Issue No. : 4/2012
October, 2012

(FOR PRIVATE CIRCULTION ONLY)

S P E NEWS LETTER

A QUARTERLY PUBLICATION OF THE SOCIETY OF POWER ENGINEER (INDIA)
(VADODARA CHAPTER) ESTD. 1996

THE SOCIETY OF POWER ENGINEERS (INDIA)
FF-48, Avishkar Complex, Old Padra Road, Vadodara - 390 007
Phone : (0265) 232 2355
e-mail : societyofpowerengg@yahoo.com, spevadodara01@rediffmail.com
Website : www.spevadodara.in

OFFICE BEARERS FOR THE YEAR 2011

Er. GV Akre
Chairman

Er. SB Lele
Vice- Chairman

Er. VB Harani
Secretary

Er. GP Shukla
Joint- Secretary

Er. AN Makwana
Treasurer

Er. SM Takalkar
Member

Er. ND Makwana
Member

Er. VB Kambad
Member

Er. PO Kulshreshtha
Member

ADVISORY COMMITTEE

1. Er. KN Rathod
2. ER. NV Rede
3. ER. KG Shah
4. Er. GM Bahudhanye
5. Dr. RB Kelkar
6. Er. KK Bhatia
7. Er. RN Purohit
8. Er. MM Naik
9. Er. NN Jadhav
10. Er. NG Yadav
11. Er. RB Desai
12. Er. PA Shah

SPECIAL INVITEE

Er. N. Dinker

OFFICE ADMINISTRATION COMMITTEE

1. Er. PO Kulshreshtha
2. Er. GM Bahudhanye
3. Er. NN Jadhav

EDITORIAL BOARD

1. Er. SM Takalkar
2. Er. NV Rede
3. Er. KN Rathod
4. Er. N. Dinker

FRONT COVERPAGE THEME: Locomotive on Indian Railway Network

1. Locomotive class WAG-9. Main Features include Thyristor Power Modulator, larger Tractive effort applicable with greater overall efficiency.
2. The Design of 25kV Overhead Conductors considering the lesser clearances due to a short tunnel.
3. 25kV, 50 Hertz AC Locomotive Banker Triplet is seen easing a train uphill to Lonavala,15,000 Horses pushing this Train from the Rear.
4. One of the Rare Locomotive Class & also the last straight 1500V DC Locomotive class WCM-6.
5. Process of discharging out moisture from the main Locomotive Compressor Reservoir.

From The Chairman's Desk

The God Particle-Higgs Boson

For thousands of years people have wondered about the universe and are trying to find out how and who has created it. Many believe that it is created by God but the scientists believe that it is a creation because of scientific reasons. They believe that after Big Bang, 13.7 billion years ago, particles were formed which did not have the mass initially. After the universe cooled below critical temperature, an invisible force field called Higgs field was formed along with sub-atomic particle Higgs boson. Any particle that interacts with Higgs boson gained the mass. More they interact, the heavier they become and gave them size and shape which ultimately caused the formation of stars and planets and whole universe. This mysterious particle was also named as"God Particle".

The theory is realized by Standard Model Theory of Particles which confirms all phenomenons predicted and is accepted and understood perfectly by most of the physicists of the world. But it is incomplete without proof for the elusive sub-atomic particle, Higgs boson. To explore the validity of Standard Model and find Higgs boson, European Organization for Nuclear Research, CERN, built world's largest and highest energy particle accelerator project, called Large Hadron Collider (LHC), costing $10 billion near Geneva which is funded by eighty five countries. It is 3.5M diameter circular tunnel with 27kM long periphery, and 100M beneath the earth. It is mainly consists of many large magnets for bending and speeding beams and detectors to study the particles along with sophisticated equipment.

India has contributed greatly in this research with its 60 scientists working at LHC and helped in building the precision equipment for detectors. It has already spent around Rs.500 Crore for this work. Also, Indian scientist, Satyendra Nath Bose predicted sub-atomic particle boson, and in 1925 the name boson is given to this particle after him. The group of thousands of physicists at LHC in collaboration of hundreds of universities and laboratories worldwide are trying to go to the beginning of time by colliding opposing beams of protons at speed nearly equal to light and recreate the situation just after the Big Bang to observe these miraculous particles

The findings of nearly decade of research done by CERN and the observations at LHC were announced on 04th Jul 2012 claiming that they have discovered a sub-atomic particle with properties consistent with Higgs Boson. This significant event took place in presence of Dr.Peter Higgs who put this theory with mathematical proof forty years back. The name Higgs is give to this particle after him. With the success of this experiment, scientist will be inching one step ahead to answer the question about "How the Universe Was Created". If Higgs boson is not confirmed with these findings, there will be new physics and new theories and human's efforts will continue to find the truth.

Also there are other benefits to mankind due to this research, such as development of World Wide Web, many applications in medicine for diagnostics and therapy, solar energy collection, climate change, development of anti-nuclear area etc. Let us wait for the final analysis of the findings and confirmation of the Higgs boson, God particle.

With Good Wishes for a Happy Diwali & Prosperous New Year,

G V Akre
Chairman

Editorial

In this issue I may like to touch upon the issue of technical education in general and the electrical engineering in particular. The country has witnessed a significant growth in infrastructure. When I graduated in electrical engineering way back in 1971, there were engineering colleges in the country which could be counted on finger, in addition to IITs. Even with this number of colleges and number of students passing out each year, jobs were very difficult to find. Even with the good influence it was difficult to get job with a salary of Rs. 250 per month. This is owing to the fact that all the development was totally the domain of central government & the state governments. Private sector participation in infra structure development and power business was never thought of. The main source of employment for power engineers was the state electricity boards and equipment manufacturers. Independent business in the power sector by young engineer was not the order of the day then.

