VIDYUT ANUSANDHAN SAMACHAR

CPRI

ISSUE NO: 02 QUARTERLY NEWSLETTER JAN-MAR 2024

CENTRAL POWER RESEARCH INSTITUTE

Index

Central Power Research Institute

(Ministry of Power, Govt. of India)

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ABOUT CPRI

Central Power Research Institute (CPRI) was established by the Government of India in 1960. For the last six decades, CPRI has been rendering dedicated service to the Power Sector.

Over the years, CPRI has developed expertise in generation, transmission, distribution systems and has established world class facilities for research and testing in the areas of High Voltage, High Power, Short Circuit, Power Capacitors, Power Cables, Solar PV, Smart Metering & AMI, Power System Studies, Energy Studies, Tower Design, Vibration Studies, Seismic Performance, Liquid Dielectrics, Diagnostics, Condition Monitoring, Cybersecurity, Smart Grid Systems, Energy Storage, RLA studies and development of newer materials for Power Sector.

ACTIVITIES OF CPRI:

- Applied Research in Power Systems Engg.
- Independent Third Party National Laboratory for Testing & Certification
- Consultancy & Field Testing Services

DIRECTOR GENERAL MESSAGE

I am glad to present the second issue of the Vidyut Anusandan Samchar. The year as a whole was very encouraging for CPRI, we were able to record the highest revenue from testing and consultancy. In the Area of R & D, CPRI as the designated agency administers the MAHIR scheme as well as other R&D scheme of the Goverment of India.

Some of the first time tests conducted were HBias Test on 420kV GIS Isolator for M/s. Toshiba T&D Systems, Hyderabad and 245kV GIS Breaker with Disconnector for M/s. Hyosung T&D Limited, Pune.

Temperature Rise Test on 18 MVA, 33/0.69-0.69-0.69-0.69kV, Five Winding Inverter duty Transformer used for solar power plant was carried out for the first time in CPRI.

It is a matter of pride for us to be awarded four patents and filing of a copyright. Also, many research paper of our officers has won best paper awards in conferences.

I look forward to your suggestion to CPRI raising to the occasion to serve the electric industry.

Sri. B A Sawale
Director General, CPRI

R & D HIGHLIGHTS

CPRI is the nodal agency for coordinating research in the Indian power sector. CPRI is continuously supporting the Indian academia to help them come up with innovative solutions. Thirteen MoUs under RSOP/NPP have been signed with reputed Indian institutes to propel R&D efforts aimed at bringing innovative solutions for the Indian Power Sector.

These projects span multitude of innovations such as integrating renewable energy sources with advanced power flow controllers, developing solar energy production forecasting systems, stabilizing DC microgrids and developing efficient grid-integrated inverters. The focus also extends to improving the safety and efficiency of high-voltage devices using nano-fluid transformer oils, recycling photovoltaic panels, devising sustainable models for rural microgrids, substation monitoring through UAV&UGV and IOT based remote diagnostics for hydroelectric facilities.

KEY HIGHLIGHTS

MISSION ON ADVANCED AND HIGH IMPACT RESEARCH (MAHIR)

The Mission on Advanced and High Impact Research (MAHIR) is one of the flagship initiatives of MoP & MNRE. In response to the call for research project proposal under the mission several project proposals were received in the areas of solar PV technologies, geo-thermal energy, Carbon capture, utilization and storage, tidal energy, wave energy and energy storage devices, alternatives to Li-ion storage batteries etc,.

The Technical Scoping Committee during its third meeting held on 25th January 2024 through video conferencing mode reviewed eight project proposals. The meeting was chaired by Chairperson CEA and was attended by representatives from MNRE, POWERGRID, NTPC, CEA, CPRI, IITs etc.

Further, discussions were held with POWERGRID and Grid-India on the MAHIR proposals in the areas identified by the respective organizations. A meeting was also held with SJVNL, CEA and industry partner, to discuss on the development of compressed air storage system for Run of the River plants in India.

RESEARCH HIGHLIGHTS

Shri B.A. Sawale, Director General, CPRI and Dr. M. Venkateswara Rao, Additional Director & HoD, R&D Management Division, CPRI attended the Valedictory session of the Standing Committee on Energy on 7th March, 2024 in Main Committee Room, Parliament House Annexe, New Delhi. During the session the overall performance of the Ministry of Power, Ministry of New and Renewable Energy and all the PSUs/ Institutions / Bodies under the administrative control of both these Ministries was reviewed.

