ELECTRICAL INSTALLATION ENGINEER

NEWS LETTER

TAMILNADU ELECTRICAL INSTALLATION ENGINEERS' ASSOCIATION 'A' GRADE (Regn. No. 211/1992)
Old No.82 / New No. 123, Lloyds Enclave, Avvai Shanmugam Road, Royapettah, Chennai - 600 014.
Phone : 2811 1300 Fax : 2811 1908 Email : tneleengrassn@vsnl.net Website : www.teiea.in

ISSUE NO. 85	VOL : No. 8/2013	MONTHLY ISSUE NO. 3	PRIVATE CIRCULATION ONLY	MARCH 2013

EVENTS

1. INTERNATIONAL GREEN ENERGY EXPO KOREA 2013

IGEEC International Green Energy Expo Korea 2013

Date : 3rd – 5th April 2013

Venue : Every Exhibition Halls in EXCO, Daegu, Korea

Website : http://www.energyexpo.co.kr/eng/

2. LED EXPO MUMBAI 2013

LED EXPO 2013 India's No.1 Exhibition on LED Lighting Products & Technology

Date
4th – 6th May 2013

Venue
Nehru Centre, Worli, Mumbai, India

Website
www.theledexpo.com

3. RENERGY 2013

International Renewable Energy Conference and Exhibition

RENERGY 2013 International Renewable Energy Conference and Expo, Tamil Nadu

Event Profile: Special emphasis on Solar – PV and Thermal – as the TN state has the most ambitious solar policy in India. 5 Workshops – 3 on solar, 1 on energy efficiency, 1 on biomass/biofuels. Each workshop will be for 3 hours. 1 Innovation Session – Will comprise companies, scientists and engineers at the forefront of renewable energy innovations.

Date : 9th – 11th May 2013

Venue : Chennai Trade Centre, CTC Complex, Nandambakkam, Chennai, Tamil Nadu, India.

Website : http://www.teda.in/site/index/id/8N8u2B6P1a

Organised by :

Tamil Nadu Energy Development Agency (Government of Tamil Nadu Enterprise)

4. SOLAR POWER BRIGHTENS THE FUTURE

SNEC 7th (2013) International Photovoltaic Power Generation Conference & Exhibition

Event Profile: It is an opportunity that industry people cannot miss to stay up to date on the technology and market, build contacts with Chinese and Asian PV business partners, access the fast-growing Asian markets, and present the technology accomplishments and services to the industry

Date : 14th – 16th May 2013

Venue : Shanghai New International Expo Centre, Shanghai, China

Website : http://www.snec.org.cn/Default.aspx?lang=en

5. LED EXPO THAILAND 2013

THAILAND LED EXPO 2013

Event Profile : LED EXPO THAILAND 2013 is dedicated to the science, technology and application of LEDs and solid-state lighting. LED Expo has evolved as a No.1 premier exhibition & the biggest & only show exclusively for this segment in India & now set to make a mark in Thailand.

Date : 23rd – 25th May 2013

Venue : IMPACT Exhibition and Convention Center, Hall 4, Bangkok, Thailand

Website : www.ledexpothailand.com

EDITORIAL

Dear Members and Friends,

SEASONS GREETINGS AND BEST WISHES!!

Power shortages continue to remain a threat and there are fears that it may worsen, though the Government is hopeful of a relief very soon.

Globally, there are initiatives of Renewable Energy mainly to reduce 'Carbon Foot Prints', and the crisis in Tamilnadu should help speed up use of all available 'Renewable Energy Resources' of our State. Efforts of Government as well as Private initiatives are seen in respect of "Solar Energy", but we are still not seeing installations coming up in a big way, though the prices of Solar Cells etc seem to reducing and becoming more and more attractive. The First and Fast actions can be with regard to 'Roof Top Solar' in Tamilnadu, both in residential buildings as well as Government Buildings and Factory Roof Tops. We carried in our last issue, some broad details in this area and members can probably initiate some work with their respective clients. There could be initiative by all to see that there are no 'Roof Tops' without Solar Panels.

Another area with substantial potential in Tamilnadu is Biomass Energy, with our sizable activities both in the areas of Plantations like Coconut, Palmyrah and Poultry activities, apart from Good population of cattle. Wastes from all these sources can help produce Biomass Energy without upsetting the Natural balance of 'Manure' etc , which will prove to be 'Firm Energy' contrary to Solar and Wind which are 'Infirm' due to seasonal and natural reasons. Government of India is expected to be announcing its "Bio Energy Mission" soon and the State Government can probably work in this area faster.

Another area of concern for our State is 'Water' and the troubles continue, with 'Confrontations' and all round displeasure. There is worldwide awareness of Importance of Water and the UN recognized "World Day of Water" falls on March 22nd. The only long lasting solution would probably be "Flood Water Harvesting" and creation of "Water Grid" to tap and use part of Rain Waters flowing back to the sea. As claimed by some of the experts in this field, this is not interlinking of Rivers, but a separate 'Water Grid' with inflow of only surplus flood waters, whenever and wherever it is available. Few Teams of Engineers from Tamilnadu have prepared and submitted Feasible Plans and Proposals for these to the Government of India long ago. It is unfortunate that the feasibility and enormous benefits arising out of the "Water Grid" etc are yet to considered and taken up.

