



Current Waves

ELECTRICAL CONSULTANTS' ASSOCIATION BANGALORE

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JUL - SEP 2003



EDITOR'S NOTE

September 15th of every year is observed as Engineers' day throughout India, to mark with respect the birthday of Sir M. Visvesvaraya, an engineer and statesman par excellence. We at ELCA paid our tributes to the great personality before commencing the seminar on 15th September 2001 during the Electrical Safety Programme, in Bangalore. It is my privilege to publish a few sentences about the lifestyle and principles of sir MV and spread his message throughout India via Current Waves. It is my fond wish that the engineering community will follow his footsteps and step-up dedication towards nation building through the engineering profession and services.

MEPEX 2004, the national level exposition on building services by ELCA is progressing well, inspite of the fact that many exhibitions in different parts of the country are slated around the same time as our own programme.

The seminar segment is being supported by sponsors, co-sponsors and expert speakers from India and abroad.

I do hope you will make it to MEPEX or atleast drop-in at the expo in case you are in or around Bangalore, on business or pleasure, from 8 to 11 January 2004. I take this opportunity to invite you all for the MEPEX 2004.

Thank you,

J. D. Krupakar



Sir M. Visvesvaraya was born on the 15th September 1861, in a small village called Muddenahalli in Karnataka State. He obtained a B.A. degree from Madras University in 1880 and later went to do L. C. E. at Bombay University. He joined the Public Works Department at Bombay, as Assistant Engineer and this led to his appointment as Chief Engineer of Mysore State. He was always consulted in many ongoing projects of the nation.

The invention of block system of irrigation and devising of automatic sluice gates were the two important achievements that were always attributed to him. Krishnaraja Sagar dam, Bhadravathi Iron and Steel works, Mysore University, The Bank of Mysore etc., to mention a few, were his own creations.

He was a personification of discipline, hardwork, modesty, honesty, courtesy and punctuality.

It would be surprising to know that he was very particular about his clothes. He was a firm believer of science and technology. He held the culture of our country at high esteem, and he advocated against blind beliefs.

He was made honorary life member of the Institution of Engineers (India) in 1934. He received a Doctorate from Mysore University in 1948 and our nation bestowed upon him the highest civilian award, 'Bharat Ratna' in the year 1955.

"A man should do any work he undertakes methodically" - that was his firm faith.

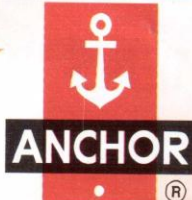
"Every man should understand his responsibility and do his best" - that was the essence of his teaching.

He participated in the 100th birthday celebrations held in his honour in 1960 and after leading a life dedicated to the nation and humanity, he passed away on 14th April 1962.

Sir MV has been made immortal by naming institutions, universities, industrial & technological museums etc. after him.

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Mr. C. Satish

B.E. (Elec.), M.Tech (Ind. Engg.),
SMIEEE.

- An Achiever -

Mr. Chaparala Satish, 59, holds a B. E. degree in Electrical Engineering from Osmania University (1965) and a M. Tech degree in Industrial Engineering from Jawaharlal Nehru Technological University (1977), both in Hyderabad, India.

He has been a members of IEEE and its Industry Applications Society (IAS) for the last 30 years. Mr. Satish was founder Secretary of the IEEE Hyderabad subsection (1981), Chair of the Hyderabad section (1989-90), and Area Chair of IAS for Region 10 west (1995-2002). A significant role played by Mr. Satish was responsible for increasing the membership of IEEE in Hyderabad subsection from mere 21 to over 2000.

Mr. Satish was awarded the IEEE Educational Activities Board (EAB) 2002 Meritorious Achievement Award in Continuing Education, "for dedicated

service and sustained leadership for over 20 years in the planning and delivery of a large number and variety of industrially oriented continuing education programmes in an IEEE section".

Mr. Satish was also recognised with the prestigious 2002 Petroleum and Chemical Industry Committee (PCIC) Electrical Safety Excellence Award. He received this award in person, at the 2002 PCIC conference held in New Orleans, Louisiana, USA, in September 2002.