PROJECT IN FOCUS

DEVELOPMENT OF POLYMERIC FILMS FOR HIGH ENERGY DENSITY CAPACITORS APPLICATIONS

Dielectric materials with high thermal stability, dielectric permittivity, and low loss are preferred for lightweight and miniaturized electronic devices. Polymeric films are favoured for capacitor materials due to their low cost, high dielectric strength, and resistance to moisture degradation. Thin films of nonpolar polymers like polypropylene are commonly used in capacitors for their low relative permittivity and ability to withstand high fields. However, their resistance to heat damage is limited. To increase permittivity, one can enhance either the ceramic filler or the polymer matrix.

In this project, a polymer/ceramic composite system using polystyrene (PS) with Strontium Titanium Manganese Oxide (STMO) ceramics was prepared. Polymer nanocomposites based on Polypropylene (PP)/ Poly Vinylidene Fluoride (PVDF) and PS/PVDF blends and Graphene Nano-Platelets (GNP) were also prepared by enforcement of GNP into 50 vol % blend. The prepared composites were investigated for structural, thermal and dielectric properties. Results showed increased permittivity and thermal stability compared to pure PS. Similarly, blends of PP and PS with PVDF were studied, with GNP added to improve dielectric and thermal behaviour. The addition of GNP enhanced dielectric properties and thermal stability of the blends.

Project Leader:
Dr. P. Thomas
Additional Director
Dielectric Materials Division
Central Power Research Institute

COLLABORATION SHOWCASE

CPRI has entered into an MoU with IIT Mandi for research and academic collaboration. Under the program, 06 Scientific/Engineering Officers of CPRI have enrolled for Joint Research Degree Programs (JRDP) to pursue M. Tech. /Dual Degree/ PhD., for the academic session starting January 2024.

As per the affiliation of CPRI as research center of Visvesvaraya Technological University (VTU), 03 Scientific/Engineering Officers have enrolled for M.S.(Research)/ PhD programs for the academic session starting January 2024.

PATENTS GRANTED

PATENT TITLE: An inspection method for characterization of surface breaking inclined crack based on Ultrasonic Time of Flight Diffraction
INVENTORS:
Dr. S. K. Nath, Shri. B. H. Narayana (Late)
Dr. Krishnan Bala Subbramaniam, IIT Chennai,
Dr. C. V. Krishnamurthy, IIT Chennai.

PATENT TITLE: Novel Polymer Composite Material for EMI Shielding of Electronic Systems / Circuits
INVENTORS:
Dr. J. Sundara Rajan, Ms. Kavya M, Dr. R. R. N Sailaja , Ms. Rashmi

PATENT TITLE: Temperature and Sag Measurement Sensor Fitted Directly on Live High Tension Powerlines
INVENTORS:
Dr. J. Sundara Rajan,
Shri. Atulya Mishra, Shri. Mohan S. Devekar(Late)

PATENT TITLE: An Energy Efficiency Optimizer System for Induced Draft Cooling Towers of Power Plants
INVENTOR:
Sri. M Siddhartha Bhat

COPYRIGHT

Copyright has been obtained by Metering Utility Automation Division, CPRI for "Parameter Verification sub module for Profile Parameters under Meter Reader Association, in testing tool for Smart meter as per Indian standards."

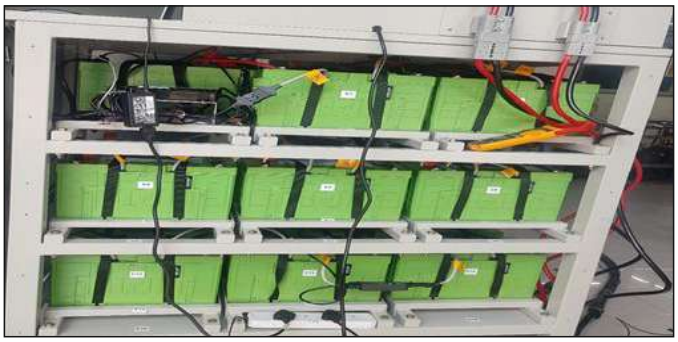
TECHNICAL SPOTLIGHT

FIRST TIME TESTS

High Voltage Laboratory, CPRI, Bengaluru has successfully carried out for the first time in CPRI, Bias Test on 420kV GIS Isolator for M/s. Toshiba T&D Systems, Hyderabad. 245kV GIS Breaker with Disconnector for M/s. Hyosung T&D Limited, Pune.

Supplementary Test Laboratory, STDS, Bhopal successfully conducted for the first time in CPRI, Temperature Rise Test on 18 MVA, 33/0.69-0.69-0.69-0.69kV, Five Winding Inverter duty Transformer used for solar power plant application, for M/s. MEI Power Pvt. Ltd., Agra.