We thank all those members who have helped us by participating in the advertisements appearing for the issue February 2013 – Intrans Electro Components Pvt. Ltd., Bracecorp Publications Pvt. Ltd., Prolite Autoglo Ltd., Wilson Power and Distribution Technologies Pvt. Ltd., Sun Sine Solution Pvt. Ltd., Power Links, Universal Earthing Systems Pvt. Ltd., Pentagon Switchgear Pvt. Ltd., Cape Electric Corporation, Easun Reyrolle Ltd., K-Lite Industries, Hensel Electric India Pvt Ltd., Elmeasure Measurements Pvt Ltd., Symtec Engineers Pvt. Ltd., Electrotherm (India) Ltd., OBO Bettermann India Pvt. Ltd., Galaxy Earthing Electrodes Pvt. Ltd., Ashlok Safe Earthing Electrode Ltd.

EDITOR

CONTRIBUTION TO NEWSLETTER (Rs.1,000/- per year)

196. Mr. M.K. Jayaraman (2012-2013), ***Non- Member***
197. Mr. James (2012-2013), ***Non- Member***
198. Rotmax Engineering Services Pvt. Ltd. (2011-2013)
199. PMK Engineering Services (2010-2013)
200. Power Engineering Company (2012-2013)
201. Mr. C. Namachivayam (2012-2013), ***Non-Member***
202. Essyen Electricals Pvt. Ltd. (2012-2013)
203. Emaar Electricals (2012-2013)

We request other members also to arrange to send their contribution for NEWSLETTER early.
(***Please help us to serve you better***).

ELECTRICAL INSTALLATION ENGINEER

President : U. BASKARAN

Secretary : K. KANNAN

Treasurer : P. SUYAMBU

Editor :
G. VENKATESH

Printer :
M. VENKATARAMAN

Advisor :
S. MAHADEVAN

CONTENTS

TECHNICAL SEMINAR

Dear Member,

I wish to inform you that a Technical Seminar on 30th March 2013, Saturday has been planned. I request you to keep yourself available to attend the seminar. The invitations are under preparation and the same will be sent to you shortly.

The details are as under:

Date : 30th March 2013

Venue : Hotel Residency Towers,
Sir Thyagaraya Road, T. Nagar, Chennai-600 017

Time : 9.00 am to 5.30 pm

Kind Regards,

K. KANNAN
SECRETARY

TAMILNADU ELECTRICAL INSTALLATION ENGINEERS' ASSOCIATION 'A' GRADE

KNOW THY POWER NETWORK – 66

Let us continue our journey through the power network further.

5.3.3.2 The existence of an aged or older component in a Power System, particularly in a substation, is always a threat to other equipment. *When it fails (a transformer) or fail to operate (circuit breaker) at the required time the other components are affected. These remaining components suffer unwanted additional stresses.* To cite an example, when one of the transformers fails in a substation, the remaining transformers in the substation required to carry additional load till the failed transformer is repaired or a replacement transformer is placed in its place. This kind of unexpected events lead to or contribute to the pre-mature failure of other transformers. This kind of problem holds good for all the equipment in the substation.

5.3.3 Among the other contributing factors that lead to various problems that are encountered in older substations are:

- **Spare Parts Availability and Cost:-** The spare parts for older and obsolete equipment always pose difficulties with the attendant higher costs. This makes them very expensive. Most of the time, these spares are not readily available and they have to be procured from OEM (Original Equipment Manufacturers) only.
- **Safety:-** Personnel safety is another important issue that needs attention when older equipment are in service. Then we have to take special precaution to obviate any untoward incidents brought by the equipment that fails or does not operate correctly.
- **Maintenance:-** Older equipment always demand a focused attention. They warrant additional maintenance so as to ward off any problem caused by deteriorated or failed components. This requirement is mirrored in the cost of maintenance by way of increase in the required spare parts and in the maintenance staff to perform the work.
- **Site Related Problems:-** There is always a possibility for the deterioration in the site grading, drainage and overall appearance and the structural strength of the buildings and other infrastructure.

5.4.1 Now Let us focus on the possible programs or methods to address the problems faced by many older substations so that their operating life can be enhanced.

- **Condition Assessment of older Substations:-** *Every one will agree that the first or initial step that is required before delving deep into the methods of improving the older substations is nothing but a systematic, across the board condition assessment of its substations i.e. the identification of the "problem- areas" or "the areas that need some level of rehabilitation".*

This kind of corrective step has yet to be taken in most of the older substations in India, especially in Tamilnadu. Then the substations under study may be ranked in the order of attention they require. The substations that require the most immediate action will top the ranking list. The high-priority substations, thus selected may be ranked further on a scale of "0" to "10" on the basis of the following categories: Maintenance; Equipment rating; Obsolence; Site clearances; Operations and type of loads; Infrastructure and other facilities.

5.4.2 After initiating the "ranking" of substations, we can proceed further as listed below:

- **Equipment Replacement:-** This step is adopted when problems are faced for the procurement of spares or an unusual increase in the failure of a particular type of equipment.

To illustrate, an increase in the failures experienced by a particular circuit-breaker mechanism or the unavailability of its spare parts can help to make a decision to replace a certain quantum of the said breakers and cannibalize them for the parts required by the breakers inservice. When these spares are used up, some more breakers may be removed from service to replenish the stock.

