CPRI NEWS

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CENTRAL POWER RESEARCH INSTITUTE
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Contents

In the News

❖ Shri Vivek Kumar Dewangan, Joint Secretary & Financial Adviser (JS&FA), Ministry of Power, New Delhi took a review meeting of CPRI, with Director General and other senior officers of CPRI, at CPRI, Bangalore, on 15th July 2018. After the meeting JS & FA visited Laboratories.

Valued Customer Award

❖ The Institute organised the Annual Customer Meet- 2018, at CPRI, Bangalore, on 24th August 2018. About 70 Senior Representatives from Utilities and Industries across the country participated in the Meet.

Shri V.S. Nandakumar, Director General, CPRI during his opening remarks informed Customers of the latest update on CPRI activities. This was followed by Presentation of Action Taken Report by Dr.K.T.Varughese, Additional Director, CPRI, Bangalore on the suggestions of the Customers made during the previous Customer Meet- 2017, held at CPRI, Bangalore. Presentations on new facilities recently added by the Institute were also made

❖ 81st Standing Committee Meeting of CPRI was held at CPRI, Bangalore, on 16th July 2018.

81st Standing Committee Meeting of CPRI

❖ The 5th Meeting of Technical Committee on Transmission Research of CPRI was held at CPRI, Bangalore, on 9th & 10th July 2018. The meeting was chaired by Dr. S C Srivastava, Professor, IIT, Kanpur. Members from CEA, BHEL, POWERGRID and IEEMA participated in the meeting. Progress of ongoing and completed projects were reviewed. Evaluation of new projects was carried out.

5th meeting of Technical Committee on Transmission Research held on 9th & 10th July 2018

❖ The 20th Meeting of Standing Committee on R&D (SCRD) of CPRI was held at Conference Hall, NRPC Building, New Delhi, on 25th September 2018. The meeting was chaired by Mr. Pankaj Batra, Chairperson, CEA, New Delhi. The meeting was attended by JS&FA, MoP, Members from CEA, BHEL, POWERGRID, NTPC-NETRA, DSIR and NHPC. Director General-CPRI attended &

convened the meeting. Progress of ongoing and completed projects were reviewed. Evaluation of four (04) new projects was carried out..

20th meeting of the Standing Committee on R&D (SCRD) of CPRI held at Conference Hall, NRPC Building, New Delhi, on 25th September 2018

❖ A program was organized on "Buy on GeM – Abhiyaan" under the directives of Ministry of Power, as Nation is observing "National Mission on GeM" from 6th September to 17th October 2018, for all the Group Heads, Heads of Divisions, Units Heads of all Units and their nominated officials, at CPRI, Bangalore, on 24th September 2018. A lecture on "Introduction to GeM and its advantages and recent features added on GeM" was delivered by Mr. K C Jha, Additional CEO, Ministry Nodal Officer of GeM, New Delhi, followed by a demonstration.

Shri. K.C. Jha addressing the gathering during "BoG (Buy on GeM) Abhiyaan" program on 24th September 2018 at CPRI Bengaluru.

Grid Tied Inverter 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 has capability to interact with the grid thus power transfer to the grid is made possible. Whereas Standalone inverter cater demand for an isolated load which is not electrically connected to the grid.

In the field of testing, grid tied inverter has to cope with few more particular standards as it interacts with grid than other common standards which are relevant to both grid tied and standalone inverter.

Following are the standards used for testing of Grid tied inverters:

1. IS/ IEC 61683:1999 (Reaffirmed 2015) : Photovoltaic systems- Power conditioners-Procedure for measuring efficiency

2. IS 16221-1: 2016/ IEC 62109-1:2010:- Safety of power converters for use in photovoltaic power systems- Part 1: General requirements

3. IS 16221-2:2015/ IEC 62109-2:2011:- Safety of power converters for use in photovoltaic power systems- Part 2: Particular requirements for inverter

4. IS 16169:2014/ IEC 62116:2008 : Test procedure of islanding prevention measures for utility- interconnected photovoltaic inverters

Efficiency Test

Efficiency measurement of power conditioners including inverters used in photovoltaic system is performed as per IEC 61683 standard published in 1999 and reaffirmed in 2015. This standard mentions different load conditions to be considered during the test viz. 5%, 10%, 25%, 50%, 75% and 100%. The installed facility can support testing of inverters up to 500 kVA for grid tied inverter while it can support up to 200 kVA for standalone inverter.

