SPE NEWS LETTER

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Welcome

2018

Bye bye 2017

THE SOCIETY OF POWER ENGINEERS (INDIA)
VADODARA CHAPTER (ESTD. 1996)

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OBITUARY

ER. SATEJ P AGASHE, Life Member of Society of Power Engineers (I) Vadodara Chapter passed away on 24 Nov 2017.
In his death, the Chapter has lost a well-wisher and active member.
May God give peace to the departed soul.

ER. VASUDEV J AMBVANI, Retd. Executive Director, Gujarat Electricity Board and Life Fellow of Society of Power Engineers (I), Vdodara Chapter passed away on 05 Jan 2018.
In his death, the Chapter has lost a well-wisher and active member. May God give peace to the departed soul.

From the Chairman's Desk

At the outset I wish all the readers of SPE NEWS Letter and members of SPE(I) a very Happy New Year 2018. We collectively are looking forward for very eventful, prosperous and spectacular New Year with a resolution to cross many milestones to achieve our destination.

Year 2017 is full of important events like decline in GDP growth due to demonetization and GST and results of State elections thereafter indicating positive acceptance of these reforms introduced by present government. In power sector, it is also very heartening to learn that India is likely to be power surplus nation in FY 2018-19. According to Central Electricity Authority report in April 2017 India is on the verge of becoming power surplus nation this year. As per Power Ministry data, many states have reported nil energy shortage except few states reporting minor energy shortage.

I feel it is appropriate time to take brief review of development of this sector in India. At the time of independence, India had only 132 kV transmissions with installed capacity of 1300 MW and power systems consisted small isolated generating stations supplying to urban and industrial areas. This is the first time that India has exceeded targeted capacity addition during 12th Five-Year plan. Today, our installed capacity has reached more than 300 GW.

Transmission voltage grew from 132kV level after 1947 to 765kV AC in 2007 while HVDC was introduced from 1989. Further transmission planning has been aligned with the Electricity Act-2003 and National Electricity Policy keeping in view the market orientation of the power sector. During 2016-17, interconnection between India and Bangladesh, Myanmar and Nepal was established and India has turned from an importer of electricity to a net exporter for the first time, as reported by Central Electricity Authority.

The main turning point of India's power sector reform is Electricity Act-2003, which reduced the monopoly of state owned utilities in power sector. The Act delicenced generation, introduced open access and promoted competitive electrical market. The infrastructural expansion in power sector was undertaken by government considering the fast economical growth with proper forecasting in long term horizon of five to ten years. The notable development such as Ultra Mega Power Projects, increasing capacity of transmission system to 3,81,671 circuit kM (ckM) of 220kV to 765kV, High Capacity Power Transmission Corridors (HCPTCs), commissioning of 800kV HVDC etc. Testing of 1200kV AC transmission at National Test Station at Bina, MP is also very ambitious project to enhance transmission capacity. Rapid approvals of the projects by present government, involving coal and gas due to which many power projects, which were stalled, have also added to the installed capacity. With this achievement in power sector we should now concentrate on providing good quality of electricity i.e. outage free, distortion free voltage supply at proper frequency. It requires our power engineers and planners to meet new challenges in improving system functionality, reliability, security and responsiveness.

At SPE(I), Vadodara Chapter, it is heartening to note that our membership has been increasing steadily and the quality of our programmes has improved considerably. We still need the support from the younger engineers by their active participation in day to day working of SPE(I). I would like to thank everyone for their contribution to SPE(I) and particularly members Executive and Advisory committees for making our organization very successful in its ventures.

GV AKRE
Chairman

From Editor's Desk

Dear Reader,

At the very outset, the Editorial team conveys its greetings to all members and their families for the New Year. We wish you all and your families "A Very Happy & Prosperous Year 2018".

India's power sector has indeed taken rapid strides during the past three years and the process of reforms continues unabated. The reforms in the sector today are recognised by all across the globe. From ranking 99th at the global level in 2014 in terms of electricity accessibility ranking, India today has come up many notches above and is sitting at the 26th spot.

The breath-taking growth of renewables has catapulted the installed capacity doubled in past five years from the cumulative capacity of 27953 MW in FY 2012-13 to 57472 MW in FY 2017-18. The catalysts for such unprecedented growth were government policies, global economy trends promoting exploration of environment friendly options for economic growth and jaw dropping prices in solar. At the time when it is welcome to have greener grid, the prevailing situation also poses challenges and risks for incumbent stakeholders in the sector, which cannot be overlooked.