Electrical Appliances Technology Division (EATD) of CPRI, Bengaluru successfully carried out for the first time in CPRI, Battery Pack Capacity Test (Built-in Battery Management System, Lithium Ion Phosphate Battery) manufactured by M/s Ultralife India, Bangalore, for M/s. Metrorail, Kolkata.



FIRST TIME TEST UNDER 'MAKE IN INDIA'

High Power Laboratory, CPRI, Bengaluru has facilitated rearranged testing infrastructure to test 72.5kV, 130kA RMS / 325kA peak for one second, Co-axial disconnector manufactured by M/s. iSAT Network, Haridwar. The product is manufactured for the first time indigenoously by the firm. The testing infrastructure is used to validate the manufactured design of different types under the development project.

SPECIAL TESTS

Energy Efficiency & Renewable Energy Division (ERED), CPRI, Bengaluru has carried out Low Voltage & High Voltage Ride Through (LVRT & HVRT), and Impulse Testing of Three Phase Vertical Multistage Centrifugal Pump set using Grid Tied Inverter, for M/s. Samudra Pumps India Private Limited, Coimbatore.

Cables & Diagnostics Division (CDD), CPRI, Bengaluru successfully carried out Pre-Qualification Test as per As per IEC : 62067 - 2022 on:

- 1C X 2500 sq.mm, XLPE Insulated HDPE Sheathed Cable
- Outdoor fluid filled (Silicone based) composite insulator termination
- Outdoor fluid filled (PIB based) composite insulator termination
- Plug In Dry GIS / Transformer Termination (Back to Back) with Socket.
- Inline joint with heat shrink outer protection, Shield break joint with heat shrink outer protection
- Shield break joint with Copper casing.
- Coffin box outer protection

This long duration prequalification test on Cable system was carried out for a period of sixteen months continuous.

Pre-Qualification test arrangements

CPRI has state of art IP X2 test facility at EATD to test panels up to 2m in height. The test enclosure was subjected to 15 degree tilt angle with 90 degree vertical rain fall (droplet) over the enclosure, as depicted in the photograph. The X2 test was carried out on a panel enclosure for an Indian customer.

TESTS FOR OVERSEAS CUSTOMER

- Switchgear Testing & Development Station, Bhopal has conducted the Test for ability to withstand the dynamic effects of short circuit test, Impulse Voltage withstand test and Temperature Rise test for 2500kVA, 11/0.415kV, Three Phase Distribution Transformer for M/s. Powermann Bangladesh Ltd., Bangladesh
- Smart Grid Research Laboratory has carried out the IEC 61850 Conformance testing for Energy Meters (Prometer 100 & Prometer 540) for M/s. Secure Meters (Sweden) AB, Sweden.
- Electrical Appliances Technology Division (EATD) has carried out test for 132 kV 6+1 and 3+1 SVL link boxes for IP 68 category 1 test as per IEC 60529 standard for M/s. Evergrow electrical Engg Supplies, Malaysia.

- Cables & Diagnostics Division carried out the type test for 6/10 (12) kV, 3CX300 Sq.mm, CU/XLPE/PVC Cable as per standards: IEC 60502 (Part-2) /2014 for M/s. RR Imperial Electricals Ltd., Bangladesh.
- Electrical Appliances Technology Division (EATD) has carried out test for 500V, 800A, 6W transformer mounted LVDB is tested for IP 43 as per IEC 61439 standard for M/s. Asiatic Electricals and Switchgear Pvt. Ltd., Alwar, Rajasthan. The test is witnessed by Mr. Ahmed Fayed - DEWA Dubai and Mr. Gyanmani Rai, VP - M/s. Asiatic.

- Cables & Diagnostics Division has carried out the type test for 0.6/1.0 kV, 4CX95 Sq.mm, Al/XLPE/PVC/SWA/PVC cables as per Standards: IEC 60502 (Part-1)/202 for M/s. Riyadh Cables Co., Riyadh
- Cables & Diagnostics Division has carried the Type test for 6.35/11 kV, 3CX240 Sq.mm, Al/XLPE/CWS/PVC/SWA/PE cable as per standards: IEC 60502 (Part-2)/2014 for M/s. Dubai Cable Company, Dubai
- Switchgear Testing & Development Station, CPRI – Bhopal has carried out the Routine test prior to ability test to withstand the dynamic effects of Short Circuit Test for 5000kVA, 33/11kV, 3-phase power transformer for M/s. LTL Transformers Pvt. Ltd., Sri Lanka

CONSULTANCY ACTIVITY

- Thermal Research Center, CPRI, Nagpur has carried out Remaining Life Assessment study of 210MW Boiler at Unit No. 4, MSPGCL, KhTPS Khaperkheda as per IBR Regulations 391(A).

