing of EHV/UHV switchgear	Urukundu K.	
37	Testing requirements for Non-conventional Current Transformers as per latest standard	Girija G. Co-authors Arjuna Rao S. Maheswara Rao N. Vasudevamurthy Swaraj B. R. Kumar Das Deshpande R. A.	TECH-IT 2018, Fourth International Conference on Instrument Transformers” held at Hotel Crowne Plaza, Gurgaon, organized by IEEMA, on 13 th & 14 th December 2018
38	CPRI experience on Internal arc testing of current transformers and its failure analysis	Rajaramamohanarao Chennu	
39	Microgrid Short Circuit Studies	Dr. Manohar Singh Hemavathi	8 th IEEE Power India International Conference, organised at NIT, Kurukshetra, from 10 th to 12 th December 2018

Sl. No.	Topic / Title	Authors	Presented/Published in Conference/ Journal
40	Closed Loop Performance Evaluation of Line Differential Relay on RTDS	Ashwin Meera K. S	National Conference on Advances in Electrical, Electronics and Computer Engineering, held at Bengaluru, on 16 th December 2018
41	Experiences on Testing of Partial Discharge Measurement and EMC including Special Tests on Instrument Transformers	Rajamani P.	Seminar on “Testing and Evaluation of Instrument Transformers”, held at STDS-CPRI, Bhopal, on 7 th December 2018
42	Comparison of New and Old standards in CT&PT testing	Leena H. Roy	
43	Effect of Transient Overvoltage on Instrument Transformer	Manoj Hirani Gangadhar Reddy K. V. Abhishek Verma	
44	Study of Inter turn fault in Instrument Transformer	Abhishek Verma	
45	RLA, R&M Studies and DPR for R & M activities – CPRI Experience	Mallikharjuna Rao T. Janardhana M. Arvind Kumar	National Seminar on “RLA of Hydro Power Plant Components”, organised by Materials Technology Division, CPRI, Bangalore, at CPRI, Bangalore, on 6 th & 7 th December 2018
46	Remaining Life Assessment of Hydro Power Station Penstock	Janardhana M. Kumar R. K. Kishore Kumar G. Arvind Kumar	
47	Corrosion Assessment of Penstock by Optical Laser 3d Scan	Janardhana M. Kishore kumar G.	
48	Evaluation of Integrity of aged Penstock Supporting Structure in Hydroelectric Generating Stations	Janardhana M. Kishore kumar G. Aravind kumar	
49	Strategy for preventative maintenance of Hydro Power Plant Components	Mallikharjuna Rao T. Janardhana M.	
50	Computational fluid dynamics approach for prediction of erosion intensities in hydro turbine components hard coated using HVOF and HVAF coatings	Dr. Kumar R. K. Saravanan V. Kamaraj M. Dr. Seetharamu S.	
51	CPRI experience in Diagnosis & Condition monitoring of EHV Circuit Breaker	Dr. Bhavani Shanker T. Vaidhyanathan V.	
52	Condition assessment of Generator Transformers in Hydro Power station for partial discharge by on-line acoustic emission technique	Dr. Bhavani Shanker T. Vaidhyanathan V. Sheik Mohamad A.	
53	Mitigation of High Ground Resistance for Hydro Electric Generating Station – A case study	Prabhakar C. Jithin Pauly Sheshagiri Rao U. R. Dr. Vasudev N.	

Sl. No.	Topic / Title	Authors	Presented/Published in Conference/ Journal
54	Damage tolerance approach for estimation of the remaining life of turbine-generator shafts of hydro power plants-A case study	Dr. Kumar R. K. Janardhana M. Kaushik K. Santhosh N. L.	National Seminar on "RLA of Hydro Power Plant Components", organised by Materials Technology Division, CPRI, Bangalore, at CPRI, Bangalore, on 6 th & 7 th December 2018
55	Failure analysis of pelton turbine runner	Dr. Kumar R. K. Janardhana M.	
56	Transformer condition assessment by DGA - A diagnostic approach	Kishore Kumar G.	
57	Power transformer core steel quality and their metrology	Karunakara K. Kishore Kumar G.	
58	HVAF based Thermal Spray Coatings for improvement of service life of Hydro Plant Components	Dr. Kumar R. K.	
59	Evaluation of integrity of aged penstock supporting structure in hydroelectric generating stations	Janardhana M. Kishore kumar G. Aravind kumar	
60	Energy Efficiency improvement studies of Hydro Power Plants	Jothibasu S.	
61	Experimental Evaluation of Transmission line tower made of Polymer Composite Material	Dr. Selvaraj M.	
62	Development of Compact overhead power transmission line tower using 8-legged configuration	Dr. Selvaraj M. Veerendra Kumar Shukla	
63	Failure Analysis of Leg Member at the Connection of Single- Angle Leg with Cruciform Leg in Transmission Line Tower	Dr. Selvaraj M. Vijaya Kumar	Two days " National Conference on "Recent Trends in Overhead Transmission line towers & Its accessories", held at CPRI, Bangalore, on 20 th & 21 st December 2018
64	Reason for failure of Transmission Lines and their Preventive Actions and Strategies"	Durgesh Kumar Yadav	
65	Review of Failed Transmission Line Towers during Full Scale Testing	Dr. Selvaraj M. Veerendra Kumar Shukla	
66	Comparison between Old IS 802 (Part-1/ Sec-1):1995 & New IS 802 (Part – 1/Sec-1):2015	Durgesh Kumar Yadav	

State Level Painting Competition on Energy Conservation

CPRI organized the State Level Painting Competition for the school students of Karnataka on Energy Conservation 2018, as part of the “National Awareness Campaign on Energy Conservation 2018” initiated by the Government of India. The painting competition was held at CCAR, CPRI Bengaluru on 14.11.2018. About 49 students from Category A and 47 students from Category B attended the painting competition from all over Karnataka State. The Awards Ceremony was held at SJ Auditorium of CPRI and 13 winners (1st, 2nd, 3rd and 10 consolation prizes)

each from Category A and B, were awarded cash prizes and certificates. Dr. (Smt) Shalini Rajneesh, IAS, Principal Secretary, Education Department, Government of Karnataka graced the occasion as Chief Guest and distributed the prizes to the winners. Sri R A Deshpande, Additional Director (R&D) CPRI presided over the function and Dr, N Vasudev, Additional Director and Group Head Training, CPRI was present during the occasion. About 350 people including children, parents and invitees attended the programme.



State Level Painting Competition 2018 on Energy Conservation



State Level Painting Competition 2018 Award Winners Category A

Accolades

Shri Rajaramamohanarao Chennu, Engg. Officer Gr.3, CPRI, Bangalore received the third prize for best paper award in International Conference on Instrument Transformers TECH-IT 2018 for the paper titled “CPRI experience on Internal arc testing of current transformers and its failure analysis” - conducted at Hotel Crown Plaza, Gurgaon, NCR, India, on 13th & 14th December 2018.



Best Paper Award Received by Shri Rajaramamohanarao Chennu