In this manner, the older breakers are gradually removed from service piece meal. When the number of these aged breakers in service falls below a certain point, the balance are then removed from service and scrapped.

This method is found useful in replacing the low rupturing capacity breakers, the breakers which faced with high maintenance and non-availability of spares and also for the breakers that demand higher maintenance cost and attention due to physical and electrical deterioration.

Kindly stay connected for the next article.

(To be continued…)

V. Sankaranarayanan B.E., FIE, Former Addl. Chief Engineer/TNEB
e-mail: vsn_4617@rediffmail.com; ***Mobile: 98402 07703***

FIRE SUPPRESSION SYSTEMS

To prevent buildings from fire hazards, new fire suppression systems have been evolved. These systems have been developed keeping in mind new requirements, environmental pressures and advances in Technology.

Water has been used to suppress fires since ancient times. In the late 19th century, Sprinkler systems have been developed to provide automatic water supply to control fire. Nowadays it has become the most common fixed fire suppression system.

Sprinkler system works by wetting and cooling the fuel surface thereby controlling the development of fire. Sprinklers are used to control fires caused by solid fuels but they are not effective to control fires caused by liquid fuels such as gasoline, diesel and jet fuels etc. To suppress fires caused by liquid fuels, foam or dry chemicals are used. This foam covers the fuel surface, thereby limiting thermal feedback to the liquid fuel surface and fuel vaporization.

The extinguishing agent can be applied in 2 methods viz. Total flooding method and Local Application. In total Flooding method, the extinguishing agent is applied to a three dimensional enclosed space. This method helps to achieve a concentration of the agent which is sufficient to suppress / Extinguish the fire.

In Local Application method, The extinguishing agent is applied directly onto a fire.(usually a two dimensional area), or into the three dimensional region immediately surrounding the substance or object on fire. The absence of physical barriers enclosing the fire space is the difference between Total flooding design and Local Application.

Suppression of fires on Electrical and Electronic facilities require special care.CO_2 helps to reduce the oxygen concentration and thereby helps to suppress fire.

In 1940, Halon chemicals were developed which was typically used for Total flooding Application. Halons were excellent fire suppressants but they also contributed significantly to stratospheric ozone depletion. As a result, Halons were phased out in developed countries in 1990.

This Halon phase out resulted in finding a new fire suppression systems for various Applications without harming Human health & environment. have been developed. This update reviews Four such Technologies:

1. Inert and Halocarbon gaseous agents.
2. Water mist systems.
3. Compresses Air Foam Systems.
4. Solid Gas Generators.

A subsequent update will focus solely on compressed Air – Foam Technology, drawing an extensive research carried out by the NRC Institute for Research in Construction. (NRC – IRC).

Gaseous Systems

There are 2 types of gaseous agents available for use in Total Flooding System.

Halocarbon Agents & Inert Gases

It is very important that in this system, the enclosure must be capable of holding the gas and withstanding high pressures produced during discharge.

Inert Gas Agents

These are applied as Total Flooding Agents. They extinguish fire by displacing oxygen in the enclosed space and thereby reducing it's concentration below the level required for Combustion. A large volume of this agent is required to extinguish fire.The rapid displacement of oxygen, rapid cooling and high noise levels are a matter of concern while using this agent.

Halocarbon Agents

These are chemicals used to extinguish fire by cooling.The test result proves that Halocarbon Agents produce 5-10 Times more toxic gases than Halon 1301 during fire suppression. Also because of it's Long Atmospheric Time (ALT), it could contribute to Global Warming.

*No one can make you feel inferior without your consent – **ELEANOR ROOSEVELT***

The ***National Fire Protection Association published NFPA 2001[1] "Standard on clean Agent Fire Extinguishing Systems"*** to ensure proper use of systems involving gaseous Agents. This also helps to ensure that such equipment will function as intended. The standard also contains information such as :

1. Use and limitations of clean Agent.
2. Physical properties of Halocarbon and Inert Agents.
3. Maximum concentrations allowed
4. Toxicity of the Agents.

It also provides information on System Components and Hardware, System Design, Inspection, Maintenance, Testing & Training.

Compressed Air Foam (CAF)

To provide Fire protection in Petroleum & Chemical Industries, Foam Systems have been used since Ancient times. The current Fixed Type Foam Systems has got it's own limitations. They are as follows:

1. The systems are unable to provide foams with high injection velocities.
2. Foam produced using traditional systems is not stable & consistent.
3. The expansion Ratio is not high as desired for some Applications, because the air used to generate foam, comes from the fire environment which may be contaminated.

CAF is generated by the process of Injecting Air under pressure into a Foam Solution Stream. Foam is obtained by properly moving the solution and air mixture through the Hose or Piping. This CAF is superior in quality and having increased injection velocities. Also it saves water & foam concentrates.

In CAF System, the momentum of the foam is very high so that it can penetrate flames and reach the fuel surface, thereby suppressing fire. The Foam possesses greater stability.

The NRC – IRC, by careful engineering design of the nozzle and piping system, developed a means of producing CAF using Class A and Class B Foam concentrates in a fixed piping system, using a new & Innovative Foam Distribution Nozzle.

The NRC – IRC conducted full scale fire tests to evaluate the performance of a Prototype CAF. This test proved that the CAF system is very efficient in suppressing fire than the traditional systems used to extinguish fire.