Safety Related Test

Guidelines for testing Safety of Power Converters for use in Photovoltaic Power Systems has been laid down by IS 16221-1&-2/ IEC 62109-1&-2 standards.

First part of the standard applies to the Power Conversion Equipment (PCE) for use in photovoltaic systems where an uniform technical level with respect to safety is necessary. It defines the minimum requirements for the design and manufacture of PCE for protection against electric shock, energy, fire, mechanical and other hazards.

Second part of the standard covers the particular safety requirements relevant to inverter products as well as products that perform inverter functions in addition to other functions. Inverters covered by this standard may be grid-interactive, stand-alone or multiple mode inverters supplied by single or multiple photovoltaic modules grouped in various array configurations and may be intended for use in conjunction with batteries or other forms of energy storage.

Grid tied Inverter test facility

Anti-Islanding Test

In the case of utility interactive type inverter (Grid tied inverters) extra measures are to be taken to make sure that while in operation with grid, inverter comes in line with behavior of the grid. Some situation may arise at which grid is de-energized but inverter tries to cater the demand on the grid. This is known as islanding. In the absence of utility control over the grid during islanding, customer equipment as well as utility equipment is more vulnerable to damage if the generation inside the island operates outside of specified voltage and specified frequency range. If main grid reconnects with island out of synchronization, again there is a chance for damage to customer/utility equipment. So the customer owned generation must be able to sense condition of the grid and must cease energy pumping to the grid if grid is offline. This function has to be equipped with grid tied inverters. As per standard IS 16169/IEC 62116, inverter shall cease the energy output within 2 seconds after grid disconnection.

RLC load

Testing Assignment for Overseas Customers

1. Lightning Impulse, Switching Impulse, Wet Power Frequency, Radio Interference Voltage and Corona tests on 400kV, Double tension Insulator string consisting of 2x21 nos. of 210kN, Glass insulators with hardware fittings suitable for triple ACSR tern conductor and on 400kV, Single "V" suspension Insulator string consisting of 2x20 nos. of 160kN, Glass insulators with hardware fittings suitable for triple ACSR tern conductor for M/s. E U GIG OU, Estonia carried out at UHVRL-CPRI, Hyderabad

2. Ability to withstand the dynamic effects of short circuit test on 100 MVA, 220/55/55 kV Scott transformer of M/s. Meidensha Corporation, Japan, at High Power Laboratory, CPRI, Bangalore

3. Short-Time Current Test on 36 kV, Out door dry type Current Transformer of M/s. PT ESITAS PACIFIC, Jababeka, Indonesia. at High Power Laboratory, CPRI, Bangalore

4. Short time current test conducted on Non-ferrous non-metallic alloy trefoil cleat clamps suitable for up to 400 kV, 2500 Sq. mm. cable for M/s. Power Transmission and Telecommunication Equipment (PTE), Jeddah, Kingdom of Saudi Arabia at High Power Lab, Bangalore.

5. Ability to withstand dynamic effects of short current test conducted on 500 kVA, 11/0.420 kV, three phase distribution transformer for M/s. SABS-NETFA, South Africa, and Manufacturer M/s. Toshiba Transmission & Distribution System (India) Pvt. Ltd., Rudraram, Telangana at High Power Lab, Bengaluru

6. Internal arc test carried out on 24kV AIS Panel Cable chamber of M/s PT Siemens, Indonesia at High power Laboratory, CPRI, Bangalore.

Participation in Exhibitions

❖ **PowerEx Asia 2018**: Central Power Research Institute (CPRI) participated in PowerEx Asia 2018 organized at Impact exhibition centre, Bangkok, Thailand from 6th to 8th September 2018. Sri. B.M Mehra, Additional Director, STDS, Bhopal and Sri. Ramadas, Engg Officer, Information & Publicity division, Bengaluru were deputed to manning the stall. CPRI stamped the presence by setting up a 3x3 meter stall and promoted our services at the exhibition. Footfalls to CPRI stall were approximately 100 Visitors / Customers.