In the later part of eighties and earlier part of nineties, there was a wakeup call all over the country and same was echoed in the central & state governments. The telecom sector was the first to usher into the Era of reforms in the country. The success achieved in the telecom sector, which was spear headed by Dr. Sam Pitroda, boosted the moral of the governments and the public at large. The reforms in power sector also started picking up. The then central power ministers Shri Kumar Mangalam and Shri Suresh Prabhu took lot of initiative and kicked off the power reforms. The Indian Electricity Act-2003 has put the power reforms on fast track. However, the state of Gujarat had taken initiative and signed number of power purchase agreements (PPA) for generation of power, with the private players. Even though the Enron Power Project did not succeed in Maharashtra, the private generators in Gujarat recorded a sizable growth.

The target of 1 Lac MW capacity addition in the power system of the country during 11th five year plan was envisaged but could not be achieved. Similarly about 1.0 Lac MW addition in the 12th five year plan has been envisaged. Lot many qualified power engineers are needed in the country to meet the challenge of adding extra capacity of the power system of the country.

Considering the demand and supply imbalance with regards to fresh engineer graduates, government decided to decontrol the education sector. This resulted into mushrooming of engineering colleges all over the country. Most of them are self financed institutions. The engineering colleges became profit centers as the admission depended upon the amount of donation one is prepared to pay. The merit of a student seeking admission to the engineering college started taking back seat. The engineering course which used to be a five year affair, has been reduced to four years. This resulted into quick inflow of graduate engineers and started bridging the gap between demand and supply. It is established beyond doubt that large number of technical institutions do not have laboratory equipment. The students have to go to other colleges / institutions for laboratory experiments and laboratory examinations. Even the basic artisan skills such as carpentry, smithy, lathe machine work, welding, fitting are rarely finding place in self financed institutions. Naturally, the students who graduate from such colleges would be ill equipped with the technical knowhow with regards to electrical equipment and controls as well as basic artisan skills.

It is a known fact that any electrical equipment or a project has only a small part which can be called pure electrical. For example, in a thermal power plant civil/structural work may be about 40%. The mechanical work may be another 40%. The electrical would be only 20%. Similarly, in a hydro power plant, civil engineering may be 60%, mechanical may be 25% & electrical may be around 15%. Similarly, in substations civil engineering work is about 50%, transmission line construction (including design) is almost 85% of civil and structural. Similarly, when it comes to the manufacture of electrical equipment, there are mechanical components, pneumatic components, fluid mechanics, material technology etc. In addition to civil and mechanical parts of the project, there are certain chemical, pneumatic, hydraulic, electronics parts which need study. An electrical engineer, who is in-charge of the project, has to over sea all the engineering & non engineering components.

Thus, it is essential that the power engineering graduate must know basic about civil engineering, structural engineering, mechanical engineering, electronics, control & physics/chemistry. The in charge power engineers should also have basic knowledge of industrial engineering & economics. The managerial skills are also required during project management. The basic knowledge of civil survey work and soil properties is vital for electrical & mechanical engineers.

Unfortunately, in the four years course, the students are not given even basic knowledge of any of the subjects referred to above. With the result, the electrical engineer in charge of the work or production of electrical equipment is unaware of civil, structural, chemical, metallurgical, mechanical, hydraulic and other

engineering subjects. This reflects upon his day to day working and control over the project. It is also important that civil, structural, mechanical and chemical engineers also learn a little of electrical engineering.

As a consultant, I have observed that electrical engineers working on projects are reluctant to take the responsibility of other engineering even though they form the part of their day to day working and overall responsibility. The colleges must address this situation. The way out is to have a short term course on other engineering aspects which are required to be taken care by the power engineering graduates. There is yet another way. The employer who works for a particular project or equipment manufacture can educate his freshly employed power engineering graduate in the additional engineering subjects, which are required for the betterment of the quality of services or product required by the employee to sustain in the market.

The SPE(I) Vadodara has many senior power engineers who are equally competent in other engineering subject while they are nicely equipped with the power engineering knowledge. SPE(I) Vadodara is organizing lecture every month and covers number of the engineering disciplines.

Let us in the SPE(I) try to think over the vexed issue mentioned above and do a bit in making the power engineers all rounder.

Er. SM Takalkar

Thoughts from Secretary

As a deviation from standard practice of organizing AGM in the end of calendar year, this year it is organized after the completion of financial year. This change is the result of thoughts of the Committee Members and also an advice from HQ office, New Delhi. With the cooperation of members, the AGM on 22 Sep 2012 was a grand success. I am really indebted to all the members who have shown their faith in the working committee in general and myself in particular. I assure all the members that myself as well the committee will be able to stand to the expectation of all the members with regards to quality programmes and office administration. I would like to put on record efforts of publication committee in bringing out quarterly journals. However, I would request all the readers and members to contribute technical papers/articles, news in power development and personal development. The readers can also write regarding their views on various articles published in the NEWS LETTER.

Wishing all the members and their family a Happy Diwali and Prosperous New Year.

Report On The 16th Annual General Meeting Of The Chapter

As per the decision taken by the Executive committee and the Advisory Committee in the beginning of this year, the Annual General Meeting of the chapter shall be conducted in the middle of the year after the financial audit of the chapter is over. After the establishment of the chapter in October 1996 it is the first time that the AGM is held following the completion of financial year. Till this time it used to be in the end of calendar year.

The AGM was held in the auditorium of GETRI, Vadodara on 22-09-2012 evening. The following transpired during the AGM.

1. Due to lack of quorum at 16.00 hrs, the members present dispersed and re-assembled in the hall after half an hour. The agenda of the meeting was then taken on hand.
2. Er. VB Harani, Secretary of the chapter read out the minutes of last AGM dt. 08-01-2012. The minutes were passed unanimously.
3. Secretary read out the exerpts from his report and the entire report was accepted by the AGM.
4. Er. VB Harani, Secretary of the chapter presented a budget for the year 2012-2013 which was passed after brief discussion.
5. The treasurer of the chapter Er. AN Makwana presented the financial accounts of the chapter for the year ending March-2012. The accounts were passed after brief discussion.