- High Voltage Division, CPRI, Bengaluru has carried out the soil resistivity measurement rough terrain tunnels at Sunni, Himachal Pradesh for M/s. SJVN, Shimla.

EVENTS

INSTITUTE DAY CELEBRATION 2024

CPRI celebrated Institute Day on 16th January 2024. The Chief Guest for the function, Prof. Rishikesha T Krishnan, Director, IIM, Bengaluru delivered Pandit Jawaharlal Nehru Memorial Lecture on "The Role of Technological Innovation in building Viksit Bharat".

On this occasion, CPRI released compilation of research projects on power, under taken by CPRI titled 'Glimpse of Power sector Research Volume-1'.

The first issue of the relaunched CPRI Newsletter "Vidyut Anusandhaan Samachar" was also released during the occasion.

The Institute Day was also celebrated at CPRI units viz., UHVRL - Hyderabad, STDS - Bhopal, TRC - Nagpur, RTL - Noida and RTL - Kolkata.

NEW YEAR CELEBRATION

On the occasion of New Year Celebration on 1st january, 2024, DG CPRI addressed & wished all the employees of CPRI & their families.

REPUBLIC DAY CELEBRATION

CPRI and its units celebrated the 75th Republic Day on 26th January 2024. Director General CPRI Sri. B.A. Sawale unfurled the National flag at CPRI, Bengaluru.

TWO DAYS EVENT ON WEPOWER SAR-100

Dr Tulika Bhattacharjee, Engineering Officer, R&D Management Division attended a two-day event as a part of WePower SAR-100 at New Delhi, organized by the National Power Training Institute (NPTI) from 15-16 February, 2024. The participants interacted with the Sri R.K. Singh Hon'ble Union Minister of Power and New & Renewable Energy.

VISIT OF JOINT SECRETARY (BIMSTEC & SAARC)

Shri. CSR Ram, Joint Secretary (BIMSTEC & SAARC), Ministry of External Affairs, Government of India, visited CPRI Bengaluru on 22nd March 2024, for the inspection of the newly created BIMSTEC Energy Centre (BEC) office building, at the renovated and refurbished Swayambhu Hall Building. Shri. B.A. Sawale, Director General, CPRI and Shri. Kumar, Executive Director, Grid India (POSOCO), Bengaluru were present. Shri. Suryanarayana. K, highlighted the progress in civil works during the inspection. Shri. Sudhir Kumar, Additional Director, Dr. Ganesh Kumar, CAdO and Shri. Praveen Kumar, Sr.A.O were also present during the inspection.

REGIONAL OFFICIAL LANGUAGE CONFERENCE FOR SOUTH AND SOUTH WEST REGIONS

Joint Regional Official Language Conference of South and South Western Regions was organized by Hindustan Aeronautics Limited and Academy of Management, Sanjay Nagar, Bengaluru, on behalf of Department of Official Language, Ministry of Home Affairs, New Delhi. Union Minister of State for Home Affairs Shri. Ajay Kumar Mishra, was the chairperson for the conference. Shri Ramjeet Singh, Additional Director, Smt. L.N.Vidya, Sr. Hindi Officer and Dr. Shamla Medhar, Sr. Hindi Translator from CPRI participated in the conference.

VISIT OF DIRECTOR GENERAL CPWD

Sri. Rajesh Kumar Kaushal, DG, CPWD & team visited CPRI, Bengaluru to review the progress of ongoing civil works being executed by CPWD.

Sri. B.A. Sawale, DG, CPRI welcomed Sri.Rajesh Kumar Kaushal and his team during the visit.

CONFERENCE / WORKSHOP / TRAINING PROGRAM

Smart Grid Research Laboratory and Metering Utility Automation Division jointly organized Two-Day National Conference on "Smart Grid, Smart Meter, Communication Technologies and Cyber Security" during 14-15 February 2024. During the conference, 23 technical papers were presented and three keynote addresses on the theme of the conference were delivered by experts. An exhibition was organized during the conference, where manufacturers and utilities had showcased their products and services. Shri B A Sawale, Director General, CPRI inaugurated the conference and exhibition.

National Conference on "SMART GRID, SMART METER, COMMUNICATION TECHNOLOGIES AND CYBER SECURITY" 14-15 February, 2024

One-day workshop was conducted by Battery Lab, Electrical Appliances Technology Division (EATD) on "Battery & Battery Energy Storage System-Present and Future" during 16-02-2024". The programme was aimed to provide various critical aspects related to Lithium ion batteries and other upcoming chemistry on use of Lithium ion batteries in EV and renewable storage. Delegates representing various manufacturers, regulatory commission, power utilities & academic institutions participated in the workshop. The programme was inaugurated by Shri. Swaraj Kumar Das, Additional Director, CPRI. Lectures were delivered by experts from CPRI & other organisations, 48 delegates participated in the programme. Laboratory demonstration was carried out and certificates were issued to the participants.