The most unfortunate event in Indian Power Sector in the last quarter happens to be the boiler blast in 500 MW Unit-VI of Feroze Gandhi Unchahar Thermal Power Station (FGUTPS) of NTPC at Rae Bareilly in Uttar Pradesh. Investigations into the boiler blast that killed 43 and left scores injured on 01st November, 2017 have revealed that engineers were aware of a problem in the boiler unit commissioned just months ago and were working to fix it. In a statement, NTPC officials have said that "extremely high pressure" because of ash within the boiler furnace caused it to leak, producing a disaster. Initial investigations by NTPC pointed out that the blast occurred because of the deposition of a large amount of bottom ash in the ash evacuation system and formation of clinkers in the boiler. Although the loss of precious human lives can never be compensated, the learning from this tragic incident is that safety has to be given utmost priority and should never be compromised in the wake of hurrying up things. It is hoped that good working practices and check-lists will evolve out as a learning from this tragedy.

We will be extremely happy to receive your views, opinions and suggestions. Please feel free to reach out to us. As an editor to the newsletter, I request that readers should contribute good technical and cultural articles for publication

Happy Reading!

(AWADHESH KUMAR SINGH)

Chapter's Activities

ä On 10 Nov 2017, on the occasion of Power Day, a lecture on "Life Management of Power Plants by Knowledge Based Inspection – KBI" was arranged at Dr. IG Patel Seminar Hall, Faculty of Social Work, MS University, Vadodara. The lecture was delivered by Er. Paresh Haribhakti, Managing Director of TCR Advanced Engineering Services, GIDC, Vadodara.

In the beginning, Er. PA Shah presented a slide show on First Power Station of India, its location, cost, capacity etc.

Speaker started his lecture with the past accidents occurred (Titanic, Molasses Tank, Tacoma Bridge and NTPC Power Plant) and lessons learnt from them. He informed to carry out the maintenance like corrective, scheduled, condition monitoring, knowledge based from the lesson learnt.

He explained the comparison amongst Time Based, KBI and Approach Based Inspection. The factors viz: material defects, fabrication practices, temperature,

thermal & mechanical fatigue cycle, improper maintenance, inspection etc. play an important role in completing the life of any equipment or plant. Due to failure in Power Plant, there is a loss of power at the rate of 3% worldwide, while 5% in India as per their analysis. Further, he added that the failures must be analyzed in terms of damage mechanisms, fire, fluid, metallurgy etc.

He further informed that one Nuclear Power Plant in Korea has 40 years life, and then its life was extended further for 20 years on the basis of metallurgical study, which will be completed by 2018. Also, it is being planned for further extension of 20 years.

Lastly, he advised to carry out team study, prepare inspection matrix and operate the matrix properly. This is NDT – Non-Destructive Testing technic which is adopted largely.

The lecture was attended by large number of members. The members had taken active part in question answer session. At the end, the lecture was summarized by Er. Vishwakarma, Retd. Chief Engineer, GEB.

ä On 20 Dec 2017, lectures on (i) New Approach to reduce Green House Gas Emission by Er. SB Lele, Retd. Chief Engineer, GEB and (ii) Statutory requirement for Solar Roof Top by Er. HV Shah, DE, MGVCL were arranged as a part of celebration of Energy Conservation Day at Baroda High School, Alkapuri, Vadodara.

Er. Lele explained that the pollution is taking a big toll in urban areas. It is now a time that population should be displaced to balance the effect of pollution. The human beings from the densly populated region should be shifted to poorly populated region. This may need social & political agreement between various stake holders.

Er. HV shah explained in details the technical and commercial matters related to the installation of Roof Top Solar Power Plant.

Both the lectures were very much interaction with the volley of questions & answers.

Er. S M Godkhindi
Secretary

Quantum Computers

We very well know computers and their use as well as various features and applications well. The capacity in terms of speed and memory has been going higher and higher day by day. We have now seen super computers also, working well for numerous and complicated calculations and processing. Their speed has now gone up to Teraflops and memory in Tera Bytes & more. To increases the capacity, the number of transistors required in computer chip increases. This increase in number of tiny transistors in a computer chip roughly follows Moore's law i.e. the numbers of transistors double at every 18 months period. But due to limitations to accommodate such number of transistors in a given size of chip, the Moore's law will become outdated in years between 2020-2030 and the progress of computers may become stagnant or slow. But scientists always think ahead to find some new means. Right from 1981an idea was given by Paul Benioff of Argonne National Laboratory at USA. He thought for use of quantum theory for computers for greater capacity. After lot of efforts, research works and trials by many scientists and engineers, a new computer is developed using quantum theory which is altogether quite different than present computer. It is called quantum computer as it is working on quantum characteristic.

The present computers work on binary system. They use 0 & 1 called bits for data presentation for calculation & processing. The physical representation of these bits is by voltage in transistors used for making chips of computer. The low voltage near to zero value in transistors is treated as zero bit and some defined higher value of voltage is treated as one. The processing is done thro' various gates used to make transistor circuit using OR, NOR, AND, NAND, XOR gates etc.