(Conti. on page 8)

Brief Report on the Workshop at Shantikunj, Haridwar.

The Society of Power Engineers, India organized a 3-Day workshop on 08, 09 & 10 Sep 2012 at Shantikunj, Haridwar in the auditorium of Dev Sanskriti Vishvavidyala. The first day was devoted to the topic of "Recent Developments in Rotating Machines". Second day was devoted to spiritual lecture and the third day was devoted to the topic of "Condition Monitoring of Substation Equipment including Power & Distribution Transformers and Emerging Trends in Transmission System". The workshop was jointly organized by Shantikunj, Haridwar, CBI&P, New Delhi and Society of Power Engineers. The Vadodara chapter had played a pivotal role in organizing Technical Sessions on Transmission and Distribution. The brief report on the workshop is as under:

Day 1: Date 08-09-2012

This day was devoted to the topic of "Recent Developments in Rotating Machines". The inaugural session was held at 10.00 hrs. Er. PP Wahi, Director, CBI&P, Shri OP Sharma, Sr. Representative, Shantikunj, Haridwar, Er. V Pandhi, Executive Directior, BHEL, Haridwar, Er. GP Patel, MD, UJVNL and Er. GV Akre, Chairman, SPE(I) Vadodara were on the dais.

In his welcome address, Er. PP Wahi briefed the delegates on the back ground of organizing the event at such a holly place. He gave details of the programme on all three days. His speech was followed by felicitation of dignitaries on dais. After felicitation all the dignitaries turned to the corner of the dais for lighting the auspicious lamp. The musician of Dev Sanskriti Vishvavidyalaya presented live performance of prayers & bhajans.

Shri OP Sharma of Shantikunj welcomed the delegates and invitees to the 3-Day workshop and gave brief account of the spiritual activities in the Shantikunj. He threw light on various aspects of life which has connection to the science. He stated that spirituality should be way of life and should be part of every activity, one performs on day to day basis.

Er. V Pandhi, ED, BHEL, Haridwar spoke on the importance of rotating machines in the power sector. He appreciated the efforts of SPE(I), CBI&P and Shantikunj, Haridwar in organizing the workshop in Haridwar.

Er. GP Patel, MD, UJVNL highlighted role of UJVNL in development of Hydro Power in the state of Uttarakhand. He gave brief account of the hydro power potential in the state. He expressed his desire that the workshop should focus on the key issues related to hydro power with reference to rotating machines.

Er. GV Akre, Chairman SPE(I), Vadodara presented vote of thanks. In his speech he stated that SPE(I) Vadodara is the biggest chapter of SPE(I) in India and described in brief the activities being carried out by the chapter regularly. He thanked the dignitaries on dais, the learned faculty members and the delegates for their presence and contribution in the workshop. He thanked Shantikunj and Devsanskriti Vishvavidyalaya.

Er. LP Sahu, Engineer in charge of the power system of Shantikunj was felicitated as a mark of his contribution in organizing 3-Day workshop. Er. SM Takalkar of SPE(I), Vadodara was the Anchor Person.

After the Tea break, Technical Sessions on the topic of Rotating Machine started. The following papers were presented in three sessions

1. Equipment, System, Operation and Maintenance of Electrical Equipment of Hydro Power Stations-KS Chatterjee, Ex. GM, BHEL.
2. Generator Maintenance, Inspection and Test Practices - by CIGRE India.
3. Detection of Broken Damper Bars of a Turbo Generator by the Field Winding - J. Bacher, Austria.
4. Copper Motor Rotor (CMR) Technology - Milind Raje - International Copper Promotion Council (India), Sandeep Garg, UNDP - GEF.
5. Design Requirements of Motors for VFD application - DK Chaturvedi, DGM (Electrical), NTPC Ltd.
6. Residual Life Assessment of Large Generators - AK Mukherjee & Somes Bandyopadhyay.
7. Case Study - Vibration Problem Encountered in Hydro Generators - Amit Kumar Verma, Design Engineer, BHEL Bhopal.
8. Design Improvements in Large Turbo Generators - Anup Kumar Goyal, BHEL, Haridwar.

In addition to above, Er. PA Shah from SPE(I), Vadodara presented a paper on "Energy Conservation in Industries".

All the papers were nicely presented and well received by the delegates.

Day 2: Date 09-09-2012

This day was devoted to spiritual lectures. The following spiritual lectures were delivered by the eminent personalities and high ranking officials of Shantikunj.

1. Scientific spirituality - This lecture was given by Dr. Amalkumar Dutta.

   Dr. Dutta co-related science & spirituality by citing various examples of humanlife.

2. Practical spirituality - This lecture was given by respected Vireshwar Upadhyaya.

   In his lecture, the speaker gave detailed account of various factors which governs practical spirituality. He advised the delegates and the family members accompanying them to adop spirituality in day to day life.

3. Our responsibility & rights with reference to divinity - This lecture was given by respected Shri Kalicharan Sharma.

The speaker stated that divinity and spiritualism is the moral responsibility of every individual. The intellectuals have a bigger role to play in this matter as they have better reasoning faculty.

First two lectures were before lunch & the third lecture was after lunch. The musicians of Dev Sanskriti Vishvavidyala, Shantikunj presented Bhajans with classical ascent. The delegates and accompanying family members appreciated the spiritual lectures. Er. PP Wahi, Director, CBI&P thanked the learned speakers. , Er. SM Takalkar introduced the eminent speakers. Er. LP Sahu also described the importance of spiritualism and requested the delegates to visit Shantikunj as often as possible and take the advantage of holy atmosphere of the establishment and reap a good benefit in life and obtain peace of mind.

After the spiritual lectures, delegates and their spouse were invited to visit Shantikunj & see various activities going on in the campus.