Visitors from M/s. Precise Electrical, M/s.ACME Industries, Thailand, M/s. Powerman, Bangladesh

❖ **INDIAN TECHNOLOGY CONGRESS - 2018:** Indian Technology Congress (ITC)- 2018 was held in NIMHANS Convention Centre, Bangalore, on 5th and 6th September 2018 with the theme "Technology First: Making India Innovate, Excel Globally and Prosper". ITC- 2018 was inaugurated by Shri H.D. Kumaraswamy, Honorable Chief Minister of Karnataka. The event discussed technological and operational issues; and contemporary digital technologies with theme based technical sessions focusing on innovation, best practices & industry engagement. CPRI sponsored the event and set up a stall displaying its facilities and credentials. The stall witnessed Visitor from Industry, Research organizations, Government and Academia who showed keen interest in the activities carried out by CPRI.

Visitor at CPRI Stall

Events Celebrated

❖ Independence day Celebration at CPRI, Bengaluru

Independence day Flag hoisted by Director General, CPRI and Officials are also presented.

❖ Hindi week celebration was conducted at STDS-CPRI, Bhopal, from 14th to 20th September 2018. During this celebration, singing, essay writing and quiz competitions were conducted for the employees. The valedictory function was presided over by Prof. Ram Dev Bharadwaj, Vice Chancellor of Atal Bihari Vajpayee Hindi University, Bhopal.

❖ Hindi Divas was celebrated at CPRI, Bangalore on 27th September 2018. Smt. Jahanzeb Akhtar, Principal Commissioner of Income tax, Ministry of Finance, Govt. of India was the Chief Guest of the function. She highlighted the importance of realizing one's potential and contributing towards the Social and Economic growth of the country to emerge as a strong nation. Prizes were distributed to the winners of various competitions. Cash awards were given to the winners under "Incentive Scheme for original Noting and Drafting in Hindi". Cash awards were also distributed to the winners of Best Original Technical article in Hindi viz. Micro wave Tube Research and Development Centre, Central Manufacturing Technology Institute, Office of the Principal Director of Commercial Audit, Bangalore. The highlight of the function was a cultural programme presented by the in-house talents of CPRI.

Workshop / Training Programme / Seminars conducted for Utilities

CPRI conducted Workshop/ Training Programme/Seminars on the following topics for utilities / Manufacturers.

❖ The 33rd and 34th Batches of "Residential Induction Training Programme" from M/s. West Bengal State Electricity Distribution Company Ltd., Kolkata, was conducted as per the MoU between CPRI and M/s. WBSEDCL, for a period of 3 weeks from 09th to 28th July 2018 and between 4th to 25th September 2018 at CCAR respectively. About 25 Engineers in the 33rd Batch and 16 Engineers in the 34th Batch attended the training programme.

The training modules covered various aspects of the electrical Distribution Engineering relevant for day to day activities of the engineers who are from the distribution sector. The technical topics covered under the training programme were aspects of distribution engineering and network, losses, billing and collection efficiency, maintenance of distribution transformers, testing and maintenance, healthiness, reactive power compensation, capacitors, protection and their testing, relays, cables, protection philosophy, monitoring and control of distribution plants, data acquisition, SCADA and RMU, Safety aspects.

The training programme had technical lectures given by in-house and external experts in classrooms as well as practical demonstrations at various laboratories of CPRI Bengaluru.

❖ High Voltage Division conducted one day workshop on Dielectric Testing of Transormers, Insulators and Circuit Breakers. The utilities have to operate and maintain a number of high voltage lines and substations. All power equipment which is used in these systems use different categories of media as insulation to provide isolation between live parts at different potentials as well as live parts and earth. The insulation has to withstand different kinds of stresses, among which, electrical stress is highly severe and predominant. System studies give us knowledge about prospective electrical stresses in terms of their magnitudes and duration. The electrical apparatus insulation should have strength to withstand those expected stresses to make the system reliable. Insulation strength of every power apparatus should be checked practically to confirm its withstanding capability against prospective stresses. Hence, it is important for power system engineers and manufacturers of power equipment to have a basic understanding of high voltage engineering and testing to ensure the reliable operation of the system. Keeping the above in view, it was intended to organize a one-day workshop on "Dielectric Testing of Transformers, Insulators and Circuit Breakers" on 31ST August 2018