Mr. Satish retired in February of 2002 after 30 years of experience as Manager (Electrical) of Indian Drugs & Pharmaceuticals Limited, Hyderabad. His specialisations are system earthing and earth fault protection, harmonics control, power quality, electrical safety, energy conservation and maintenance.

About electrical consultancy Mr. Satish says...

"... There is a great need to have competent, qualified and ethical electrical consulting engineers. The government and private industries must be forced to use their knowledge and experience. Safe, economical and reliable electrical systems demand that. Safety standards are not appreciated and implemented. This needs to be changed. I request ELCA to force all concerned to learn from practices abroad and use the services of competent and qualified consulting electrical engineers".

(We at ELCA congratulate Mr. Satish on his achievements and appreciate his concern for electrical safety and electrical engineering consultancy profession. We wish him well in all walks of life).

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AGM

In the Annual General Meeting held on Friday, 22nd August 2003, at The Atria Hotel, Bangalore, it was unanimously decided to extend the tenure of the office bearers and the executive committee members by one more year, i.e. till 31st August 2004. Mr. Madan Srinivas of M/s. Madan & Co., our Auditors, was also present during the AGM.

The office bearers & executive committee members are:

| | |
|------------------|-------------------|
| B. K. Charan Dev | - President |
| G. P. Bhat | - Vice President |
| Jayashree Umesh | - Secretary |
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TRENDS IN TRANSFORMER TECHNOLOGY

Dr. G. V. RAO, Ph.D.
Senior Member IEEE - PES
Chairman & Managing Director
Rowsons Marketing Pvt. Ltd.,
Chennai.

An universal link in the power system of any new or existing construction is the transformer. Whether a factory, office building, subway or shopping centre, electricity will need to be stepped down from transmission voltages to

usable voltage and transformers are employed to do this job. Because this function is so vital, transformers are often viewed strictly in terms of technical performance and overlooked as an energy saving opportunity. As a result, industrial transformer specifications often delineate any number of considerations except one: Operation costs are given by energy consumption.

The fact that transformers are energized 24 hrs. a day, every day, means that substantial energy is consumed in the core of the transformer, a term referred to as core loss. Since core loss is such a

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|---|---|--|
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predictable quantity over the potential life of a transformer, typically 20-30 years, it is of special interest to energy managers who continually seek such predictable and substantial sources of energy savings.

There are many ways to save electrical energy in an industrial and commercial facility, including the usage of adjustable speed drives, automation, more efficient motors and efficient lighting. But there is one way in saving electrical energy that results in both the utility and the industrial and commercial customers saving money i.e. by way of using energy efficient transformers.

Transformers have a significant impact on the losses of a utility's transmission and distribution system. The major source of losses is from distribution transformers. In the case of non generating public utilities, distribution transformers contributed to over 30.0% of losses, while substation transformers contributed only 2.0%. In case of investor owned utilities, distribution transformers contributed to over 16.0% of losses and substation transformers contributed less than 1.0%.

Manufacturers improve the efficiency of the transformers by reducing load and no load losses. No load losses include hysteresis and eddy current losses which are constant and occur 24 hours a day.

Load losses occur primarily in the copper conductors, and are temperature dependent and vary as the current squared. The transformer design engineer reduces no load losses by reducing the size of the core and using steel that is energy efficient, like Amorphous metal or laser etched silicon steel (Laser scribed). The transformer designer also reduces load losses by increasing the size of the conductor, reducing the length of the conductor and by reducing the transformer temperature like in super conducting transformers.

SUPER CONDUCTING TRANSFORMERS

The technological progress of power frequency ac super conductor is remarkable and application studies are being carried out. The merits of this will be

efficiency improvement and also power system performance and operation. A future possible power system employing coreless super conductor transformers is not far away. Researches are being carried out for coreless Solid State Distribution Transformers and it will not be too long to introduce the same to the end users.

In a high temperature superconductor (HTS) transformer, conventional windings are replaced by superconductor wire and liquid nitrogen is employed instead of oil for cooling and dielectric. The barrier of high refrigeration costs associated with very low temperature (less than 30 degrees K) operation using helium is to a large extent, removed with the availability of these superconductors, which may be cooled by the more economical liquid nitrogen, LN₂.