As stated in case of classical computer the value of a memory location is called ' bit' while the same in case of quantum computer (also called QC or Q-computer) is called 'qubit'. Here the prefix 'q' is indicative of quantum property of sub particle of an atom. The present classical computer can have logical value 0 or 1 while a qubit of Q-computer can have 0, 1 or any value at different points between 0 and 1 due to use of

mechanical phenomena such as 'Superposition' and 'Entanglement' of atoms.

This concept of qubit is difficult to understand. It requires knowledge of quantum theory and atomic science. But, in a simple language for the sake of understanding we can say that the value in a qubit is represented by sub particle of an atom at different points in the atom. This is done with the help of different control methods like Laser beams, Electromagnetic field, Radio wave etc on sub particles like electrons, nucleolus, photons, ions etc.

At any given point of time value of a qubit is obtained by 'measuring ' a value of a sub particle at a particular point of position and that value is taken as data at that point of time in a memory location. This is done by 'Entanglement' feature of two closely related atoms.

Therefore, the location of a memory can have any of multiple values like 0, 1 and different value between 0 & 1 at that point of time. This makes the Q-computer work many parallel processing at a time, which increases speed (Flops) and memory capacity (Bytes). This process is at atom level.

To give an idea of speed of Q- computers, a 300 qubit computer runs at 10 Teraflops (Floating point operations per second) while present Desktop computers run at giga flops speed. The 7,16,30,50 to 3000 Qubits are already developed by various giant MNCs. D-Waves system with 1097 qubits out performed 3600 times more than existing super computer for solving optimization problem in few seconds. At present, companies like D-Wave, IBM, 1Qbit, Hamilton, Microsoft, Google QuAll. are in this field. IBM has made available 'Quntum experiences services' on cloud platform by Application program interface (API) to join programmers and Developers using IBM – Q computer for software development. Anybody can register and have 'quantum experiences'

Google and NASA have tested Q-wave quantum computer for its speed 10 Crore times faster than classical computer.

The Q-computers make use of various technologies as follows

1) Super Conducting 2) Trapped ion internal state 3) Optical lattices 4) Spin state of electrons 5) Nuclear magnetic resonance 6) Bose –Einstein condensate based 7) and other technologies

Q- computers can be used to solve complicated Mathematical Algorithms, Find out patterns from large data, Banking services, Data security, Handling huge data for commercial use, Artificial Intelligence in medical field, find natural secrets, financial services, solving problems of chemistry. Help to find chemical properties and reactions, Transport route optimization and speedy transport, handling large size data of photos and Videos etc.

To conclude, the Q-Computers are going to revolunise the IT sector in the third decade.

In India, some of prestigious Institutes of Technology have stated working on Q-computers. IIT Banglore, ILSC Research Institute, Allahabad, IISc, Banglore, IISER Mohali have taken up working on computing and other problems of Q-computer. Training for Q- Computer is also being given by some of the organizations in India. The Department of Science and Technology of Central Government is also supporting by funding certain activities for Q-Computers.

Let us hope these computers will come in market for our use earlier.

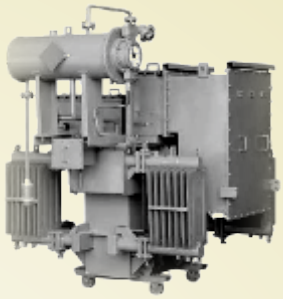
Compiled by : **Er. A N Makwana**

Action Replay – 2017

January, 8 to 12	:	5-Day Workshop for Students of LE College, Morbi
Subject	:	Industrial Practice in the Field of Electrical Engineering
Lecture	:	2 - Days
Visits	:	Sardar Sarovar Narmada Project – Kevadia; State Load Dispatch Centre – Gotri; 400kV GETCO Substation – Asoj; HT Meter Testing Laboratory – NABL Accredited-MGVCL; Vadodara City SCADA system-MGVCL; Solar Power Plant – Canal Top at Sama, Vadodara-SSNNL
January, 9	:	Technical Lecture
Subject	:	Power System Modelling & related Studies with the help of Software EAPSM
Speaker	:	Sh Vikas Jaywant & Sh Pradeep Takur, Director, EAIPL