❖ UHVRL, CPRI, Hyderabad conducted one day tutorial program on "High-Voltage Testing of Electrical Equipment" during 27th July 2018 at CPRI, Hyderabad. The tutorial program was tailored to suit engineers at all levels ranging from for those entering this subject area for the first time, new graduates or entry level apprentices to those who are wishing to improve their knowledge in this important topic. The aim of the tutorial program was to disseminate the know-how and the state-of-the-art of HV testing to all who are related to HV generation, transmission and distribution. Altogether 48 participants from utilities, industries, academic institutions including 12 in house participants attended the program. Experts from UHVRL, Hyderabad delivered lectures on Generation and Measurement of High-Voltages, Dielectric Testing of Electrical Equipment, Partial discharge, RIV and Corona test and Testing of Transformers. The participants were also exposed to practical demonstration on high voltage testing and measurement techniques on a few electrical equipment in the laboratory which benefitted them in understanding the high voltage test and measurement techniques. The program was well appreciated by the participants

Delegates of the One day Training Program on "High Voltage Testing Of Electrical Equipment" UHVRL, CPRI, Hyderabad

❖ Dielectric Materials Division organized 2 days tutorial program on "Insulating Fluids (New and In-service) and Diagnostic Tests" during 06-07, September, 2018. 3 participants, from M/s. Vijai Electricals Ltd., Haridwar, participated in the program.

Power transformers are vital links in the power system network. These costly systems have to function for long periods without any problems. Any failure of these components will lead to serious consequential losses. The oil before filling into Transformers, has to be selected on the basis of different physical, chemical and electrical parameters in order to get long service life. Also, this oil has to be periodically tested to ascertain its basic electrical properties, for continued safe use in Transformers.

This tutorial is planned to disseminate the knowledge, expertise and experience CPRI personnel on testing of transformer oils and significance of Dissolved Gas Analysis and Furan analysis as diagnostic tool in maintenance of transformers.

First module is on various properties of new insulating oil and in-service oil. This module focuses on various properties of new and in-service insulating oils and provide significance of parameters that are practically measured on routine basis for transformer maintenance. The topics covered are:

- Manufacture and Storage of transformer oil.
- Procedures for the sampling of new insulating oil and in–service insulating oil.
- Parameters of new and in-service oil and their significance.
- Discussions on national and international Standards and specifications.

Second module is on various diagnostic properties of in-service oil for transformer condition monitoring and maintenance. Here discussions were focused mainly on Dissolved Gas Analysis and Furan analysis and Degree of Polymerization including case studies.

At the end of this program, the participant shall be able to Know about Physical/Chemical and Electrical tests on Transformer oil to assess the condition of oil for continued use. This also helps to know about Dissolved gas analysis test, Furan test and interpret the results to assess the internal condition of Transformer and its insulation.

Dielectric Materials Division organized 2 days tutorial program on "Insulating Fluids (New and In-service) and Diagnostic Tests" during 06-07, September, 2018.

❖ Tutorial Program Conducted by UHVRL, Hyderabad in September 2019

The Ultra High Voltage Research Laboratory (UHVRL), of Central Power Research Institute (CPRI), Hyderabad has organized one day training programme on "Testing and its significance on Instrument Transformer as per IS 16227 series", during 28th September, 2018 at Seminar Room, CPRI, Hyderabad. Altogether 40 participants from utilities, industries, academic institution including 12 in house participants attended the training program.

Shri. K Devender Rao, Joint Director, delivered lecture on "Overview of Instrument Transformers testing as per IS 16227 series". Followed by Dr. Pradeep Nirgude, Additional Director and Unit Head delivered lecture on "Short circuit and partial

discharge testing on Instrument Transformers". In the second session, Dr. P Rajamani, EO Gr.3, delivered lecture on "Dielectric accuracy and temperature rise tests on Instrument Transformers as per IS 16227" and "Special Test on Instrument Transformer".

Some of the tests on Instrument Transformer was demonstrated to the participants during the laboratory visit. The training programme ended with valedictory program at 05:30 PM. Some of the photographs of the program is given below

Photographs of One day Training Programme on "Testing and its significance on Instrument Transformer as per IS 16227 series" organized at UHVRL-CPRI, Hyderabad

❖ One day workshop was organized by Oil Test Lab, STDS Bhopal on 28.9.2018. The workshop was well attended by representatives from various organizations. The workshop was presided by Additional Director - Unit Head, CPRI Bhopal Shri J. Santosh with senior officers sharing the Dias.

