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PROBAHO'22

B. P. PODDAR INSTITUTE OF MANAGEMENT & TECHNOLOGY
BP PODDAR
KOLKATA

DEPARTMENT OF ELECTRICAL ENGINEERING

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Editor, 1st Year

Department of Electrical Engineering
B.P Poddar Institute of Management & Technology

B. P. Poddar Institute of Management & Technology
Department of Electrical Engineering

VISION

To emerge as a knowledge hub for higher learning and research in Electrical Engineering.

MISSION

·To create a conducive quality teaching –learning environment to make the student assimilate thorough knowledge in Electrical Engineering.

·To create a platform for building confidence among faculties and students by exchanging their views through research, interactive sessions with industry and by the use of modern tools.

·To adopt a goal driven teaching learning method to foster innovative entrepreneurship skills in student community with expertise in different engineering domains.

·To enable students to become authorities in the field of Electrical Engineering along with sustainable and environment friendly technologies to meet the societal needs.

B. P. Poddar Institute of Management & Technology
Department of Electrical Engineering

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO-1: Engineering Ethos
Graduates of Electrical Engineering will be having physical, analytical and technical knowledge and skills to meet challenges of professional career in Industry and Society

PEO-2: Diversification
Graduates of Electrical Engineering shall gain cross disciplinary knowledge through projects and industrial assignments, leading to a sustainable competitive edge in Research and Development.

PEO-3: Ethics and Attitudes
Graduates of Electrical Engineering shall maintain professional ethics and proper attitude to collaborate with other discipline and lead a team while promoting lifelong learning.

PROGRAM SPECIFIC OUTCOMES (PSOs)

The students would be qualified to integrate their knowledge on power, control and signal processing techniques to contribute in the fields like renewable energy systems and emerge as successful entrepreneurs as well, endorsing sustainable eco-friendly development.
The students would be endowed with the skills to succeed in national and international level examinations to pursue their career with Academia and R& D Labs across the globe, in the field of engineering or management.

ACKNOWLEDGEMENT

The publication of the 17th edition of Probaho has been made possible through the collective effort, encouragement, and support of many individuals associated with the Department of Electrical Engineering. We take this opportunity to express our sincere gratitude to the Head of the Department and all the respected faculty members for their constant guidance and inspiration throughout the preparation of this magazine.

We are equally thankful to the respected faculty members and students whose enthusiasm, creativity, and contributions have added great value to this edition. Their participation reflects the vibrant spirit of our department.

Mr. Samrik Barma
From the Editors

To the Readers

"Probaho" is a Bengali word meaning *flow*. More than two decades ago, in the year 2005, when our seniors first envisioned this departmental magazine, they chose this name because it beautifully represents the philosophy of life — a journey that moves continuously forward with time.

As students of the Electrical Engineering Department, we too have become a part of this ever-flowing journey. The classrooms, laboratories, workshops, and corridors of our department have witnessed countless memories filled with curiosity, learning, hard work, and achievement. From assignments and practical sessions to project work, examinations, and endless discussions with friends, every experience has shaped us and added meaning to our academic lives.

With the passing years, the world around us has changed rapidly. Technology has transformed the way we learn, communicate, and express ourselves. Yet, even in this fast-moving era, the importance of creativity, imagination, and shared ideas remains timeless. Amid the rush of everyday life, there are always individuals who pause for a moment to create, to reflect, and to inspire. "Probaho" is a humble collection of such thoughts and expressions — a platform where students and faculty members share their creativity, knowledge, experiences, and emotions.

Building an identity is never easy, and preserving it across generations is even more challenging. The journey of "Probaho" began with the vision and dedication of our seniors, and today we are proud to continue that legacy with gratitude and responsibility. Every edition carries not only articles and artwork, but also the spirit, memories, and collective identity of our department.

We sincerely hope that this edition of "Probaho" reflects the enthusiasm, creativity, and unity of the Electrical Engineering family. May these pages inspire readers, preserve memories, and strengthen the bond between past, present, and future generations of our department.