The major advantages and benefits from HTS applications in transformers are threefold. HTS transformers offer improved energy efficiencies, reduced environmental concerns, and significant electrical power system benefits.

a. Increased Energy Efficiencies :

In a HTS transformer, the HTS conductor has no resistive losses due to the absence of dc resistance. However, under ac excitation condition, as in a transformer, losses are associated with the time varying flux penetrating the superconductor, and with eddy currents in the matrix. These are called ac losses.

b. Reduced Environmental Risks :

The environmental impact of transformers is due to their mineral oil content, their power losses, and the noise they generate. The immediate favourable environmental impact gained by HTS transformers is the elimination of transformer oil.

Preliminary analysis indicates that a single 500 MVA generator HTS GSU combination can provide as much as 25 MW of additional power, not now delivered, if the transformer impedance can be reduced by 50 percent. HTS transformer technology can potentially facilitate reduction of emissions by 6,000 tons of NO_x gases annually, thus creating a cleaner environment.

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c. Electrical Power System Advantages :

The greatest value of a HTS transformer is through its benefits to the power system. Transformers impact the power system as they offer protection to the power system by limiting large currents resulting from system faults, and by being able to handle system overloads. In order to limit fault currents to acceptable levels, transformers are designed with large impedance (typically 10-16 percent), which can affect the voltage regulation and reactive power demand in the system.

The dynamic current limiting of the HTS transformer also can reduce the short circuit rating of the circuit breakers. Transformers are designed to meet overloads stemming from factors such as large demands of emergency power during the hot summer months, contingencies posed by transformer failures etc. Conventional transformers can be overloaded for only short periods of time. HTS transformers, on the other hand can be economically designed to carry overloads without any reduction in life and manageable additional load losses.

AMORPHOUS CORE TRANSFORMERS

After meticulous evaluation and comparison, a growing number of industrial units are already choosing Amorphous Metal industrial transformers over the conventional Cold Rolled Grain Oriented Transformers. CRGO cores of transformers are replaced by Amorphous alloy where by 75.0% of the core loss is reduced resulting in the saving of enormous energy.

COMPARISON

| RATING (kVA) | ANNUAL POWER LOSS AMIT (kWH) | ANNUAL POWER LOSS SIFE - IT (kWH) | ANNUAL SAVING Rs. |
|--------------|------------------------------|-----------------------------------|-------------------|
| 250 kVA | 15140 | 22100 | 6960 |
| 500 kVA | 22800 | 36000 | 13200 |
| 630 kVA | 24600 | 43100 | 18500 |
| 750 kVA | 29200 | 49600 | 20400 |
| 1000 kVA | 36800 | 63800 | 27000 |

Assumption : Average Load of 70.0%, Tariff charge Rs. 3 = 00 per kWH and 24/365 work schedule

The ceaseless search for a technology that will reduce operating costs and increase energy savings ends here.

Amorphous Alloy Transformer Cores are manufactured from low loss METGLAS transformer core alloy. This low loss, high permeability alloy is ideal for single and three phase industrial and distribution transformer applications. METGLAS cores are installed using industry standard transformer assembly techniques.

FLUID FILLED TRANSFORMERS:-

Fluid Filled transformers have fire resistant dielectric coolant. Fluid is highly refined, paraffinic Hydro Carbon with molecules that range from 30 to 50 Carbon atoms. Fluid is similar to conventional transformer oil in most aspects, except fire point and viscosity. It is fully miscible and compatible with conventional transformer oil.

Fluid Filled transformers have a vastly superior ability to withstand the heat and stress from overloading compared to non-liquid units. The liquid cooling system protects fluid-filled transformers from even severe overloads that can lead to significant reduction of life, sometimes failure, in non-liquid transformers. Fluid filled transformers can tolerate greater overloads for longer periods of time without abnormal reduction of insulation life.