There were 50 participants including 7 Lecturers in the program. The Organisations like BHEL, MPMKVV, Rajasthan Rajya Vidyut Utpadan Nigam Limited, Rail Vikash Nigam limited, EMCO, Sterlite Power Transmission Limited, Gujrat Energy Transmission Corporation(GETCO) – GETRI , NHPTL, CSPDCL , ACME Cleantech Solutions PVT Limited, Toshiba, Crompton Greaves, M/s Century Infrapower PVT Ltd and many other Transformer manufacturers as well Power oil industries personnel from M/s Apar Industries, M/s Savita Oil Technology, Hindustan Petroleum Corporation Limited participated in the program.

In the workshop 5 Technical papers and technical talks presented various speakers – Shri Rahul Buswala & Mr. Jubair Ahamed Sr. Engineers from BHEL on "Dissolved Gas Analysis"; Shri Sanjay Jagdale, Vice President from M/s Savita Oil technologies Limited on "Natural Easter- Alternate Dielectric Fluid for Transformers"; Shri G.R. Viswanath, JD CPRI, Noida on "Special tests for New Insulating Oil as per IS : 335 Specifications"; Shri P. Sadasiva Murthy JD, CPRI, Bengaluru on "Characterization of Easter based oils as alternative to mineral oils" ; Dr. P.K. Maiti JD, CPRI, Kolkota on "Ageing behavior of Mineral oil based Al2O3 Nano fluid" and Ramjeet Singh, Additional Director, STDS Bhopal on "Moisture and particles - Contamination in Transformer oil". The technical queries and doubts raised by participants were answered by key speakers. In the program Sr. Officials / engineers from CPRI, STDS, Bhopal and Bina were also present.

Delegates of the One day Workshop was organized by Oil Test Lab, STDS Bhopal

Visit of Overseas Customers/Important Customers to CPRI

1. Visit of Mr. Alok Kumar Mohanty, representative from M/s. ACME Electronics Limited, Dhaka for witnessing the Ability to withstand the dynamic effects of short circuit test carried out on 200kVA 11/0.415kV Three Phase Distribution Transformers, for M/s. ACME Electronics Limited, Dhaka, Bangladesh.

2. Visit of Mr. Raghunath G from M/s. UL – Underwriters Laboratories Middle East, Dubai for witnessing the Conditional short circuit tests at 36kA, 30kA, 21.6kA & 18kA carried out on 415V, 250A 8 way LV Switch Board (SMDB), as per IEC 61439-1 & IEC 61439-2 for M/s. Gama Engineering, Sharjah, UAE.

3. Visit of Mr. Rajeev K V from M/s. AL Hamad Industries International and Mr. Mohamed Abullal Ibrahim & Ms. Arra Alsam Al Napsi from M/s. Federal Electricity & Water Authority (FEWA) UAE for witnessing the Verification of short-circuit withstand strength at 30 kA for 1 second for M/s. AL Hamad Industries International, UAE.

4. Visit of Ms. Frayt Oleksandra and Ms. Olga Oleksandrenko M/s. Lviv Insulator Company, Ukraine and Ms. Dipal Panchal, M/s. Advait Infratech, Ahmedabad, India for witnessing the Dielectric, Radio Interference Voltage and Corona test performed on 3 Nos. of 400kV, Glass insulator strings of M/s. E U GIG OU, Katuselapi 6, 11412, Tallinn, Estonia make at UHVRL-CPRI, Hyderabad

5. Visit of Mr. Md. Hamidur Rahman- Engineer, Mr. Md. Abdur Rahim Technician and Mr. Md. Rahat Hosain, Technician for witnessing the Impulse withstand Voltage Test on 15kVA, 6.35/0.24 kV Single Phase Distribution Transformer of M/s. Confidence Electric Ltd, Dhaka, Bangladesh carried out at STDS-CPRI, Bhopal

6. Visit of Mohammad Arif Haidari, Electrical Engineer & Mr. Sayed Abdullah Hamraz, Engineer from M/s. DABS, Kabul, Afghanistan visited STL-STDS, Bhopal for witnessing Impulse test on 100kVA, 20/.0420kV transformer of Vijai Electricals Ltd, Haridwar