Mr. Samrik Barma
(Member of Editorial Team
Electrical Engineering)

HOD'S COLUMN

As the Head of the Department,firstly I thank almighty to give us strength to overcome the outbreak of COVID 19 pandemic and to return back to the normal rhythm of life. I extend a warm welcome to all members of our magazine committee as we embark on the publication of Probaho 2022 for another academic year filled with promise and potential against all odds.

At Department of Electrical Engineering, we are committed to fostering a culture of academic excellence, innovation, and collaboration. Energy is one of the major inputs for the economic development of any country. In the case of the developing countries, the energy sector assumes a critical importance in view of the ever- increasing energy needs requiring huge investments to meet them. Energy can be classified into several types based on the following criteria: Primary and Secondary energy, • Commercial and Noncommercial energy, Renewable and Non-Renewable energy, Conventional and Non-conventional energy. Primary energy sources are those that are either found or stored in nature. Common primary energy sources are fossil fuels. When fossil fuel is burnt, carbon dioxide gas is released into the atmosphere, hereby causing global warming, as a result earth might face problems of acid rain. Pollution from vehicles and coal powdered power plant can cause serious environmental & Health hazards. Other primary energy Sources available include nuclear energy from radioactive substances, thermal energy stored in earth's interior, and potential energy due to earth's gravity. Primary energy sources are costly converted in industrial utilities into secondary energy sources for example coal, oil or gas converted into steam and electricity. Renewable energy is energy obtained from sources that are essentially inexhaustible. Examples of renewable resources include wind power, solar power, geothermal energy, tidal power and hydroelectric power .The most important feature of renewable energy is that it can be harnessed without the release of harmful pollutants.

The sun provides a vast amount of energy to the Earth daily, It is a non-depletable, environmentally friendly resource that produces no greenhouse gases during operation. Photovoltaic cells (usually made of silicon) convert sunlight directly into voltage. Sunlight strikes the semiconductor material in a solar cell, freeing electrons and producing an electric current. Because single cells produce low voltage, they are connected to form panels for practical use. DC (direct current) electricity produced by panels are converted to AC (alternating current) for home use. Rooftop systems for homes and large utility-scale solar plants.

In 2022, India's solar PV sector experienced record growth, adding approximately 13.9 GW of new capacity. This represented a significant boost to renewable energy, with solar alone driving the majority of new capacity additions, bringing cumulative installed solar capacity over 50 GW by February 2022.In 2022 there is a 17% increase in capacity additions compared to 2021,significantly up from 3 GW in 2014.Through PM-KUSUM: Over 9.2 lakh standalone solar pumps installed, aiding rural energy transition.

India is on track to achieve 500 GW of non-fossil fuel capacity by 2030, with solar playing the leading role. The government is providing subsidies for residential rooftop systems and pushing for solar manufacturing to make the country sustainable in domestic energy sector.

I once again thank my dear student members and faculty advisors for their tireless effort for publishing this edition of Probaho 2022.

Nandita Sanyal

Prof. (Dr.) Nandita Sanyal
Head of the Department
Department of Electrcial Engineering

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11501618016
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B.P. Poddar Institute of Management and Technology

AISIK DAS
11501619004
Department of Electrical Engineering
B.P. Poddar Institute of Management and Technology

Living Through the Pandemic: Daily Life During Corona Lockdown

The COVID-19 pandemic was one of the most unforgettable events in modern history. It affected every country, every community, and almost every individual in some way. When the coronavirus began spreading rapidly across the world, governments announced lockdowns to control the infection. For the first time in our lives, we experienced empty roads, closed schools, silent markets, and fear everywhere around us. The lockdown changed our daily routine completely and taught humanity many important lessons about life, health, and unity.

Before the pandemic, life moved very fast. People were busy with work, studies, travel, shopping, and social activities. Suddenly, everything stopped. During the lockdown, people had to remain inside their homes for weeks and even months. Schools, colleges, offices, shopping malls, movie theatres, and parks were closed. Public transport was suspended, and people were advised not to go outside unless it was absolutely necessary. At first, many people thought the lockdown would last only a few days, but slowly everyone realized the seriousness of the situation.

For students, the lockdown created a completely new learning environment. Traditional classroom teaching was replaced by online classes through mobile phones, tablets, and laptops. Teachers and students both faced difficulties adapting to this system. Internet problems, lack of devices, and long hours in front of screens made studies stressful. Many students missed their friends, classroom activities, sports, and normal school life. However, the situation also encouraged students to become more independent and learn the use of technology in education.