Recently a Prototype CAF system to provide fire protection to very large structures such as Aircraft Hangars & Power Transformers has been developed by NRC – IRC.

Foam Basics

A brief on Foam in the Fire Service.

Class A Foam is used on Class A fuels. Class B foam is used on Class B fuels. Making foam is a very simple task – water + soap + air. There are numerous variations in the makeup (consistency) of the foam. Knowing which variation to use when requires good equipment, training and practice. Using the wrong consistency at the wrong time makes for very unhappy firefighters and possibly a very unhappy situation.

There are 4 levels of effectiveness in firefighting.

The bottom level is water. High ***surface to mass ratio*** *(STMR) – inefficient heat absorption; high surface tension – no penetration; repels carbon – won't stick.*

Next up is Foam solution – water + concentrate.

Reduced surface tension – improves penetration. Carbon loving – it sticks horizontal, but not vertical. Still has high SMTR. Only slight improvement in heat absorption.

Next level up is Aspirated Foam – better than solution since it is in a bubble format – the bubbles result in an increased STMR for better heat absorption. These bubbles are fragile and cannot be applied at long distance – low energy.

Top level is CAF – penetrates, sticks, ultimate heat absorption (this is what firefighting is all about), high energy, small, strong bubbles – long reach.

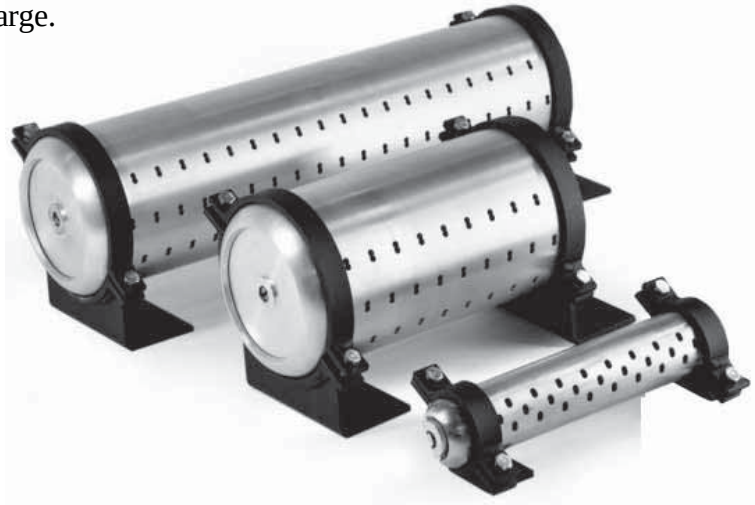
Courtesy: http://compressedairfoam.com

Gas Generators have been developed for Fire Suppression Applications. This is based on automotive Air Bag Technology. There are 2 types of Gas Generators Available. They are: 1. Conventional & 2. Hybrid.

The Conventional Gas Generators contain an Electrical Initiator and a Propellant. The Electrical Initiator ignites a charge to start a Combustion process in the Propellant after it receives a signal from the Detector/ Controller. This combustion of the solid Propellant generates Large amounts of N_2, CO_2 and Water Vapour.As a result the internal pressure is increased which results in rupture of a Hermetic Seal and the Gas products are discharged into the protected space. Suppression is by oxygen displacement and gas discharge. (Blowing Effect)

In a Hybrid Gas Generator, there is an Electrical Initiator, a Solid Propellant Chamber and a Suppression Agent Chamber.

The heat and pressure generated by the combustion of the Propellant are used to heat & expel the liquefied suppressant. It is advisable to use these Hybrid Generators in unoccupied spaces because of their high temperature and high momentum discharge.



ADVANTAGES OF GAS GENERATOR FIRE SUPPRESSANT

Effective Total Flood Protection

- Extinguishes explosive fires in less than 150 milliseconds
- Extinguishes fires in less than a minute
- Fills entire room with no stratification
- Works around corners and behind obstructions
- Ultrahigh heat capacity allows it to retain its gas-like flow and filling behavior
- Discharge temperature is automatically elevated, preventing the extinguishant from immediately freezing after discharge under extremely cold conditions

Maintenance Free

- 25 year service-free shelf life
- Rechargeable on site
- Its solid propellant makes it 100% leak-proof

Pre-Engineered for Easy Installation

- Compact and space efficient
- No need for pressurized gas or the associated "bottle farms"
- No piping or nozzles
- Easy for retrofitting
- High design margin for flexibility with changes in the room's free volume

Environmentally Friendly

- Zero effect on ozone depletion and global warming
- Complies with all existing or future national or international environmental legislation

People Safe

- Releases harmless, inert, N2 gas
- Maintains oxygen levels that are safe for occupied spaces
- No cardiotoxicity
- Creates no HF decomposition gases

Reliable

- Simple, fool-proof design
- Benefits from the extreme levels of reliability that are standard for the gas generator devices due to their propensity for use in critical life-safety applications such as automotive airbags
- Reduced risk of piping damage due to manmade or natural disasters or mishaps, with each compartment being independently protected

Protects Room Contents

- No residue or cleanup
- No water damage
- No caustic acid by-product
- One of the quietest clean agent systems in the world

Cost-Effective

- Low up-front unit cost
- Negligible design and installation costs
- Long life-cycle
- Minimal maintenance and support requirements

Courtesy: http://www.n2towers.com

GUIDANCE FOR USERS

All Fire Suppression systems have their own advantages & Disadvantages.