Day 3: Date 10-09-2012

This day was devoted to the workshop on "Condition Monitoring of Substation Equipment including power and distribution transformers and emerging trends in transmission system".

The dignitaries on the dais during inaugural function included; Er. PP Wahi, Director, CBI&P. Respected Sandeep Kumar, Registrar of Dev Sanskriti Vishvavidyala, Er. S Bhatnagar, Chief Engineer, PITCUL, Er. BCK Mishra Director UJVNL and Er. GV Akre, President SPE. After introduction and felicitation of the dignitaries, auspicious lamp was lighted to mark the beginning of the workshop. The musicians of Dev Sanskriti Vishvavidyala presented very good spiritual songs set to various ragas of classical music.

Er. PP Wahi gave brief account of a theme of the workshop & welcomed the dignitaries on dais, eminent speakers delegates and invitees.

in his address, respected Sandeep Kumar, Registrar, DSU, Shantikunj, Haridwar appreciated the efforts of CBI&P and SPE(I) in organizing workshop in Shantikunj. He wished that the delegates and their family members take advantage of the natural and holy atmosphere of Shantikunj.

Next to address the gathering was Er. S Bhatnagar, Chief Engineer, PITCUL. He stated that transmission and distribution system is very important as they are directly connected to the consumers. Maintenance of the T & D system is vital for consumer satisfaction.

In his address, Er. BCK Mishra, Director, UJVNL highlighted the steps taken by his company in maintaining the existing Hydro Power Capacity of Uttarakhand and putting in stream about 1200 MW Hydro Power Plants in the state.

Er. GV Akre, Chairman, SPE(I) Vadodara presented vote of thanks and informed the dignitaries on the dais regarding the activities of SPE (I) in general and SPE(I) Vadodara in particular. After the tea break, technical sessions took place. Following presentations were made.

1. Causes of failure of Distribution Transformers - Manoj Kumar Srivastava, BSES, Yamuna Powe Ltd.
2. Low loss conductor cable - An answer to high T&D losses - Rajendra Mishra, Sundaram, Prashant Arya, Anandkumar and Pranav Vasani, Power Cables, Sterlite Technologies Ltd.
3. Composite Insulators - Rajesh Gupta, Power Grid Corporation of India Ltd.
4. Condition monitoring techniques of EHV Transmission lines - LN Agrawal, NRLDC, Power Grid.

5. Measurements on bushings to predict abnormality - Asseem Dhamija, BHEL, Bhopal.

6. Laboratory Testing and Diagnostics: Acquiring information on Transformer Health for Condition Assessment - Double.

7. On- Line Condition Monitoring for Transformers/Reactor/CT/Switchgear.

In addition to above, Er. SM Takalkar from SPE Vadodara presented a paper on Modern Design & Engineering Practices in Transmission Lines. Similarly, Er. GV Akre presented a paper on Instrument Transformers.

There was lot of interaction during the presentation and during Tea & Lunch breaks on the papers presented.

There was a good representation from SPE(I) Vadodara. Those who attended the workshop included Er. GV Akre, Er. SM Takalkar, Er. KN Rathod, Er. PA Shah, Er. Debal Sinha, Er. BN Solanki, Er. DM Patel, Er. GM Bahudhanye, Er. GP Shukla, Er. NG Yadav, Er. RN Purohit. Some of the engineers were accompanied by their family members.

The workshop at Shantikunj Haridwar was thus, a grand success in terms of technical presentations and spiritual lessons.

Chapter's Activities

❖ On 22 Sep 2012, Annual General Meeting (AGM) of the Chapter was arranged at the Auditorium of GETRI, Vadodara at 16.00 hrs. The detailed report on the AGM is covered in this volume.

The AGM was followed by a lecture session. The topic was "Power Factor and Harmonics".

Er. LC Awasthi, VP (Operation) of M/s Electrotherm (I) Ltd. was first to speak. His presentation started with basic about power factor. He added that proper management of reactive power increases the efficiency of the power system. He compared Harmonics in power system with the blood pressure in human body. He described in detail the term Dynamic VAR.

Mr. Nitin Patel, Dy. Manager of the same company was the second speaker. He started with active & reactive power components of the system. He described in detail the tariff mechanism of Electricity Board related to the power factor maintained at consumer's end. He went on to describe the types of reactive power compensation. It included fixed/variable compensation. MV reactor, LV reactor, thyrister switch, APFC Panel, detuned filters, dynamic reactive power compensation, reactive power controllers. He explained in brief the damage which is caused to the cables, circuit breakers, generators, control circuits & instrumentation, transformers, meters etc. due to the continued presence of harmonics in the system.

Er. Buddhiraja, business head of the company stated that the Electricity Boards have started monitoring and insisting for maintaining level of harmonics by the consumers. TNEB is the first state to implement such control. Er. Venugopal Subbramaniyam answered the questions raised by the audience. The programme was well received.

The programme started with brief introduction & welcome address by Er. GV Akre, Chairman of the chapter. It was followed up by the company presentation by Er. Buddhiraja. Vote of thanks was presented by Er. VB Harani, Secretary, SPE(I) Vadodara.

❖ On 26 Oct 2012 a lecture on "Present Trend Large Coal Based Power Plant in India and Associated Electrical Systems and Super Critical Technology" was arranged at Vasvik Auditorium. The speaker was Shri Ranjan Baenerjee, General Manager of L&T Power, Vadodara.

He started his presentation with the present Indian Power scenario. He stated that present total installed capacity of power plants in India is 207,876MW with per capita consumption standing at 778kWh per year. Govt. of India targets per capita consumption to 1000kWh by end of 2012. However, there is a deficit of 16,300MW in the targeted capacity addition during 11th Plan, he added. He also gave the statistics of Government's target of capacity addition during 12th, 13th and 14th Plan as 90,000MW (18,000MW/Year), 135,000MW (27,000MW/Year) and 162,000MW (33,000MW/Year) respectively.