The Business Development & Capacity Building Division (BD&CBD) conducted "Residential Induction Training Programme (Batch No.54)" for M/s. West Bengal State Electricity Distribution Company Ltd., Kolkata, for a period of 20 days from 29th January to 17th February 2024.

The training programme mainly focused about the important aspects of electricity distribution such as protection system, relays, cables & capacitors, energy metering, electricity Act, maintenance of substation, billing, reduction of technical and commercial losses, loss precaution, power system management, SCADA system, distribution network, reactive power compensation, voltage improvement, faults, earthing system, etc., the training programme is devised to comprehensively address various aspects of electrical distribution for the newly inducted Engineers.

LEGACY DESK

TECHNICAL ARTICLE

Implementation of Advanced Non-Destructive Testing and safety evaluation of risks in power plant components-A CPRI Perspective

Introduction:

The electrical power sector is a critical component of modern society, providing the energy necessary to power homes, businesses and Industries. The infrastructure that supports this sector, including power plant, transmission lines and distribution system, is complex and requires careful management to ensure reliability and safety.

Background:

Most of the power plants in India were installed during late 60's and these plants are still under continuous service. Over a period of time, power plant equipment undergo degradation due to various operations reasons such as frequent start-ups and shutdown, operating above design limits, material degradation due to corrosion, erosion, growth of flaws etc. Condition assessment of critical power plant component such as civil structures, boiler tubes, high energy pipelines, water intake and its conduits system including turbine /generators are carried out using various advanced Non-Destructive Techniques (NDT) carried out, plays a vital role in enhancing the performance and availability of the plants. The condition assessment of the power plants through RLA studies play significant role and is of prime importance.

Role of CPRI:

Central Power Research Institute is playing a major role in conducting Remaining Life Assessment (RLA) studies and has effectively implemented various condition assessment techniques especially for the boiler side inspection, high energy pipeline inspection, stress analysis, robotic inspection of boiler tubes, penstock, and supporting civil structures.

Methodology

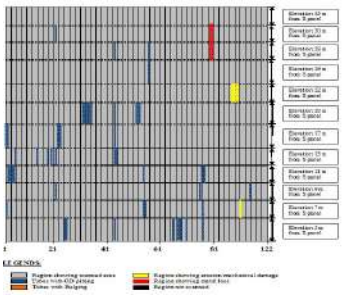
1. Low frequency Electromagnetic testing (LFET) for Corrosion mapping for boiler tubes.

This is an advanced Non-Destructive testing method, wherein the waterside corrosion of boiler tubes can be detected by way of corrosion mapping. The method adopts Low Frequency Electromagnetic Techniques (LFET). The electromagnetic sensor is able to scan the area of the tube covering up to 170 degree. In case of pitting corrosion damage due to caustic, acid attack etc., there is a change in the wave pattern in the form of a peak at the damaged location. The effective application of LFET inspection technique can reduces boiler tube failure due to internal corrosion.

Boiler tube scanning 9

Internal corrosion

Data Analysis



Internal corrosion

2. Detection of Magnetite in Boiler tube bends; this methodology was introduced for first time by CPRI

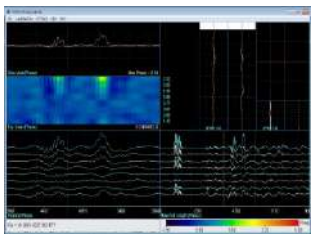
The Low frequency Electromagnetic Testing (LFET) with contoured bend scanners are used to inspect super heater outlet tube bends in a 500MW unit, which experience problems, arising due to magnetite deposit in the bottom of the tube bends.

Super heater tube bends

Detection of Magnetite at tube bend

The typical view of the cut tube which has shown 30 % of magnetite deposit accumulation with extracted magnetite deposit including the waveform output.

Photograph

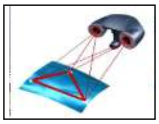


Corresponding waveform

Extraction of magnetite

3. 3D laser scanning method to assess the external corrosion spread on water conduit system used in Hydropower plants.

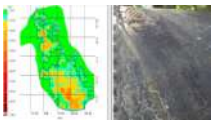
CPRI recently used state-of-the-art-technology of Non-destructive technique (NDT) for condition assessment of the water conduit system (Penstock) for hydropower plant to predict Remaining life of the Penstock. The 3D-Laser technique has enhanced the capabilities of CPRI in the area of condition assessment of penstock for the hydro power plants.