Working professionals also faced major changes. Many offices shifted to the "work from home" system. Meetings were conducted online, and employees had to manage office work while staying at home. Some people enjoyed spending more time with family, but others struggled with workload, stress, and lack of proper work-life balance. Unfortunately, many workers lost their jobs or suffered financially because businesses, factories, hotels, and shops remained closed for a long period. Small business owners and daily wage workers were among the worst affected during the lockdown

The healthcare system faced tremendous pressure during the pandemic. Doctors, nurses, hospital staff, and healthcare workers worked day and night to save lives. They treated patients while risking their own health and safety. Many healthcare workers stayed away from their families for months to protect them from infection. Their courage and dedication earned them respect across the world. Police officers, delivery workers, sanitation workers, and other essential service providers also played a vital role during this difficult time. They became true heroes of society.

Daily life during lockdown was filled with fear and uncertainty. People constantly watched news updates about rising infection rates and deaths. Masks, sanitizers, and social distancing became necessary parts of life. Every small cough or fever created panic among families. Hospitals were overcrowded, and many people lost their loved ones. The emotional pain and loneliness during isolation were very difficult for many individuals, especially elderly people and children

At the same time, the lockdown also brought some positive changes in people's lives. Families spent more time together than ever before. Parents and children shared meals, conversations, games, and activities. Many people discovered new hobbies such as cooking, gardening, painting, music, photography, and fitness exercises. Some individuals used the time to read books, learn online skills, or improve their mental and physical health. The lockdown reminded people of the importance of family bonds and simple happiness.

Nature also showed signs of recovery during the lockdown period. Since factories, vehicles, and industries were closed, pollution levels decreased significantly. Rivers became cleaner, skies looked clearer, and people could hear birds chirping again in cities. This situation made people realize how human activities affect the environment and why sustainable living is important for the future.

The pandemic also highlighted the importance of science and medical research. Scientists and researchers from different countries worked tirelessly to develop vaccines and medicines. Vaccination drives later became a major step in controlling the spread of the virus. People learned to trust science, healthcare systems, and preventive measures more seriously than before.

Social media and technology became very important during the lockdown. People stayed connected through video calls, online meetings, and social networking platforms. Festivals, birthday celebrations, and even family gatherings were conducted virtually. Although technology helped reduce loneliness, it could not fully replace real human interaction and emotional connection.

One of the biggest lessons from the lockdown was the value of health. Before the pandemic, many people ignored healthy habits due to busy lifestyles. During the lockdown, people understood that good health is more important than wealth or luxury. Regular exercise, proper hygiene, nutritious food, and mental well-being became priorities for many families.

The lockdown period was undoubtedly challenging, painful, and emotional. Millions of people suffered physically, mentally, and financially. Yet humanity also showed kindness, cooperation, and resilience during this crisis. Neighbors helped each other, volunteers distributed food and medicine, and communities supported the needy. The pandemic proved that even in difficult times, compassion and unity can give people strength and hope.

In conclusion, living through the Corona lockdown was a life-changing experience that will always remain in our memories. It was a period filled with fear, struggle, sacrifice, and uncertainty, but it also taught us valuable lessons about health, humanity, discipline, and togetherness. The pandemic reminded us that life is unpredictable and fragile. As the world slowly recovered, people emerged stronger, wiser, and more thankful for the simple joys of normal life. The memories of the lockdown will continue to inspire future generations to face challenges with courage, patience, and unity.

ARJUN GHOSH
11501619001
Department of Electrical Engineering
B.P. Poddar Institute of Management and Technology

Electrical Safety Methods and Best Practices in Modern Systems

Importance of electrical safety in home industries office hospitals and smart infrastructure-
Office Environments- In a standard office, the primary focus is on high-density occupancy and the proliferation of personal electronics.
Fire Prevention: Overloaded power strips and daisy-chained extension cords are leading causes of office fires.
Data Integrity: Sudden surges or electrical faults can lead to catastrophic data loss and damage to expensive IT infrastructure.
Ergonomics and Tripping: Proper cable management prevents physical injuries and reduces the strain on connectors, which can otherwise become sparking hazards.
Industrial Settings -Industrial environments face higher voltages, heavy machinery, and often hazardous atmospheres.
Arc Flash Protection: High-energy equipment can produce arc flashes—explosions of light and heat—that are life-threatening. Safety protocols like Lockout/Tagout (LOTO) are mandatory to ensure machinery is de-energized during maintenance.