He stated that in order to achieve the target set out by GoI, it is necessary to address the concerns such as Fuel availability/Linkage, Land availability, Water resource, Evacuation system, Infrastructure, Policy reforms etc..

The speaker gave the statistics of Sub-Critical, Super Critical and Ultra Critical Technology. Adoption of Super / Ultra Critical technology increases overall efficiency of the plant and reduces down time of the plant.

The lecture was well attended by members of SPE (I) and the IE(I).

High Voltage Distribution System

By : Er. P A Shah

INTRODUCTION:

The HVDS stands for High Voltage Distribution System. The HVDS project is to be implemented on Agriculture Feeder to have better results. It is nothing but conversion of Low Tension LT line in to High Tension HT line and installation of small capacity distribution transformers having capacity of 10kVA, 16kVA and 25kVA. If the contract load of the consumer is less than the capacity of distribution transformer, two or more consumers can be clubbed so that optimum capacity of the distribution transformer can be utilized. The scientific approach is required for HVDS to achieve the desired results. The evaluation of the project shall be carried out on the basis of calculation of losses in the system before and after implementation of HVDS. It is known fact that for the same amount of power, the increase in the voltage will decrease the current in the same ratio. With little higher size of HT conductor and reduction in current, there will be reduction in line losses. No doubt, there will be a small increase in the transformer no load losses due to increase in number of transformers in the same feeder. Besides, it will be difficult for unscrupulous elements to tap energy directly from HT lines. However, detailed study is required before taking a decision on the implementation of HVDS.

STUDY:

Prior to implementation of the project, it is necessary to prepare single line diagram of the Agriculture feeders of the Division. In this module the main focus is on the losses. Therefore, it is proposed to calculate theoretical as well as practical losses prior to implementation of the project and similar exercise is to be carried out after implementation of the project.

LOSSES:

The losses in agriculture feeder do comprise of transformers' no load losses and load losses, HT line losses and LT line losses. The line losses are based on the current passing through lines & transformation losses based on duration i.e. time in hours.

PROCEDURE FOR CALCULATION OF EXISTING LOSSES:

Prior to implementation of the project, it is necessary to prepare single line diagram of the Agriculture feeder. The SLD shall be to the scale (preferably 1cm = 2.56kM) and it must be with direction. The topo sheet may be obtained from office of Collector / Mamlatdar i.e. Revenue Department of State Government or from Survey of India by indicating Northing and Easting of the area where exercise is intended to be done. The capacity of Transformer, length of HT line, length of LT line, nos. of Consumers along with contract load of the each consumer, name of substation, name of feeder, size of conductor, loading on feeder i.e. minimum, average and maximum for period of 6 or 3 months shall be mentioned in SLD. Then calculate existing losses as per procedure prescribed in Annexure-I. The transformation losses shall be calculated as per Annexure-II. Further, for calculation of actual real losses, consider the energy sent out in kWh of the feeder for a period of 6 months and energy sold to the consumers during this period. The calculation of energy sold to the consumers, shall be as per actual billing.

PLANNING FOR PROPOSED FEEDER:

Prepare a plan to supply power to each agriculture consumer with individual transformer. It is advisable to use optimum capacity of the transformer by using adequate size of the transformer, however two or three consumers can be clubbed if required. Prepare proposed single line diagram on scale showing capacity of Transformer, length of HT line along with contract load of the consumer, length of LT line along with contract load of the each consumer (if two or more consumers are clubbed), name of substation, name of feeder, size of conductor and total load on the feeder. Then calculate projected losses as per procedure prescribed in Annexure-II.

CALCULATION OF ENERGY SAVING:

The saving in the theoretical losses on the project is the difference between theoretical losses on existing agriculture feeder and proposed feeder. Here, the care is to be taken that all consumers nos. as well as their load shall tally with existing and proposed feeder or feeders. It is advisable to prepare project for a division. If the saving is significant, then implement the project. After execution of the project, take readings of feeder and consumers as prescribed above for two or three cycles for bimonthly billing or six months. Compare the saving in actual losses with existing as well as proposed feeders.

PROJECT COST:

The net project cost is the difference between new work cost and market cost of materials removed from the existing feeder. The cost of the project comprises conversion cost of LT line in to HT line (labour cost, conductor cost, insulator cost and other cost of line materials), cost of small capacity transformers including cost of transformer structures, cost of additional HT line to be laid switching, cabling, clamps/connectors and transportation cost of old materials to store. While the cost of old materials comprises cost of LT line conductor, cost of LT insulator, cost of High capacity transformer (25kVA, 63kVA and 100kVA), cost of HT line if any removed shall be excluded from the total project cost considering appropriate depreciation.

CALCULATION OF NET ENERGY SAVING & PAY BACK PERIOD:

The saving in the theoretical losses is the difference between existing losses and projected losses (lines and transformers), while actual energy saving is the difference between actual energy losses prior to implementation of the project and actual losses after implementation of the project. Here due care shall be taken to the additional load on the feeder to have exact saving. The payback period shall be calculated on the basis of energy saving in kWh, cost of energy and cost of the project. It is the ratio of total project cost and saving in Rs. (multiplication of energy saved in a year and cost of unit). The payback period shall be calculated as per Annexure-IV.

DATA:

The data for Transformer - no load losses and load losses; Feeder - name of feeder, name of Division, size (name) of conductor, length of HT line, length of LT line, power factor of the feeder, loading on feeder in Amp (minimum, maximum and average); Average energy cost in Rs. per kWh; Consumer details - contract demand in kVA / kW /HP of each consumer along with location of transformer; Cost data of HT line, LT line, Transformer centre (10kVA, 16kVA & 25kVA), Conversion cost of LT line to HT line, labour cost, transportation cost; Single line diagram to the scale of 1 cm = 2.56 kM of all agriculture feeders of the division;

EXERCISE:

The exercise is to be carried out to have better result for three days. Detailed calculation and Annexures will be published in the next issue.