Power Station Related Field Services

S/N	Field Services	Organisation for which carriedout
1.	Evaluation of performance testing of 2x195 MW cooling towers	M/s. Kanti Bijle Utpadan Nigam Ltd.(KBUNL), Muzaffarpur Thermal Power Plant, Kanti, Muzaffarpur
2.	Preliminary Inspection of Failed water wall tube at site at KPKD TPS, 500 MW u#5 (LT-287)	M/s. Khaperkheda Thermal Power Station, Khaperkheda
3.	Metallurgical Analysis of Failed Water Wall Tube from Rear arch U#5, 500 MW (LT-287)	
4	Metallurgical Analysis/ Material Composition and Hardness Test of Failed Plate (LT-287)	
5	Metallurgical Analysis of Failed Tubes (LT-256)	M/s. M.B. Power Ltd., Jaithari Thermal Power Plant Annupur, M.P
6	Corrosion mapping of Unit-2 Boiler	M/s. NTPC, Farakka
7	Condition Monitoring Tests on Generator, Transformer and Lightning Arresters	M/s. NPCIL, Tarapur Atomic Power Station 1 & 2, Boisar, Maharashtra
8	Protection audit for the following substations (s/s): • 765 kV Dharmajaygarh s/s • 765 kV Tamnar s/s • 765 kV Kotra s/s • 765 kV Durg s/s • 400kV Kolhapur s/s • 765kV Pune s/s	M/s PGCIL, WR-I, Nagpur
9	Failure and Chemical Analysis of Clinkers(LT-272)	M/s. Khaperkheda Thermal Power Station, Khaperkheda
10	Material Composition of Samples & Hardness Measurement (LT-275)	M/s. Chandrapur Super Thermal Power Station, Chandrapur
11	Corrosion mapping of water wall tubes	M/s. NTPC, Unit # 2 , Farakka (W.B)
12	Corrosion mapping of water wall tubes	M/s. NTPC, Unit # 2 ,Tuticorin (TN)
13	Field Tests on Station Transformer	M/s. Harduaganj Thermal Power Station, UPRVUNL, Kasimpur, Aligarh
14	Metallurgical analysis of Failed Boiler Tubes of Unit No. 1&2 (LT-302)	M/s. Marwa Tendubhata Thermal Power Station, Marwa Janjgir, Champa, Chhattisgarh
15	Metallurgical analysis of Failed Boiler Tubes of Unit No. 1(LT-300)	M/s. D.B.Power Ltd., 2x600MW Super Thermal Power Station, Janjgir, Champa, Chhattisgarh
16	Metallurgical analysis of Water Wall Tubes (LT-276)	M/s. Koradi Thermal Power Station, Koradi
17	Expert Service for high Shaft vibration of Unit No. 1,500MW BHEL make Turbine(TOS-237)	M/s. Marwa Tendubhata Thermal Power Station, Marwa Janjgir, Champa, Chhattisgarh
18	Metallurgical analysis of Failed Water Wall Tubes(LT-280)	M/s. MSPGCL, Koradi Thermal Power Station, U#8&9, 3x660MW Koradi

Research Papers Published / Presented

CPRI has published technical papers on the following topics during July – September 2018

Sl. No.	Topic / Title	Authors	Presented / Published in Conference/ Journal
1.	Study of effect of Water Droplets on the surface of polymeric Insulators	B. Yashodhara K. A. Aravind Dr. Pradeep M Nirgude Dr. D. Devendranath	International Journals of New Technologies in Science and Engineering, Volume No. 5, Issue No. 5, July 2018, PP 111 to 121
2.	The effect of BaO.85 CaO.15 ZrO.1 TiO.9O3 (BCZT) nanoparticles on the critical parameters of synthetic ester based nanofluids	Dr. P. Thomas Nandini E Hudedmani	IEEE 2nd International Conference on Dielectrics- ICD- 2018, held at Budapest, Hungary, from 1st to 5th July 2018
3.	Characterization of LDPE-Metal oxide Nanocomposites using Thermo-Analytical and Spectroscopic Techniques	Dr. B. Nageshwar Rao S. Vynatheya R. Kandiban	
4.	Ageing Indicators of Stator Winding Insulation subjected to Elevated Frequency Voltage & Thermal Stresses	Dr. B. Nageshwar Rao Burjupati	
6.	Identification of Slot Discharges in Rotating Machine Insulation System using Variable Frequency PD Measurement	Ramesh P Nair Dr. B. Nageshwar Rao B. V. Sumangala	IET Journal, May 2018 issue
7.	An approach to develop a compact transmission line tower with special 8-legged configuration	Dr. M. Selvaraj V. K. Shukla Dr. R. Ramesh Babu	International Journal of "Steel Structures", June 2018 issue
8.	Thermal characterization of Polyethylene-metal oxide nanocomposites used as electrical insulation in HVDC cables	Dr. B. Nageshwar Rao Anju R.K Ashwin Parthasarathy	IEEE 12th International Conference on Properties and Application of Dielectric Materials (ICPADM- 2018), held at Xian, China, from 20th to 24th May, 2018
9.	Effect of moisture and geometrical parameter on dielectric behavior of ester oil impregnated insulation using dielectric spectroscopy measurement	Manas Ranjan Patra Dr. B. Nageshwar Rao Burjupati	
10.	Effect of Temperature on Slot Discharge Pattern Measured in Stator Coils at Variable Frequency Sinusoidal Voltage Excitation	Ramesh P Nair Dr. B. Nageshwar Rao Thirumurthy B. V. Sumangala	
11.	"Significance of Transformer Oil Testing"	Dr. P. K. Maiti	Regional Power Meet held at Kolkata, organized by IOCL, on 10th August 2018.
12.	Evaluation of the effects of UV radiations on outer sheath of Cables	P. N. Ashitha K. P. Meena S. Ganga	Published in 8th International Conference on Cables and wires, CABLEWIRE-2018, held in New Delhi, on 23rd & 24th August 2018.