Liquid filled units run cooler than non-liquid transformers by design. They are also more energy efficient. Non-liquid transformers suffer energy losses that are two or three times greater than liquid-filled units.

The increasing use of electronic equipment causes added thermal demands on the transformers. As the usage of these equipment escalates, the incidence of non-linear loads will also increase. These non-linear loads result in harmonics in the system, causing overheating of cores and conductors. Liquid-filled transformers are much better able to withstand the stress on non-linear loads.

(to be concluded in the next issue)

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Mr. L. V. Ranganath, B.Sc (Hons), AMIE, C.Eng., FIE, Member IEEE (USA), IEE (UK), - has worked overseas (Libya & Qatar) with British and German consultants and contractors. He has 23 years of experience in India, in various fields - 3 years in consulting engineering organisations (M/s. SEMAC & M/s. Space Tech) and 20 years in contracting, marketing & service departments of reputed companies, (M/s. Jyoti Ltd., M/s. Dodsai, M/s. Kirloskar Electric Co., MEI, Maharashtra and Mysore State EBs). He has been practising as an electrical consultant in Bangalore since 7 years. He has a daughter working as a senior Architect at Edmonton, Canada, and a son working as a software engineer in Bangalore.

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e-mail : hariniranganath@vsnl.net



Mr. B. V. Ram Mohan, B.Sc., B.E. (Elect.) - graduated from Mysore University in Electrical Engineering in the year 1970. He has worked for M/s. Mahindra Electrochemical Products, Pune, manufacturers of HT & LT cable jointing kits, at their distributors office at Rourkela, for 3 years. He took up electrical contracting work in Karnataka from 1976 to 1995. Since 1995 he has been practising as an independent electrical consultant specialising in lighting and power designs.

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Miss. A. L. Nirmala, B.E. (Elec.) - She graduated from Dayananda Sagar College of Engineering, Bangalore in 1995 and worked with M/s. Poorna Engineering Consultants, Bangalore, for five years as project-in-charge. She is an independent electrical consultant in Bangalore since 2002.

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Veena Nilaya, 17th Main, 9th Cross, Giri Road, Muneshwara Block, Bangalore - 560 026.
Tel : 080 - 674 3636,
e-mail : nirmala_al@yahoo.co.in



Mr. G. N. Mohankumar, 53, worked with M/s. VBJ Electricals & Engineering Corporation, Chennai, as electrical supervisor, in their contracts division for 10 years (1971 - 81) and later as electrical engineer in the projects division of M/s. Spencers & Co, Chennai for 17 years (1981 - 98). At present he is an independent electrical consultant working for various architects in Chennai. Apart from a Diploma in Electrical Engineering (1971), he holds a B. A. Degree in economics (1984) from Madurai University and a PGD in Business Administration (1989) from Annamalai University. He is a member of ISLE and a life member of ELCA.

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e-mail : mk_elecons@rediffmail.com



Mr. Sivaprasad Madhu, 57, holds a B. E. degree in Electrical Engineering (1969) and a M. E. degree in Power System (1973) from Regional Engineering College, Warangal, Osmania University. He was a lecturer in Engineering College, Trivandrum (1973 - 74), Assistant Engineer / Executive Engineer in I.A.A.I. (1974 - 79), and Project Manager (construction) in Kerala Kawmudi (1979 - 82). Since 1982 he has been practising as an Electrical Consultant under the name S. Madhu and Associates, in Cochin, Kerala. His specialisation is Power System. He is a Fellow of Institute of Engineers and Member of Power Engineers.

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Tel : 0484 - 236 8634, 235 1232, Fax : 0484 - 236 8634, cell : 98463 43250.
e-mail : smadhu@sancharnet.in



Mr. G. S. R. Gupta, is a graduate in Electrical Engineering. His experience covers power system design, earthing, lightning protection, smoke detection and automatic fire alarm systems, networking and captive power supply to various industrial buildings, commercial complexes, residential apartments and townships.

Address:

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ABB



Chief Guest, Mr. Basavaraj H. Patil, Hon'ble Minister for Energy, Government of Karnataka, delivering the inaugural speech at the one-day seminar on 'Electrical Energy Conservation', held on Friday, 9th August 2002, at The Atria Hotel, Bangalore.