In Gaseous systems, the fire hazard must be in an enclosed space. Otherwise the system may fail to suppress the fire. Also steps must be taken to minimize gas production & exposure to Halocarbon gaseous agents because they produce toxic gases.

Water Mist systems are suitable for a large fire in a reasonably enclosed space. Water Mist System is a better option than the Water Sprinkler System in specific areas such as Banks, Document Storage areas etc., as it shall minimize the damage caused by Water.

For extinguishing Liquid Fuel Fires, The CAF System is the best.

For extinguishing fire in small & airtight compartments, such as storage space or Engine compartment, the Gas Generators work well.

All the above systems extinguish fire at their design conditions. So utmost care should be taken in choosing the right Fire Suppression System in relation to specific requirements.

Courtesy: Electric Guru

LIGHTING AND ENERGY CONSERVATION - 2

Blended lamps:

A special type of mercury vapour lamp incorporates a tungsten filament in its construction, as shown in figure 9. The lamp is often referred to as the mercury blended lamp. The filament acts as a current limiting device, and in addition , adds some of the 'warm' colours of the spectrum to the output from the mercury discharge. This lamp does not require external control gear for its operation. This lamp takes time to attain its steady-state luminous output, although the inclusion of the tungsten filament means that some useful light output is available immediately following switch on of the electrical supply.

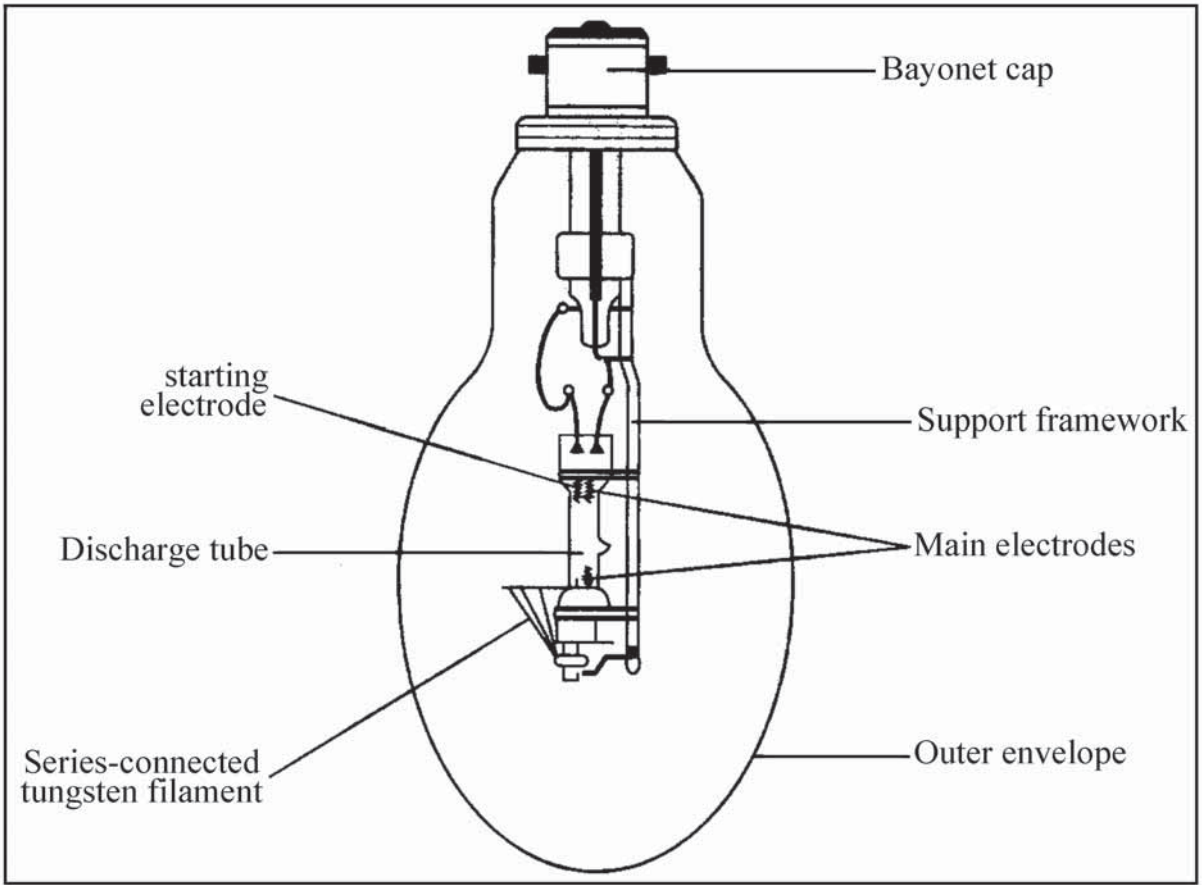


Figure 9 - Mercury blended lamp

Both the high pressure mercury vapour lamp and the mercury blended lamp are not dimmable and their re-strike capabilities will of necessity involve a time delay. There are few restrictions on the operating positions of such lamps.