Sl. No.	Topic / Title	Authors	Presented / Published in Conference/ Journal
13.	Assessment of Properties of Insulation Materials of house wiring cable	R.Arunjothi P.V.Satheesh Kumar Thirumurthy G.K. Raja K.P.Meena	8th International Conference on Cables and wires "CABLEWIRE- 2018", conducted by IEEMA, at New Delhi, on 23rd & 24th August 2018
14.	Screened Separable Connectors for compact Cable Terminations of Distribution Networks: Evaluation criteria & Failure Modes	Thirumurthy R.Arunjothi K.P.Meena	
15.	Cluster Based Protection Coordination using a New Voltage Current Time Inverse Relay	Dr. Manohar Singh Ms. Anubha Agrawal	IEEE Power & Energy Systems General Meeting- 2018, held at Portland, U.S.A., from 5th to 9th August 2018
16.	AMI and Theft Detection in Smart Grid: A Review	Priyamvada Chandel B.A Sawale	Journal of Emerging Technologies and Innovative Research (JETIR), Volume No.5, Issue No.6, page no.811-814 in June 2018
17.	Evaluation of Smart and Prepayment Energy meter under short circuit fault conditions	Surendra Kalambe B.A. Sawale	Conference on Smart metering post-paid, pre-paid and net metering, organized by CBIP, New Delhi, on 6th & 7th September 2018
18.	Performance test on 1200kV, AC voltage measuring system of CPRI, UHVRL, Hyderabad.	Dr. P. Rajamani K. A. Aravind Dr. Pradeep M Nirgude.	National Conference on Electrical and Electronics Measurements (NCEEM-2018), organised by CSIR – National Physical Laboratory, New Delhi, held on 19th September 2018
19.	Performance test on ±1200kV, HVDC voltage measuring system of CPRI, UHVRL, Hyderabad	K. A. Aravind Dr. P. Rajamani B. Krishna Dr. Pradeep M Nirgude	
20.	"Ageing Behavior of Mineral Oil Based Al_2O_3"	Dr. P.K Maiti	one day workshop on "Performance Evaluation and Acceptance Criteria of Liquid Dielectrics for use in Power Transformers as per National and International Test Norms," held at STDS-CPRI, Bhopal, organized by CPRI- STDS, Bhopal, on 28th September 2018
21.	Symmetric Supercapacitor performance of $CaCu_3Ti_4O_{12}$ decorated polyaniline nanocomposite	M.Padmini Dr. P. Thomas	Published in Electrochemicia Acta, Elesiver. Doi:10.1016/j.electacta.2018.09.179

New Test Facility

Vertical drop impact tester facility at insulation division:

Mechanical impacts are likely to stress electro technical equipments in service. One of the way in which this stress can be reproduced in the lab is by using hammer tests of various severities. With this view the Division has fabricated a Vertical Drop Impact Tester employing vertical hammer for stress testing. The instrument is capable of simulating an energy of 2J, 5J, 10J, 20J and 50J. Other energy levels as required can also be simulated by changing the drop weight. This instrument complies to IEC 60068-2-75, IEC 61914, BS EN 50483, NFC 33-020 etc and can be used for stress testing of cable cleats/clamps, enclosures, connectors etc to name a few.