3D Laser scanner

Penstock scanning

Laser reflector



Inspection view of scanned helical corrosion

4. High Energy Pipeline Inspection and Stress Analysis

Pipe & Hangers Inspection and Flexibility analysis of High-energy Pipeline systems for Thermal Power Plants are being analyzed by CPRI regularly. The steam generation and transportation to other systems are done through pipelines. The pipeline includes main steam, hot re-heater, cold re-heater, and boiler feed pump discharge. The effect of loads

acting on pipeline and hangers are required to be maintained well within the safe operating limit to avoid deformation. Steam pipelines operating at 4500C and above deform and are required to be periodically monitored for metal creep rate, conditi

ons of the weld seam, etc. While current design codes allied with modern computer-aided analysis provide a good base for modeling and stress analysis, long-term integrity for safe running is a concern and hence calls for an in-depth study. The techniques used by CPRI helps the utilities to plan for regular monitoring of high stress concentrated zones by NDT techniques and to avoid failures through effective remedial measures.

5. Introducing Robotic System for Boiler Water Wall Tube Inspection

6. Scope for the Future:

Various power plant assets are required to operate and generate power in large scale. Consequently, the information regarding assets that are targeted for repair, and the information on depreciation is essential for calculating efficiency and increase in operation. Technologies related to safe operation and asset inspection, help utilities to assess the conditions that are important for preventing equipment failures. CPRI with its vast expertise in power plant NDT studies can play a major role in development of power plant asset management system software for asset management through information, data on assets, service history, Robust reporting, architecture etc,.

Author:
Sri. M. Janardhana,
Additional Director (Retd), CPRI,
Bengaluru.

INDUSTRY TRENDS

CYBERSECURITY: SAFEGUARDING THE FUTURE OF THE POWER SECTOR

In the dynamic landscape of the 21st century, the power sector stands as a foundational pillar of modern civilization, invisibly powering our homes, commercial space, industries, and critical infrastructure. Amid the complex processes of electricity generation, transmission, distribution, and consumption, the power sector not only fuels societies but also emerges as a prime target for malicious attacks in this digital age. The integration of digital technologies and the extensive interconnectivity of power grids has created a vulnerable attack surface, demanding a proactive approach to address potential threats that could disrupt the flow of electricity to the consumers, impacting economies and public safety.

Efficient communication systems are paramount for safeguarding complex electrical network infrastructure. Communication systems facilitate the transfer of crucial data between control centers, substations, and end-users which helps utilities to monitor and control the network for maintaining its stability. These systems play a crucial role in the operational dynamics of the entire electrical grid.

While communication systems make smart grids viable, they also expose vulnerabilities to cyberattacks. The power sector faces multi-faceted vulnerabilities, including interconnected systems, reliance on legacy infrastructure, remote operations, supply chain risks and the human element. These factors make the sector an attractive target for cyber attackers, posing risks to both economic stability and public safety.

The power sector's significance as critical infrastructure cannot be overstated, playing a vital role in economic growth, public health, safety, and national security. The expanding attack surface due to increased reliance on digital technologies necessitates robust cybersecurity measures

SAFEGUARDING THE POWER SECTOR THROUGH CYBERSECURITY MEASURES:

In our technology-driven world, the power sector is increasingly vulnerable to cyber threats that can disrupt services and damage equipment and critical infrastructure, leading to widespread power outages, thus affecting the entire populations and may bring down the economy of the nation. Types of cyber-attacks could include phishing attacks, ransomware, distributed denial of service (DDoS) attacks, IoT vulnerabilities, and zero-day exploits.

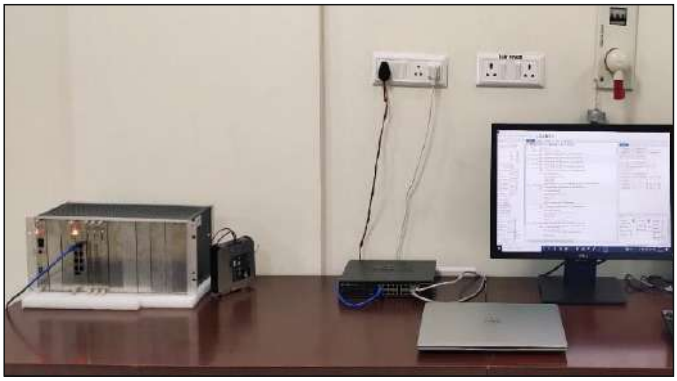
Implementing robust cybersecurity measures is crucial for protecting critical power infrastructure. Key measures and best practices include risk assessment, security policies, network segmentation, access control, patch management, firewalls, encryption, incident response plans, backup and recovery, employee training, regulatory compliance, continuous monitoring, and security audits.