Operational Continuity: In manufacturing, an electrical fault doesn't just pose a safety risk; it can halt production lines, costing thousands of dollars per minute in downtime.
Hazardous Zones: In plants dealing with chemicals or dust, a single spark can trigger an explosion, making explosion-proof electrical fittings essential.
Healthcare and Hospitals- In hospitals, electrical safety is literally a matter of life and death. The "patient vicinity" requires much more stringent standards than any other industry.
Life Support Systems: Continuous power is non-negotiable. Redundant systems, such as Uninterruptible Power Supplies (UPS) and backup generators, must be tested rigorously.
Macroshock and Microshock: Patients are often more vulnerable to electricity due to invasive procedures (like catheters or internal electrodes). Even a tiny current that a healthy person wouldn't feel can cause cardiac arrest in a clinical setting.

Isolated Power Systems: Many operating rooms use isolated power to ensure that a single ground fault doesn't trip a breaker and plunge a surgery into darkness.

Smart Infrastructure-As cities and buildings become "smarter," the complexity of the electrical grid increases, introducing new vulnerabilities.

IoT Vulnerability: Smart sensors and automated systems (HVAC, lighting, security) rely on a stable electrical supply. A fault in the power layer can "blind" the management system of an entire building.

Integration of Renewables: Smart infrastructure often incorporates solar panels and EV charging stations. Managing the bi-directional flow of electricity requires sophisticated safety controllers to prevent back-feeding into the grid during repairs.

Cyber-Physical Risks: Electrical safety now includes protecting the software that controls the hardware. A digital breach that manipulates voltage levels can cause physical damage to infrastructure.

TYPES OF ELECTRICAL HAZARDS-

Electric Shock: Occurs when the body becomes part of the electric circuit, often resulting from touching exposed, energized components.

Arc Flash/Blast: An electrical explosion that occurs when energy jumps through the air between conductors, causing severe burns and pressure injuries.

Fire/Explosion: Caused by overloaded circuits, short circuits, or sparking electrical equipment, which can ignite surrounding materials.

Electrocution: Fatal electric shock.

CAUSES OF ELECTRICAL SAFETY ISSUES-

Exposed/Damaged Wiring: Broken insulation or uncovered components.

Wet Conditions: Water conducts electricity, making damp environments extremely dangerous.

Overloaded Circuits: Plugging too many devices into one outlet or circuit.

Improper Grounding: Equipment that lacks proper grounding, making it possible for the casing to become energized.

Overhead Power Line Contact: A major cause of fatelities particularly in construction.

FUNDAMENTAL ELECTRICAL SAFETY METHODS-

Electrical safety is very important in homes, schools, industries, and workplaces. Electricity makes our work easier, but if it is not handled properly, it can cause electric shocks, burns, fires, and even death. Therefore, everyone should know the basic methods of electrical safety to avoid accidents and protect lives and property.The Useful methods are like using

Proper Insulation- we have to provide proper insulation and all electric wires and cables must be properly insulated.

We should always keep our hand dry before touching any wire

Earthing system of home must be well maintained so that all appliances can run on their own rating and if a fault happen the fault current should go to earth through earthing system.

CIRCUIT BREAKERS- we have to installed the circuit breakers which will help to trip the appliance when overheating and overloading of the machine happen. For this we can use MCB and MCCB(Molded case circuit breaker).Also there are different types of circuit breakers which we use in transmission system for the protection purpose.

Lighting Arrester- We use Lightling arrester for protection from surges in Transmission line.

MODERN ELECTRICAL SAFETY METHODS-

Residual Current Devices (RCDs/GFCIs)-

Detect leakage current to earth and trip in milliseconds. Standard in residential and portable equipment to prevent electric shock.

Arc Fault Circuit Interrupters (AFCIs)-Detect arcing signatures in wiring and cut power before it causes fire. Common in modern building codes for branch circuits.