Seminar on Electrical Energy Conservation



Guest of Honour, Mr. M. Satyanarayana Swamy, President, FKCCI, Bangalore, releasing the Souvenir during the inaugural function of 'Electrical Energy Conservation' Seminar.

Seminar on 'Art & Science of Illumination'

Inaugural function of the one-day seminar on 'Art and Science of Illumination', held on Saturday, 21st September 2002, at The Atria Hotel, Bangalore. Seated on the dais (L to R), Mrs. Jayashree Umesh, Secretary ELCA, Mr. K. Venugopal, Guest of Honour, Chairman, Indian Society of Lighting Engineers, Karnataka State Centre, Mr. K. P. Pandey, I.A.S., Chief Guest, Principal Secretary to Government, Energy Department, Government of Karnataka, Mr. Steven Mesh, guest speaker, from the USA, and Mr. Mani Samuel, immediate past president, ELCA.



Mr. Mustafa Wajid, B.E. (Electrical), Executive Director, Meher Capacitors Private Limited, Bangalore, delivering a technical speech, during the EEC Seminar.



Mr. Steven Mesh, IES, IALD, from the USA, delivering a speech on 'Art and Science of Illumination' during the seminar.

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THE HINDU, Sunday, November 16, 2003



ANDHRA PRADESH

Five labourers electrocuted

VANNEL K (NIZAMABAD DT), NOV. 15. Five farm labourers engaged in removing submersible pumps were killed this morning when the metal pipe they were holding came into contact with an overhead 11 KV high tension electric wire in an agriculture field near this village in Nandipet mandal, about 40 km from the district headquarters.

A farm labourer survived the tragic incident and is undergoing treatment for severe burns in a private nursing home in Nandipet mandal headquarters. All the victims were poor labourers.

They were identified as Kummari Dattula Rajanna, Kurma Pothanna, Bontha Muthanna and Bontha Mallaiq, (both brothers) and Sunkari Bhomanna. The sarpanch, Abbi Gangaram, immediately called up the AFTRANSCO sub-station at Khudavanpur. The sub-station staff switched off power supply to the nearby villages. The Nandipet St. Nagabhushanam, rushed to the spot. The bodies were charred beyond recognition.



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7

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POTPOURRI PAGE

- ◆ For sale : Parachute. Used only once, never opened, small stain.
- ◆ To steal ideas from one person is plagiarism; to steal from many is research.
- ◆ If at first you don't succeed, skydiving is not for you.
- ◆ I used to be indecisive. Now I am not sure.
- ◆ A diplomat is one who can tell you to go to hell in such a way that you will be looking forward to the trip.
- ◆ Women who seek to be equal to men lack ambition.
- ◆ For every action there is equal and opposite criticism.

Every morning in Africa a gazelle wakes up.
If knows it must run faster than the fastest lion or it will be killed.
Every morning a lion also wakes up.
If knows it must outrun the slowest gazelle or it will starve to death.
If does not matter whether you are a gazelle or a lion.
When the sun comes up you would better be running.

A letter to the income tax officer :
"Sir. I have not been able to sleep because I cheated on 13st year's income tax. Here is a cheque for five hundred rupees. If I find that I still can't sleep. I will send you the balance".

The fact that George Washington never told a lie does not set an example because there were no income tax returns those days.

A doctor and a young man met at a cocktail party.
"I want to thank you, doctor" said the young man, "for the benefit I have gained from your treatment".
The doctor looked at him blankly and said, "But I don't think you are a patient of mine".
"No I'm not," came the cheerful reply. "But my uncle was, and I'm his heir".

The long suffering husband was protesting his wife's demands for a new fox fur.
"What is the matter with the one you have ? It is only two years old."
"I know that," She wailed, "but look how long the fox had it before I got it."

A man by the name Dunlop once challenged a famous punster to perform a pun on his name.
"Easy enough," cried the punster. "Just lop off the last syllable and it's Dun."

cut and paste from
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Bulletin
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Founder President & Editor
Bangalore

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