Metal halide lamps:

When selected materials are added into the discharge tube of a high pressure mercury vapour lamp the colour output gets improved. The dosage of the additives is relatively small and, in order to produce a more accurately-controlled output, it is more appropriate to use the metal in powder form as halides. Some of the halides used include dysprosium, indium, lithium, scandium, sodium, thallium and tin. Figure. 10 shows the constructional features of the metal halide lamp.

Metal halide lamps, like high pressure mercury vapour lamps, are not dimmable. Their re-strike capabilities are poor and involve a time delay and in addition the lamps can only be operated in limited positions.

Love one another and help others to rise to the higher levels, simply by pouring out love.
Love is infectious and the greatest healing energy. - SAI BABA

Low pressure sodium lamps:

Figure 11 shows the typical constructional features of a low pressure sodium lamp. With low pressure sodium lamps the arc tube, which is made of special ply glass, has an internal coating which is resistant to sodium. Figure 11 shows that the arc tube is shaped like the letter 'U' and it is located within an outer vacuum jacket, thereby assisting in the control of thermal stability.

Because of the neon/argon gas filling within the discharge tube, the lamp output is initially a red glow, immediately following switch on. As the lamp approaches a steady-state luminous output, the observed radiation becomes monochromatic. Strictly this is a slight misrepresentation since the output consists of two spectral lines at 589 nm and 589.6 nm. It is however usual to consider the output as monochromatic, as shown in Figure 12.

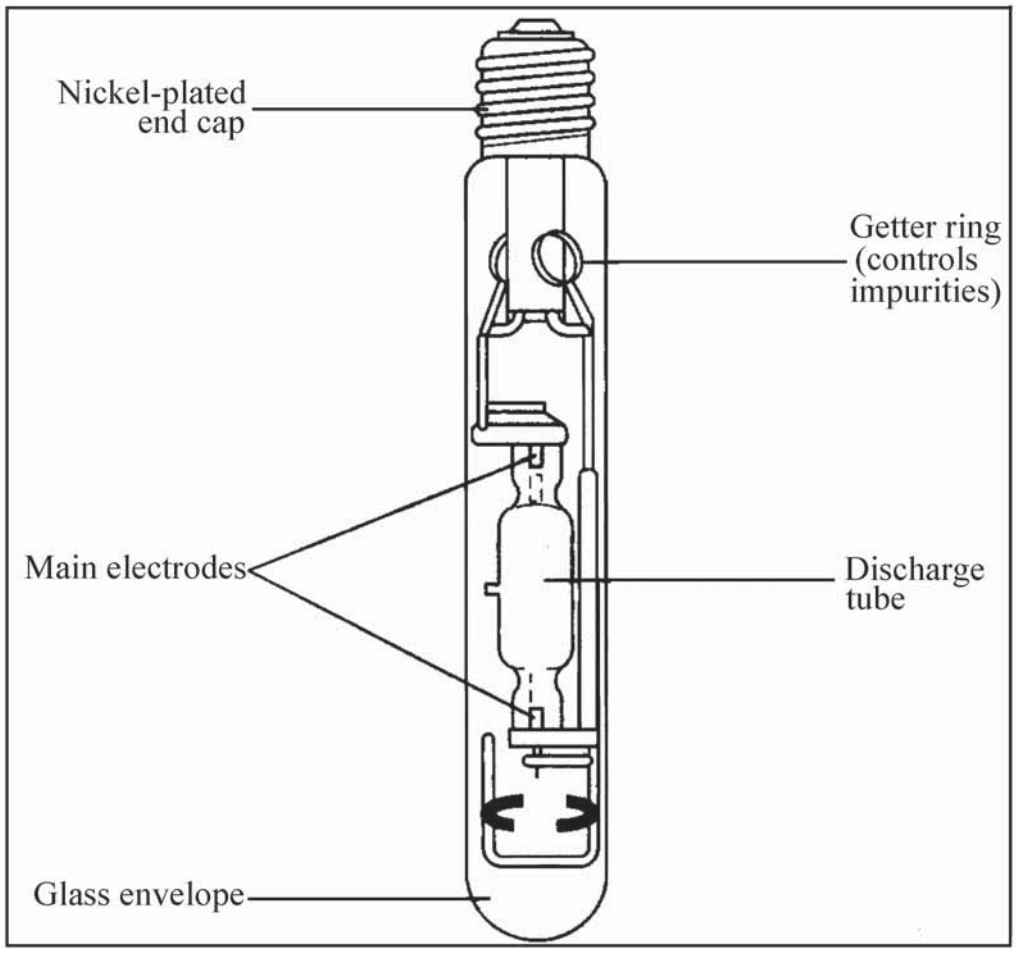


Figure 10 - Metal halide lamp (tubular)

The low pressure sodium lamp has a major advantage over other artificial light; it is very useful in foggy or steamy environments where droplets of water in suspended in the atmosphere, act as prisms. Since the incident light is monochromatic, it will not be dispersed after striking the droplets.

The major disadvantage of the low pressure sodium lamp, and one which renders it unsuitable in many applications, is its colour rendering properties. Surface colours of objects seen in the light output from such lamps are badly distorted; hence, use of these lamp are restricted to areas where colour discrimination is not a prime consideration.

The light output from low power ratings of the lamp will not be adversely affected when there is a momentary loss in electrical supply and when the electrical supply is restored the lamp should re-strike almost immediately. For higher power ratings of the low pressure sodium lamp there will be a time delay before the arc will re-strike. Low pressure sodium lamps are not dimmable.