INITIATIVES BY GOVERNMENT OF INDIA:

Indian Government has taken steps to protect the critical infrastructures including power sector through the establishment of sectoral Computer Emergency Response Teams (CERTs) and by issuing cyber security guidelines from time to time. In power sector applications, instances like Cyber-attacks on RTUs/FRTUs have serious consequences, including the disruption of operations, compromise on data, and the potential for physical damage to the equipment and life. Keeping this in mind cybersecurity testing facilities at the Central Power Research Institute (CPRI) for RTUs/FRTUs has been established for testing and validation as per IEC 60870-5-101/104, IEC 62351-3 and IEC 62351-5 Standards.

LOOKING TO THE FUTURE:

As technology advances and smart grids are being implemented, IoT devices, and renewable energy sources are at the forefront and are expanding, the power sector must remain vigilant and adapt to emerging threats and build resil As technology advances and smart grids are being implemented, IoT devices, and renewable energy sources are at the forefront and are expanding, the power sector must remain vigilant and adapt to emerging threats and build resilience to any kind of possible cyber-attacks.



The security of the power sector is not only a national concern but a global imperative, impacting economic growth, quality of life, technological progress, national security, and the preservation of critical infrastructure. In this era of technological progress, vulnerabilities in power sector should not only be acknowledged and identified but every opportunity should also be seized to fortify the power sector. It is collective responsibility of everyone involved in the day-to-day activities of power system management to be vigilant and follow the best practices for creating a secure power sector and ensuring that it continues to illuminate our world and empower our future.

Authors:
Sri. Shailesh Kapoor
Sri. Pradish,
Sri. V. Shivakumar,
Dr. Amit Jain
Smart Grid Research Laboratory(SGRL)

CPRI @ DISTRIBUELEC 2024 EXHIBITION

Central Power Research Institute (CPRI) participated in DistribuElec Exhibition organised by IEEMA during 16th to 18th January 2024 at Bombay Exhibition Center, Mumbai. Honorable Union Minister for Power Sri. R K Singh inaugurated the exhibition on 16th January 2024. CPRI has showcased its test facilities in the exhibition. CPRI officers from BD&CBD and EATD of CPRI, Bengaluru were deputed for the exhibition.

In addition to visitors from various Indian power utilities, overseas visitors from countries including Bahrain, Nepal, Bangladesh also visited CPRI stall and discussed about CPRI services.

Exhibition during 2 Day National Conference on "Smart Grid, Smart Meter, Communication Technologies and Cyber Security at CPRI

MUAD & SGRL jointly organised 2 Day National Conference on "Smart Grid, Smart Meter, Communication Technologies and Cyber Security during 14th to 15th February 2024 at CPRI.

Sri. B.A. Sawale, Director General, CPRI inaugurated the conference & exhibition. CPRI's stall at the exhibition showcased test facilities and other activities. The conference delegates from various organizations, utilities and manufacturers visited CPRI stall.

AWARDS & HONORS

Smt. Ashitha P.N, Engineering Officer, Insulation Lab received Mylavarapu Subbalakshamma Award for the Best Women Scientist in recognition of her contributions to CPRI, for the year 2023 during CPRI Institute Day Celebration on 16th January 2024.

Sri. Dillip Kumar Puhan, Engineering Officer, Cables & Diagnostic Division has received Best Paper Award for the technical Paper titled" Offline Partial Discharge Diagnosis of Electrical Machine Insulation System - Case Studies", presented at the 11th International Conference on Electrical and Electronic Insulation Materials & Systems - INSULEC during 1-2 February 2024.