Insulation Monitoring Systems- Used in IT earthing systems and medical/industrial setups. Continuously monitor insulation resistance and alarm before faults become dangerous.

Personal Protective Equipment (PPE) + Arc Flash Analysis -Arc flash studies define hazard boundaries and required PPE levels. Modern approach uses incident energy calculations, not just voltage.

CONCLUSION- IN Conclusion we can say that Electrical safety is an issue where all the engineers and not only engineers, every people should take it seriously and if somewhere we can see any safety issue happen we should take necessary steps.

SACHIN KUMAR YADAV
11501618022
Department of Electrical Engineering
B.P. Poddar Institute of Management and Technology

MATLAB: A Powerful Tool for Electrical Engineers

In the modern world of engineering and technology, computer-based tools play a very important role in solving complex problems quickly and accurately. Among these tools, MATLAB has become one of the most popular and powerful software platforms used by engineers, researchers, and students. MATLAB, which stands for "Matrix Laboratory," is a high-level programming and numerical computing software developed by MathWorks. It is widely used in electrical engineering for analysis, simulation, design, modeling, and problem-solving. Today, MATLAB has become an essential tool for electrical engineers because it helps simplify complicated calculations and improves efficiency in technical work.

Electrical engineering involves many difficult mathematical operations, circuit analyses, signal processing tasks, and control system designs. Performing these calculations manually can be time-consuming and sometimes inaccurate. MATLAB helps engineers solve these problems easily by providing powerful mathematical functions and graphical tools. Engineers can write programs, analyze data, simulate systems, and visualize results with great speed and accuracy. Because of its user-friendly interface and programming environment, even students can learn MATLAB easily and apply it in practical projects.

One of the most important features of MATLAB is its ability to perform numerical computations. Electrical engineers often deal with matrices, differential equations, complex numbers, and large data sets. MATLAB is specially designed for matrix operations, making calculations faster compared to traditional programming languages. Engineers can solve equations, plot graphs, and analyze system performance within seconds. This saves valuable time and increases productivity in research and industrial applications.

Another major advantage of MATLAB is simulation. Simulation allows engineers to test and analyze systems before implementing them in real life. In electrical engineering, simulation is extremely important because it reduces risk, cost, and time. MATLAB provides a powerful simulation platform called Simulink, which is widely used for modeling dynamic systems.

Engineers can create block diagrams of circuits, motors, power systems, and control systems without physically building them. By using simulation, engineers can observe the behavior of a system under different conditions and improve its performance before actual implementation.

MATLAB is widely used in power system engineering. Electrical engineers use it for load flow analysis, fault analysis, power system stability studies, and renewable energy applications. It helps engineers understand how power systems behave during faults or disturbances. For example, engineers can simulate transmission lines, transformers, generators, and substations to study system performance and protection methods. MATLAB also plays a vital role in smart grid technology and renewable energy research such as solar and wind power systems.

In the field of control systems, MATLAB is considered one of the best tools available. Control systems are used in industries, robotics, automation, and electrical machines. Engineers use MATLAB to design controllers, analyze system stability, and improve system response. By using transfer functions, root locus plots, Bode plots, and Nyquist plots, engineers can easily study system characteristics. MATLAB helps students and professionals understand complex control theory concepts through graphical visualization and practical simulation.

Signal processing is another important area where MATLAB is highly useful. Electrical engineers work with audio signals, communication systems, image processing, and digital filters. MATLAB provides advanced toolboxes that help engineers analyze and process signals effectively. Engineers can remove noise from signals, compress data, and improve communication system performance. Applications such as speech recognition, radar systems, biomedical signal analysis, and wireless communication greatly depend on MATLAB-based signal processing techniques.

MATLAB is also widely used in electronics and embedded systems. Engineers use it to design and test digital circuits, microcontroller-based systems, and communication devices. With MATLAB, students can create algorithms and later implement them in hardware systems. It supports coding for embedded systems, which makes it useful in industrial automation and real-time applications.