February, 25 - 26	:	Seminar
Subject	:	Electric Motors & Controls at Vadodara
March, 6 to 9	:	4-Day Workshop for Parul Uni. Students
Subject	:	Hands-on Training on Power System and its upcoming Scenario
Visits	:	State Load Dispatch Centre – Gotri; M/s Trivedi Associates Training Centre, Nana Fofalia; 400kV GETCO Substation – Asoj, M/s Highvoltrans, Halol; HT Meter Testing Laboratory – NABL Accredited-MGVCL; Vadodara City SCADA system-MGVCL; Wanakbori (GSECL) Thermal Power Station and Small Hydro Power Station
March, 14 to 18	:	5-Day Workshop for LE College, Morbi Students
Subject	:	Industrial Practice in the Field of Electrical Engineering
Lecture	:	2 - Days
Visits	:	M/s Atlanta Electricals, VV Nagar; 400kV GETCO Substation – Kasor; ERDA, Vadodara; State Load Dispatch Centre – Gotri; HT Meter Testing Laboratory – NABL Accredited-MGVCL; Vadodara City SCADA system-MGVCL; Solar Power Plant – Canal Top at Sama, Vadodara-SSNNL.
April, 25	:	Technical Lecture
Subject	:	Electric Meters – Latest Technology Trends
Speaker	:	Er Ms Varsha Joshi, Dy Engr, Hi-Tech Lab, MGVCL, Vadodara
June, 2	:	Technical Lecture
Subject	:	Solar Roof Tops – Latest Trends
Speaker	:	Sh Amit Barve – VP and Sh Krutarth Mengde – Sr Engr of Enerparc Energy P Ltd, Mumbai
July, 17	:	Technical Lecture
Subject	:	Can Solar batteries & EVs disrupt Energy Industry ?
Speaker	:	Dr. KN Shrivastava – Visiting Prof., IIT – Mandi. (Now Vice Chancellor , Symbiosis University of Applied Sciences, Indore)
August, 20	:	AGM Annual General Meeting, Honouring Senior Members & Spiritual Talk
Subject	:	Positivity and Spirituality
Speaker	:	B.K. Tarlika Didi & B.K. Varsha Didi
September, 27	:	Technical Lecture
Subject	:	Project Management of Power Stations
Speaker	:	Er. RP Sharma; Freelance Consultant - Elect. & Project Management
October, 11 to 14	:	4-Day Workshop for Parul Uni. Students
Subject	:	Hands-on Training on Power System and its upcoming Scenario
Visits	:	Danke Power, Waghodiya; BioGas Plant, VMC; M/s Highvoltrans, Halol; 400kV GETCO Substation, Kasor; M/s Atlanta Electricals, VV Nagar; Sardar Sarovar Narmada Nigam Ltd, Kevadia
November, 10	:	Technical Lecture
Subject	:	Life Management of Power Plants by Knowledge based Inspection (KBI)
Speaker	:	Sh Paresh Haribhakti - M.D., TCR Advanced
December, 20	:	Technical Lecture
Subject	:	New Approach to reduce Green House Gas emission
Speaker	:	Er. SB Lele; Retd. Chief Engr., GEB
Subject		Statutory Requirement for Solar Roof Top
Speaker	:	Er. HV Shah, Deputy Engineer, MGVCL, Vadodara

मैं और मेरा ट्रान्सफॉर्मर



मैं और मेरा ट्रान्सफॉर्मर
मैं और मेरा ट्रान्सफॉर्मर,
अक्सर ये बातें करते हैं

ये ओवरलोड न होता तो कैसा होता
तुम शहर में भी चलते, तुम गाँव में भी चलते
तुम दिन में हल्का सा गुनगुनाते
तुम रात में चुप हो जाते

ये ओवरलोड न होता तो ऐसा होता, ये ओवरलोड न होता तो वैसा होता
ये काले साँप हैं या तुम्हारे तार जले हुए हैं

ये सुबह का उजाला है या तुम्हारे अंदर अभी कोई धमाका हुआ है
ये टूटा कंगन है या तुम्हारी सी.टी. जली हुई है
ये आँसू हैं या तुम्हारे कन्सर्वेटर से तेल टपका है

रुठना है तुम्हारा या तुम्हारे फ्यूज़ जले हुए हैं
ये शिकायत है तुम्हारी या तुम्हारे कोरोना की आवाज़
ये सोचता हूँ मैं कब से गुमसुम

की जब की ये तपी हुई वाइंडिंग कह रही है की तुम खतरे मे हो, खतरे मे हो
मगर ये तपी हुई कोर कह रही है, मेरा इन्सुलेशन बचालो, बचालो
मजबूर ये हालात इधर भी हैं उधर भी

गरमी की एक रात इधर भी है उधर भी
लोड शेयर करने को है बहुत पर किससे करें हम
कब तक यूँ ही ओवरलोड तुझको करें हम

दिल कहता है तेरे पूरे फ़ीडर को ट्रिप करा दें
धरने से कब तक डरें, जनता को बता दें
हाँ ये मासूम अब थक गया है, थक गया है, थक गया है
नए ट्रान्फॉर्मर का प्रस्ताव इधर भी है उधर भी

– केवल वेलानी

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