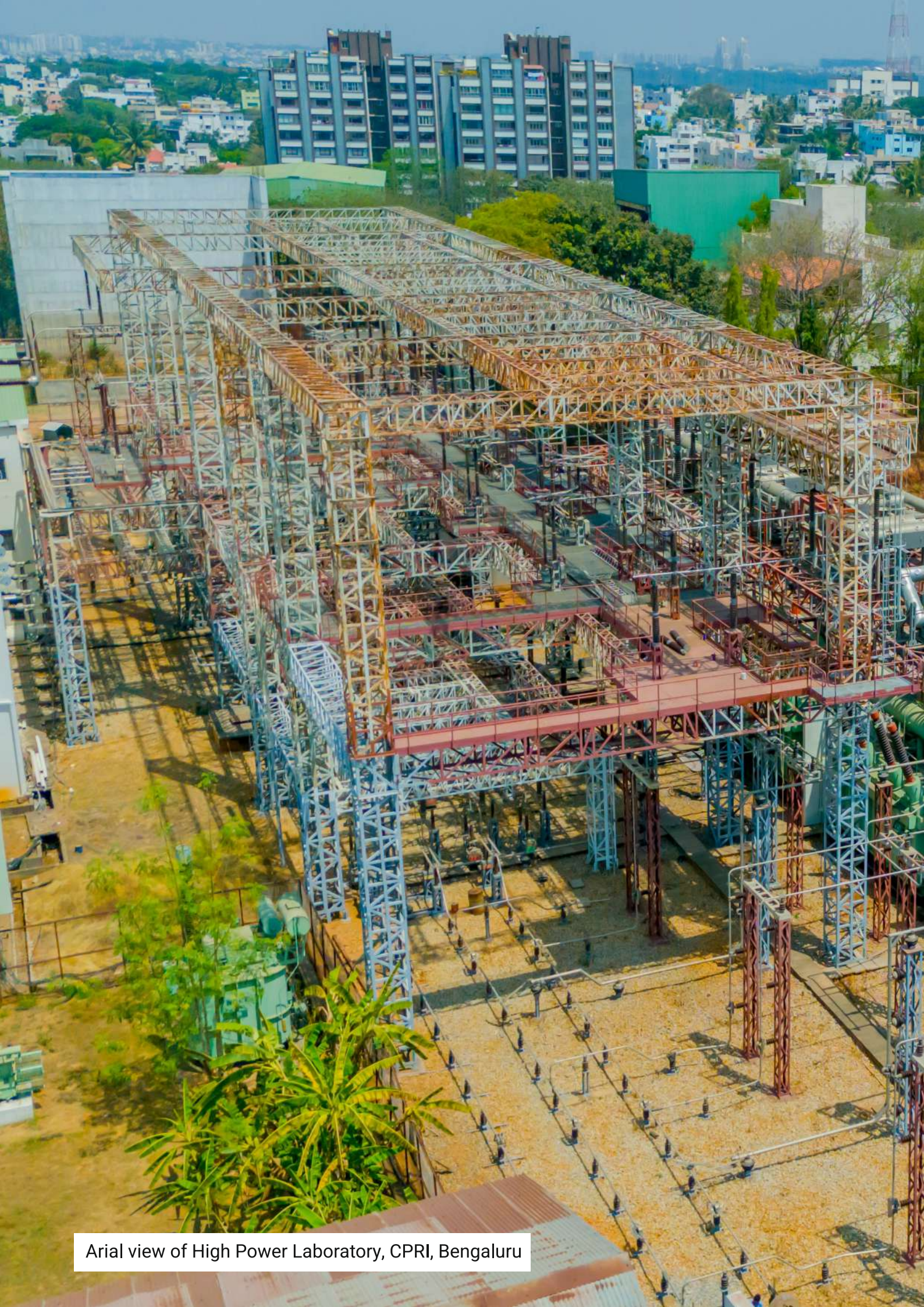
Ms. Mamatha N, Ramesh H R and Jeykishan Kumar K from ERED-CPRI won the Best Paper Award for the paper titled "Design and Analysis of 3-Phase Hybrid Asymmetric Multilevel Inverter Topology with Reduced CMV" presented at the International Conference on Green Energy, Computing and Sustainable Technology 2024, held during 17th to 19th January 2024 at Malaysia.

Dr. Tulika Bhattacharjee, Engineering Officer R&D Management Division successfully completed the WePOWER SAR-100 programme at the Asian Institute of Technology (AIT), Bangkok and was awarded a professional certificate by Dr. Sudha Murthy (Infosys Foundation). The eight-month long training series comprised of 10 modules delivered in hybrid mode followed by a weeklong capstone session in Bangkok between 4th to 8th March 2024 at AIT Bangkok.

Sri. Kishore Kumar, Joint Director, MTD received Best Paper Award for the paper titled "Characteristics of coffee husk blending with Indian coal and study the thermal behavior for power generation" from M/s. Indian Institute of Chemical Engineers at International conference on IIChE-CHEMCON 2023 at Heritage Institute of Technology, Kolkata.

TOLIC RAJBHASHA SHIELD

CPRI was awarded with TOLIC Rajbhasha Shield for its excellent performance in 'Implementation of Official Language' during the year 2022-2023. The award was presented to Shri. B.A. Sawale, Director General by Shri S Rajendra Kumar, Chief Post Master General, during the Second Meeting of TOLIC held on 12th January 2024 at CMTI, Bangalore.



Arial view of High Power Laboratory, CPRI, Bengaluru