One of the biggest advantages of MATLAB for students is its educational value. Engineering students often find subjects like electrical machines, network theory, power electronics, and control systems difficult because of complex mathematical concepts. MATLAB makes learning easier by allowing students to visualize concepts through graphs, animations, and simulations. Instead of only studying theory, students can perform experiments virtually and understand practical applications better. Many colleges and universities include MATLAB in their engineering curriculum because it helps students develop analytical and programming skills.

Research and innovation in electrical engineering also heavily depend on MATLAB. Researchers use MATLAB for data analysis, artificial intelligence, machine learning, and advanced electrical system design. New technologies such as electric vehicles, smart grids, robotics, and renewable energy systems are often developed and tested using MATLAB tools. Its flexibility and wide range of applications make it an important software platform in modern engineering research.

Despite its many advantages, MATLAB also has some limitations. The software can be expensive for personal use, and beginners may initially find programming difficult. Some complex simulations require high-performance computers for faster execution. However, the benefits of MATLAB greatly outweigh these disadvantages, especially in professional and educational environments.

The future of electrical engineering is closely connected with computer-based technologies, automation, and intelligent systems. As industries become more advanced, the demand for engineers with MATLAB knowledge is increasing rapidly. Companies prefer engineers who can analyze systems, simulate designs, and solve technical problems efficiently using software tools. Therefore, learning MATLAB not only improves technical skills but also increases career opportunities for engineering students.

In conclusion, MATLAB is truly a powerful and versatile tool for electrical engineers. It simplifies complex mathematical calculations, improves system analysis, and supports simulation and design in various engineering fields. From power systems and control engineering to signal processing and electronics, MATLAB plays a major role in both education and industry. It helps engineers save time, reduce errors, and develop innovative solutions for modern technological challenges. For electrical engineering students and professionals, MATLAB is not just a software tool but an essential companion for learning, research, and future development.

RIMA CHATTERJEE
11501618029
Department of Electrical Engineering
B.P. Poddar Institute of Management and Technology

IoT in Power Systems: Building the Smart Grid of the Future

The world of electrical power systems is undergoing a massive transformation. Traditional power grids, which once relied heavily on manual monitoring and centralized control, are now becoming smarter, faster, and more efficient with the integration of the Internet of Things (IoT). From smart meters in homes to intelligent substations and automated fault detection systems, IoT is revolutionizing the way electricity is generated, transmitted, distributed, and consumed.

In simple terms, IoT refers to a network of interconnected devices that collect and exchange data over the internet. These devices are equipped with sensors, communication modules, and processing units that help monitor real-time conditions and make intelligent decisions. In power systems, IoT acts like the "brain and nervous system" of the modern grid, continuously observing electrical parameters and improving operational efficiency.

The conventional power grid faces several challenges such as energy losses, power theft, equipment failures, voltage instability, and difficulty in integrating renewable energy sources. With increasing electricity demand and the rapid growth of urbanization, traditional systems are no longer sufficient to ensure reliable and uninterrupted power supply.

IoT-based power systems address these problems by enabling real-time monitoring, predictive maintenance, and automated control. Instead of waiting for a fault to occur, utilities can now predict failures before they happen. This not only improves reliability but also reduces operational costs and downtime.

An IoT-enabled power system consists of sensors, smart devices, communication networks, cloud computing platforms, and automated control systems. Sensors installed across transformers, substations, and transmission lines continuously measure voltage, current, frequency, and temperature. The collected data is transmitted through communication technologies such as Wi-Fi, GSM, Zigbee, and cloud-based networks.

The received information is then analyzed using intelligent software systems and Artificial Intelligence algorithms. Based on this analysis, automatic decisions can be taken to optimize grid performance and isolate faulty sections. This entire process creates a highly responsive and intelligent electrical network commonly known as the Smart Grid.

One of the most important applications of IoT in power systems is smart metering. Smart energy meters automatically send electricity usage data to utility providers in real time. Consumers can also monitor their power consumption through mobile applications, helping them reduce unnecessary energy usage and electricity bills.

Another major application is fault detection and predictive maintenance. In conventional systems, identifying faults often takes significant time. IoT devices can instantly detect abnormal conditions such as overheating, insulation failure, and line faults. Utilities can therefore repair equipment before complete failure occurs, increasing the lifespan of electrical infrastructure.