The efficiency of a low pressure sodium lamp diminishes rapidly as the current density is raised above an optimum value. Hence are to be operated at a relatively low current value; the surface area of the discharge tube must be

large for the power dissipated. Hence are made with relatively long discharge tubes which are bent into the shape of a letter 'U'. One strange phenomenon with this type of lamp is, excited sodium vapour is opaque to its own radiation; the light emitted from one limb of the 'U'-shaped discharge tube will not transmit through the other limb. When the lamp is installed horizontally in a luminaire (which is the usual burning position), the lamp should ideally be orientated so that the limbs of the 'U' tube are arranged one above the other, in order to produce the greatest light output from the lamp.

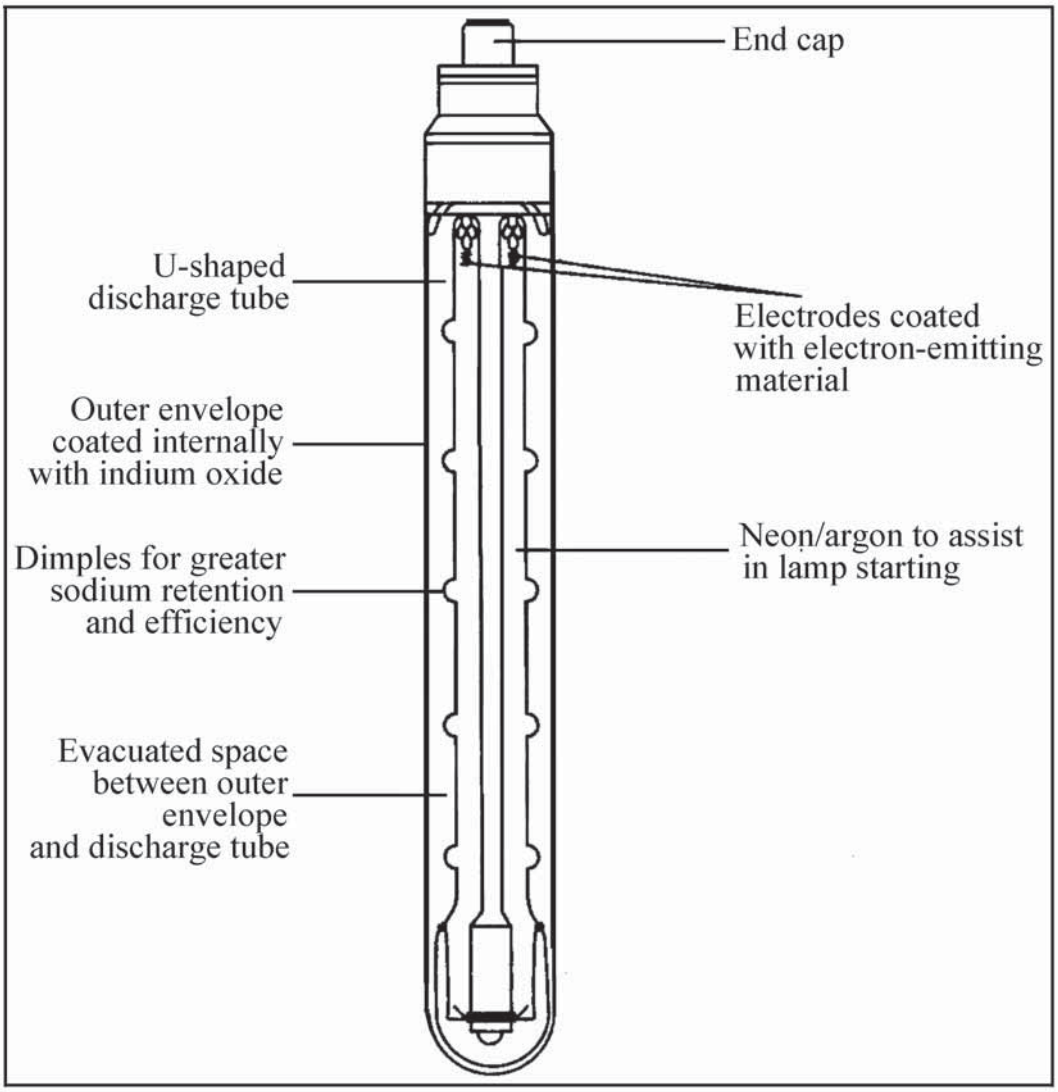


Figure 11 - Low pressure sodium lamp

High pressure sodium lamps:

When the pressure of the sodium within the discharge tube is raised, the luminous output tends more towards the yellow region of the spectrum. The net effect is that the colour appearance of the lamp shifts towards a golden white. This has the advantage of improving the colour rendering of the lamp, but the increase in colour rendering results in a reduction in lamp efficacy when compared with the low pressure sodium lamp.

Due to the reactive nature of sodium, the conventional arc tube cannot be used for high pressure sodium lamps. The discharge tube for a high pressure lamp is constructed from translucent polycrystalline alumina. The outer glass envelope of the lamp is evacuated to assist in the prevention of arcing and oxidation. These lamps can be operated in any position.