Vertical drop impact tester

Accolades

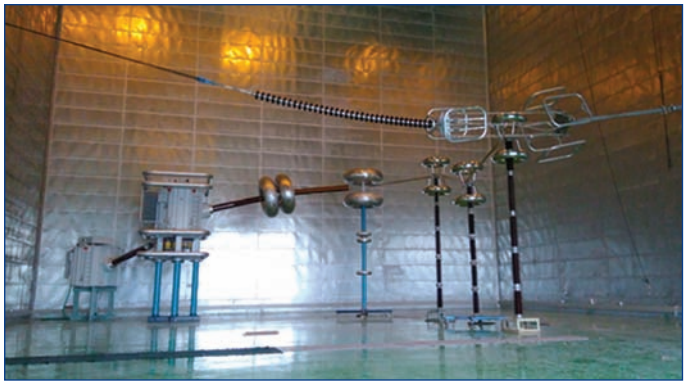
The technical paper titled "Performance test on 1200kV, AC voltage measuring system of CPRI, UHVRL, Hyderabad" authored by Dr. P Rajamani, Engineering Officer Gr.3, UHVRL-CPRI, Hyderabad got the "best oral paper award (First)" in National Conference on Electrical and Electronics Measurements (NCEEM-2018), organised by CSIR – National Physical Laboratory, New Delhi, on 19th & 20th September 2018.

PD Test Facility at UHVRL, Hydrabad

Ultra High Voltage Research Laboratory (UHVRL), of Central Power Research Institute, Hyderabad, has commissioned a new UHV Indoor Shielded laboratory of size 35 (H) x 35 (W) X 50 (H). The laboratory has 1200 kV, 2A, 2400 kVA UHVAC partial discharge free test system consisting of 2 ×600 kV cascaded testing transformer to perform partial discharge tests on various electrical equipment. The laboratory has a background partial discharge of less than 5.0 pC at a test voltage of 850 kV. Two sliding doors of 10 m (height) × 8 m (width) is giving perfect darkness and shielding, which facilitates to perform visual corona test even during day time. The laboratory has a ambient noise level as low as 20- 30 µV. This facilitates to perform radio interference voltage measurement test even with maximum permissible radio interference voltage emission limits of 250 µV also. The indoor laboratory is doubly shielded having Electric Overhead Travelling crane with 2 hooks each of 5 ton capacity. It is also equipped with 2 numbers of 5 ton winches for erection and handling of large electrical equipment.

Using this facility the following tests are performed

1. Partial discharge measurement test on current transformer, capacitive voltage transformer, bushings, lightning arresters and GIS of upto 800 kV system voltage
2. Radio interference voltage measurement test on electrical equipment of upto 800 kV system voltage
3. Type and some special tests on instrument transformers of upto 800 kV system voltage



Towards Six Decades of Dedicated Service To Power Sector

CPRI

RESEARCH

* Collaborative Research between R&D Institutions, Industry and Academia
* Coordinates In-House R&D (IHRD), Research Scheme on Power (RSoP) and Research Projects under National Perspective Plan (NPP)

TESTING AND CERTIFICATION:

* High Power Short Circuit testing of Transformers/Switchgear
* Ultra High Voltage testing upto 1200kV
* Transmission line Towers & accessories
* Power Cables & Capacitors
* Material characterization including CRGO
* Insulators & Lightning Arresters
* Vibration studies, Transformer Oil
* Seismic Qualification
* Relays, Energymeters and Smart Meters
* Refrigerators and Air Conditioners
* Domestic appliances including LED and SPV Lighting Systems

CONSULTANCY:

* Diagnostic & Condition Monitoring of electrical equipment
* Power System Studies, Real Time Simulation of Power System Controls, Protection Audit
* RLA and R&M of Thermal & Hydro Power Plants
* Energy Audit, Fuel Audit, training services in Plant Optimization for Thermal Power Stations
* Power System Automation/Distribution Automation, Smart Grid
* Services for programmes initiated by Government of India
* Third Party Inspection Services and Vendor Assessment for Utilities

TRAINING:

* Customised Training Programmes for Utilities and Industries

ACCREDITATIONS/CREDENTIALS:

* ISO/IEC 17025
* Member – STL
* Intertek (ASTA), UK
* ISO 9001 Certification for Research & Consultancy activities
* INMETRO, Brazil for tests on Transformers
* Corporate Member in DLMS UA, UCA IUG
* Association with UL, TUV

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