IoT also plays a significant role in renewable energy integration. Renewable energy sources like solar and wind are highly dependent on weather conditions, making power generation unpredictable. IoT helps monitor weather conditions, energy generation levels, and storage systems in real time, ensuring smooth energy balancing and efficient utilization.

Modern substations are increasingly adopting IoT-enabled automation systems. Engineers can remotely monitor and control substation operations without physically visiting the location. This improves safety, reduces manpower requirements, and enhances reliability.

Industries and commercial buildings are also using IoT-based Energy Management Systems to optimize power consumption. These systems analyze energy usage patterns and automatically control electrical loads to reduce wastage and improve efficiency.

The advantages of IoT in power systems are numerous. Continuous monitoring and automated control improve system reliability and reduce power outages. Real-time optimization minimizes transmission losses and increases energy efficiency. Automation also reduces operational costs and maintenance expenses. Consumers benefit from better awareness of their electricity usage, while society benefits from reduced carbon emissions and improved sustainability.

Despite these benefits, implementing IoT in power systems also presents challenges. Since IoT devices are connected to the internet, cybersecurity becomes a major concern. A cyberattack on a power grid can cause serious disruptions. Additionally, installing sensors, communication infrastructure, and cloud systems requires high initial investment.

Managing the massive amount of real-time data generated by IoT devices is another challenge. Compatibility issues between old electrical infrastructure and modern digital systems can also slow down implementation.

However, advancements in cybersecurity, Artificial Intelligence, and communication technologies are gradually overcoming these problems.

Despite these benefits, implementing IoT in power systems also presents challenges. Since IoT devices are connected to the internet, cybersecurity becomes a major concern. A cyberattack on a power grid can cause serious disruptions. Additionally, installing sensors, communication infrastructure, and cloud systems requires high initial investment.

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The future of IoT in power systems is extremely promising. Technologies such as 5G communication, Machine Learning, and smart automation will further enhance the capabilities of smart grids. In the coming years, fully automated power distribution systems, intelligent electric vehicle charging stations, and self-healing smart grids are expected to become common.

IoT is transforming conventional power systems into intelligent and efficient smart grids. By enabling real-time monitoring, automation, predictive maintenance, and renewable energy integration, IoT improves reliability, reduces operational costs, and enhances energy management. The fusion of electrical engineering with digital technology is shaping a smarter and greener future for the world.

Title of the Paper:Comparative study on analysis of daylight glare from windows for different seasons

Author- Hena Mahata, Subhajit Sarkar, Dr. Sutapa Mukherjee

Published in: Michael Faraday IET International Summit 2020 (MFIIS 2020)
Date of Conference: 03-04 October 2020
Date Added to IEEE Xplore: 22 September 2021

Abstract:
This paper deals with the comparative study on visual comfort level as experienced by the occupants in a daylit room and is assessed by the parameter DGI (daylight glare index) - a measure of discomfort glare level due to window. Matlab programs are developed to compute DGI values corresponding to a set of occupant's position and directions of view. Four window orientations, viz. N, E, S, W and two directions of view, viz. directed to the window and 45° away from the window are considered for the assessment of visual comfort. The assessment is done on the basis of computed DGI compared with the three reference values of DGI, viz. 22, 24 and 28 representing “Acceptable”, “Just uncomfortable” and “Just intolerable” discomfort glare respectively for three different seasons, summer, winter and equinox. Here, coloured glass Oceanic Blue, manufactured by Asahi India Glass Ltd (AIS) is considered as glazing material for window.

EPILOGUE-2022,BATCH:2018-2022
ELECTRICAL ENGINEERING, BPPIMT

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PROBAHO '22

VISION

To emerge as a progressive and premier institute for Engineering and Technology education with ethical values for creative engineering solutions commensurate with global changes.

MISSION

- Offer quality education through modern accessible, comprehensive and research oriented teaching – learning process.
- Create opportunities for students and faculty members in acquiring knowledge through research and development.
- Providing effective interface with industry by strengthening Industry-Institute interaction and developing entrepreneurial skills.
- Meet ever-changing needs for the nation through rational evolution towards sustainable and environment friendly technologies.

> *The greatest threat to our planet is the belief that someone else will save it.*
>
> — Robert Swan