The author is a retired Chief Engineer of GETCO / GUVNL having an experience of more than 36 years in the field of Transmission, Distribution, Power System Analysis, Hydro Power and Energy Management. At present he provides honorary services as an Associate in the Takalkar Power Engineers and Consultants Pvt. Ltd.

(Conti. from page 3)

6. The Polling and returning officer Er. YD Mehta conducted the election for the three vacant posts for of executive committee. There were four candidates for above three posts. Er. YD Mehta declared elected Er. VB Harani, Er GP Shukla and Er. PO Kulshreshtha.

7. Normally, merit awards are distributed to the engineers for their outstanding contribution to the power sector. As there was no nomination received, this item of agenda was not taken up.

8. As per tradition, the engineer members who complete age of 65 years are felicitated by presenting bouquet and a shawl. This year the following engineers were eligible.

1. Thakkar Rajnikant J	2. Chaudhari Suhas D.	3. Akre Ghanshyam V
4. Patel Kanubhai A.	5. Patel Bhikhubhai M.	6. Patel Dahyabhai M.
7. Lad Laxmichand G	8. Sheth Kirtikumar V.	9. Gandhi Raghunath M.
10. Mehta Pravinchandra R.	11. Kantawala Govind R.	12. Dasani Sureshchandra K.
13. Patel Arvind K.	14. Ashwani KG.	15. Patel Arvind H.
16. Joshi Satishkumar	17. Desai Arun N.	

Out of above, the engineers who were present were felicitated. The recipient engineers reciprocated by expressing their gratitude to SPE (I).

The AGM was followed by the lectures by the engineers of M/s Electrotherm Ltd., Ahmedabad. The report on the lecture is covered in this issue.

Random Thoughts

System & Individuals

By : N. Dinker

The two terms - "Systems" and "Individuals" have gained abundant significance now a days to focus all our attention particularly in the context of the present scenario in our country, whether it is in the political field, economic field or moral/ethical field.

In an ideal situation, both these terms should be complementary to each other. Both are equally important, any attempt to outdo the other is not only damaging but would be a time consuming process without any benefits.

Individuals have brains and intelligence and if the most enlightened individuals put their best thoughts & ideas forward and channelise them to achieve the best objective to built up a strong edifice - It can be named as 'system'. If adequate proportion of time & energy is spent on planning and implementing the system, that system will be strong enough to take any adverse, unforeseen, calamities, if arises, in future.

Instead of wasting unnecessarily our energies whether 'Individuals' comes first & then 'systems' or vice versa (akin to Egg & Chicken riddle as to who came first), we may start with "Individual'. If anyone (individuals) is in tune with himself (Svabhava) and with the work he is engaged in (Svadharma), there is nothing that can displace him, as long as he is guided by his inner voice. Any country, which has maximum number of ideal individuals will lead to having or forming an ideal system.

I recall a story which was taught to us in our school days - apt to be mentioned here_____

A well governed kingdom, of a benevolent, kind and just king, fell to bad days, due to the erosion of moral values of his subjects (individuals). The king summoned a saint to find out the depth of decay of his subjects and a method to find out this.

The saint said that in the early hours of New Moon (Amavasya) night, each householder of the kingdom should bring a glass of milk & pour it in the big jar kept in the compound of palace. On the appointed day, in the presence of the king, saint and the public when the lid of the jar was opened, it was almost water. The moral deterioration was almost complete.

The saint further advised that on another prescheduled day, in the morning hours, each householder should bring a glass of milk and pour in the jar, this time, the result was much better as there were many fence - sitters who desired to show to the outsider that they are good and thus brought glass of milk unlike on the previous occasion when he was sure that his bad act will go unnoticed

There are many 'systems' - power system (Electric Grid), Railway System, public distribution system, Education system, legal system, revenue & tax system, communication system etc. All these systems are meant for the benefit of man (individuals) planned & implemented by the individual. A good system is a result of the efforts put in it. Then, any lacuna failure of the proper operation of the system is the responsibility of the individuals.

Few months back, there was unprecedented collapse of Northern & North Eastern Grids, crippling the power supply for hours together, to almost half the population of the country. Each state started blaming the other for overdrawing their scheduled power. A committee was formed to report the reasons for the failure of the Grid. A leading vernacular Newspaper invited 'Write up & Comments' from the State authorities, on the incident. Many have tried to wriggle out of the situation by narrating the historical growth of their system (not relevant in this content) and such points with no mention for the exact failure of the system and with no recommendation to prevent recurrence. What we can infer from this? Both the "systems" & individuals have proved to be weak at present by remaining mute on the actual reasons for the failure.

Another example & important area is mining sector - coal, oil, water are all public resources of the country & should therefore never be misused by few individuals for their personal good. There should not be any loopholes in the system to circumvent the correct and proper functioning of the system.

What we need today are simpler, easier more coherent laws. We need fewer taxes, efficient & accountable bureaucracy & political system, punishing the corrupt in any exemplanay manner, building up faith by words & deeds in judiciary

We always say "Charity begins at home". Why not an individual start a system and thereafter the system will automatically start taking care it self, provided it was planned and implemented on sound basis.

Random Thoughts

Inspirational Quote

By : N. Dinker

- If the world seems cold to you, kindle fires to warm it.
- The way to love anything is to realise that it might be lost.
- You are not drop in the ocean, but the ocean in the drop.
- A champion is someone who gets up, even when he can't.
- Unforgiveness is like drinking poison and hoping other person dies.
- We teach what we know, but we reproduce what we are
- Knowledge, speaks, but wisdom listens.
- The fall of a leaf is a whisper to the living.
- Attitude is a little thing that makes a big difference
- Two wrongs don't make a right, but they make a good excuse.
- See everything; overlook a great deal, correct a little.
- The aim of an argument or discussion should not be victory, but progress.

With a Light Heart

By : N. Dinker

- A man came to the office of a news paper to insert an Advertisement and offering Rs.10000/-for the return of his wife's favorite and now lost cat.

  The lady at the counter "isn't that a rather high reward for a cat?"

  Man: "No, not at all! I have drowned it myself yesterday in the river."
- Wife "Almost a calamity befell today. The clock fell down and broke into pieces. However, my mom had a narrow escape - if it had fallen a few seconds earlier it would have fallen on her head"

  Husband: "I knew already, that the useless clock was always slow."
- Raju: "How is your business these days?"

  Mohan: Extremely dull! I sold one pair of shoes yesterday, and today it is still worse"

  Raju: "How, it could be still worse?

  Mohan: Today the man has returned the pair he had purchased yesterday.
- A woman went to the doctor and said, " when I looked in the mirror this morning, I saw my hair frizzy, my skin wrinkly, my eyes bloodshot - what is wrong with me?

  The Doctor said "well, the good news is that your eyesight is fine.

Wisdom Evergreen

By : N. Dinker

- Observe with the eyes; listen with the ears; shut the month.
- If you speak too much, you will learn too little.
- Tomorrow belongs to the people who prepare for it today.
- If you live next to the cemetery, you can't cry for everyone.
- Fool me once, shame on you, fool me twice, shame on me.
- A half truth is a whole lie.
- God gives the nuts, but He does not crack them

Random Thoughts

Multi Culture in India - One aspect

By : N. Dinker

Seenaaris 1	Two guys are fighting and a third guy comes along, sees them and walks on -That's MUMBAI
Seenaaris 2	Two guys are fighting. Both of them take time out and call their friends on mobiles. Now 50 guys are fighting.---- You are definitely in PUNJAB
Seenaaris 3	Two guys are fighting and the third guy tries to make peace. The first two get together and beat the third guy-------- That's Delhi
Seenaaris 4	Two guys are fighting and the 3rd guy comes along, then a fourth and they start arguing about who is right -----You are in KOLKATA.
Seenaaris 5	Two guys are fighting 3rd guys comes and shoots both of them.---- You are definitely in UTTAR PRADESH
Seenaaris 6	Two guys are fighting with a carton of beer. Two guys come along. All sit together drinking beer and abusing each other and all go home as friends.----------You are in GOA
Seenaaris 7	Two guys are fighting - A crowd gather to watch. A guy comes along and quietly opens a chai stall (Tea Stall). That is AHMEDABAD.

Who is Dumb?

By : N. Dinker

(Never underestimate the 21st century kids for their smartness)

A young boy enters a barber shop and the barber whispers to his customer," This is the dumbest kid in the world. Watch while I prove it to you.

The barber puts a fifty rupee note in one hand and two-ten rupee notes (total 2x10= Rs. 20) in the other, then calls the boy over and askes "which do you want, son?"

The boy takes two -ten Rupee notes and leaves.

What did I tell you' said the barber that kid never learns!'

Later when the customer leaves, he sees the same young boy coming out of the Ice-cream store, "Hey son! May I ask you question? Why did you take the two-ten Rupee notes instead of one fifty rupee note.

The boy licked his cone and replied. Because the day I take the fifty rupee note, the game is over!

A Twist in the Tale

By : N. Dinker

We have all heard when we were young about the tale of the "Cap seller and Monkeys"

The story goes like this. An old Cap-seller was taking a bundle of Caps for selling in the market. He was tired while walking in the sun and rested under a tree. It was so cool he dozed off. When he woke up, he was startled to find the bundle of Caps was empty. When he looked up, he saw a whole lot of monkeys on the tree each wearing a cap. He tried to threaten them, shout at them and even tried to shake the branches - all to no avail. Then out of sheer frustration, he took the cap on his head and threw it down. Instantly all the monkeys on the tree too threw down the caps. The cap seller collected the caps & happily proceeded to the market.

The present day Cap Seller had the same experience as the Cap Seller of the story. The present day Cap Seller reenacted in the same way as the Cap Seller in the Story.

But alas! The world has changed. All have become smarter! This time there was no response from the monkeys. An old monkey climbed down the tree, slapped "the present day Cap Seller" and told him……..?

Guess what? Make an honest attempt to find out what has happened

Answer: "Do you think you alone have a grand father to tell stories"

Relationship Limits

By : Er. N. D. Makwana

We as engineer have learnt that there are certain pairs of parameters having specific relationship. This relationship is maintained during all normal ups and downs. But it is up to certain limit, thereafter, the specific relation is not maintained. The parameters will be independent and behave erratically.

Consider the case of elasticity of material. The relation between stress and strain in the material follows Hook's law as shown in the standard stress strain chart. Strain is per unit deformation in the material due to external force. Stress is restraining force developed in the material under strain

Application of external force on material cause strain (deformation) in the material and consequently proportionate stress (opposing force) is developed in the material to counter balance the applied force. This relationship continue till applied force is up to the yield point x in the chart. Applied force beyond the limit result in to permanent strain (deformation) without development of corresponding stress and ultimately material fails.

Similar is the case of magnetizing characteristic. The B-H curve represents the relation of induced magnetic flux against magnetizing force. But this relation is up to the saturation point x in diagram. Beyond x is a saturation zone where increase in magnetizing force, hardly increases the flux. Care is taken about this in design of magnetic circuit of any equipment.

Consider (angular) stability of power system. The plot is of power flow over network against power angle (between two voltage vectors). The relation is maintained up to the point x, the steady state stability limit. This indicates maximum power that can be transferred without loss of synchronism. Any action for more power over network may result in isolation. However, the limit can be improved by suitable modification in the network.

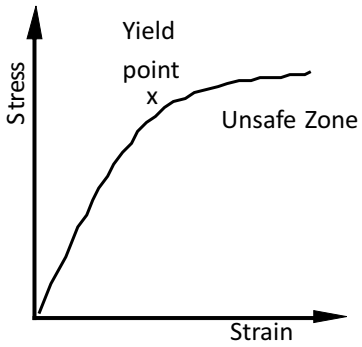
Similarly, examine (voltage) stability plot. PV curve represents the relation between power flow in network against voltage sink. The relationship holds during all ups and downs up to the knee point marked as x in the chart. Flow of power more than limit lead to unstable zone and results in voltage collapse.

Similar phenomenon is experienced in life also. Each relationship has limit. The limit is pair specific and may be different for each pairs. Of course, the limit is dynamic and may vary with time, task and treatment and also can be improved by appropriate treatment. Relationship works smooth up to the existing limit but after the limit is crossed, it is unpredictable. In routine, care is taken but due to unexpected impulse, limit gets crossed and disrupt the relation.

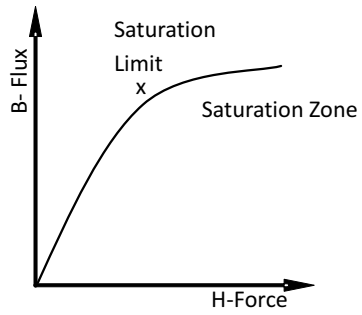
Take the case of two business partners. In the development stages, many odd incidences are ignored by each other. But after progress to a level, the same persons get excited and react even for insignificant issues. Harmony turns out to discord and result in isolation. This may be with friends or brothers or other pairs and not only in business but other matters also. The base of this is human tolerance characteristic having "Lightning Arrestor Effect". Human tolerance falls with growth of health (physical power), wealth (money power) and wisdom (knowledge power). Really it should be like metals that become mild while getting heat energy.

Note : The various curves in above article were misprinted in July-2012 issue. Hence the article is reprinted with due correction. We apologies the error in printing.

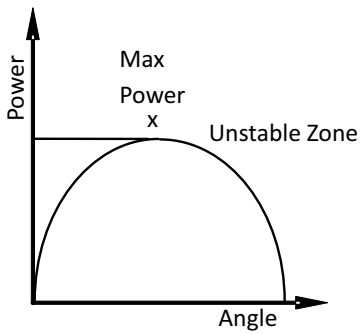
Stress-strain Curve



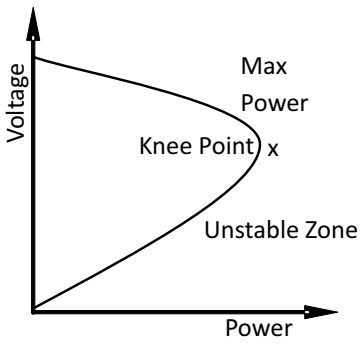
BH (Magnetizing) Curve



Angular Stability Curve

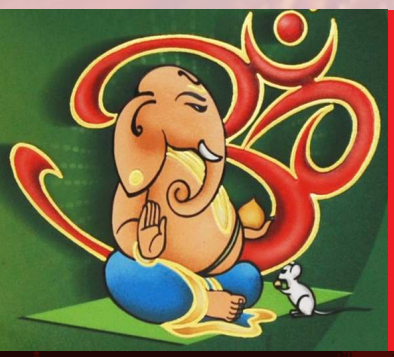


PV Curve (Voltage Stability)



List of New Members

Sr. No.	Gr. No.	Name	Member
1	2010	Bhatt Praghnesh J.	Member
2	2011	Mehta Bhinalkumar B	Member
3	2012	Parekh Sandeep S.	Member
4	2013	Solanki Krupa M	Member
5	2014	Mistry Nikunj N.	Member
6	2015	Bhandari Narendra K.	Member
7	2016	Thakur Ravi	Student Member
8	2017	Topiwala Mohammedaftar A.	Life Member
9	2018	Jain Dipesh D.	Life Member
10	2019	Gour Babbusingh D.	Life Member
11	2020	Mehta Devashi S	Student Member
12	2021	Shah Hiteshkumar K	Life Member
13	2022	Vahora Moli S.	Associate member
14	2023	Zala Devendrasinh S	Life Member
15	2024	Mistry Ashokkumar T.	Life Member
16	2025	Chauhan Fatesinh S.	Life Member
17	2026	Dave Nikunj S.	Life Member
18	2027	Kadri Zeeshanali N	Associate Member
19	2028	Jog Sidhdharth C.	Associate Member
20	2029	Marthe Aditya A.	Associate Member
21	2030	Kavishwar Dharmendra V.	Associate Member
22	2031	Patel Mantra Nitinbhai	Student Member
23	2032	Shah Vaibhav Jitendra	Associate Member
24	2033	Natu Anurag Ramesh	Associate Member
25	2034	Jani Chinmay Y.	Student Member
26	2035	Trivedi Jitesh P	Life Member
27	2036	Ramtirth Chandrashekhar G	Life Member
28	2037	Deodhar Milind M.	Member
29	2038	Acharya Kalapi H.	Life Member
30	2039	Kadri Zeeshanali N	Life Member
31	2040	Bhavsar Dineshchandra A	Member
32	2041	Joshi Mrugeshkumar G.	Associate Member
33	2042	Jayswal Hardik D.	Associate Member



Diwali Greetings

The Executive Committee, the Advisory Committee and Editorial Board of SPE NEWS LETTER wish all the Members, Readers, Patrons and well wishers a very Happy Diwali and Prosperous New Year.

May god shower thousands blessings on you and your family members in the New Year.

Book - Post

To _____

_____

_____

From :
The Society of Power Engineers (India)
Vadodara Chapter
FF-48, Avishkar Complex,
Old Padra Road, Vadodara - 390 007.

Printed Matter

Printed by : Manish Art, Pratapnagar Road, Vadodara & **Published by : Er. SM Takalkar** for Society of Power Engineers (I) Vadodara Chapter