When the power supply to the lamps is momentarily interrupted, restriking takes time. Further, the pressure in the discharge tube will have to fall before the lamp arc can be re-established and there will be a further time delay for the lamp to attain full luminous output. In some lamps a second discharge tube, identical to the main discharge tube,

is incorporated which becomes energized following extinction of the first discharge tube, thereby reducing any time delay, before full luminous output is restored.

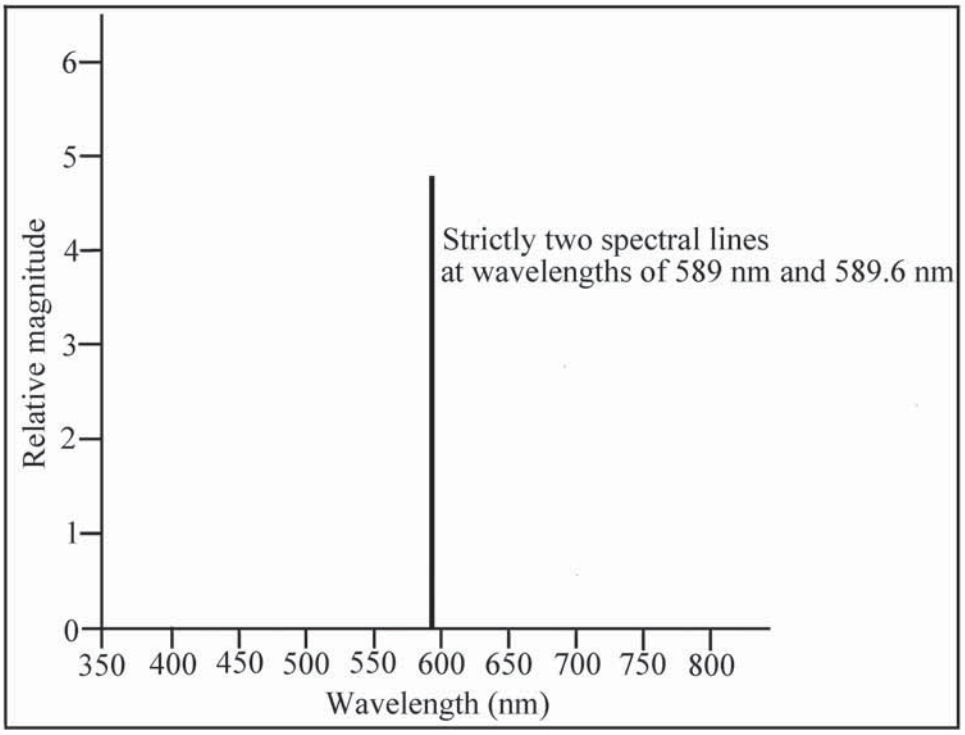


Figure 12 - Spectral output of low pressure sodium lamp

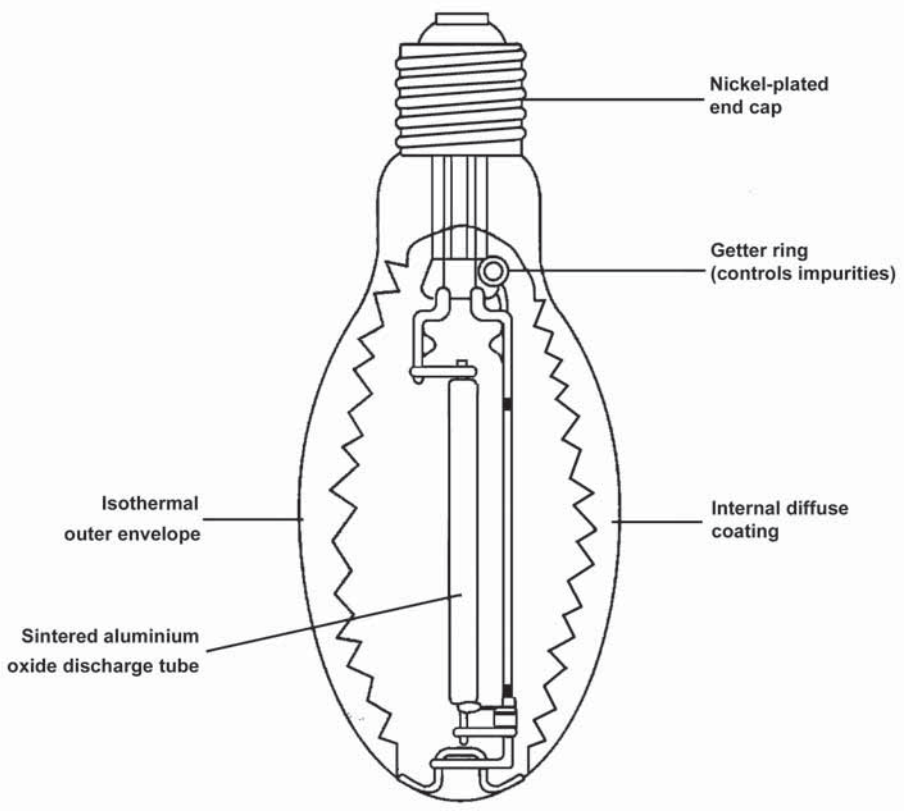


Figure 13 - High pressure sodium lamp- the constructional features

Induction lamps:

The induction lamp, sometimes referred to as the 'electrodeless lamp', relies upon both magnetic and fluorescent principles for its operation. The constructional features of the induction lamps are shown in Figure 14.

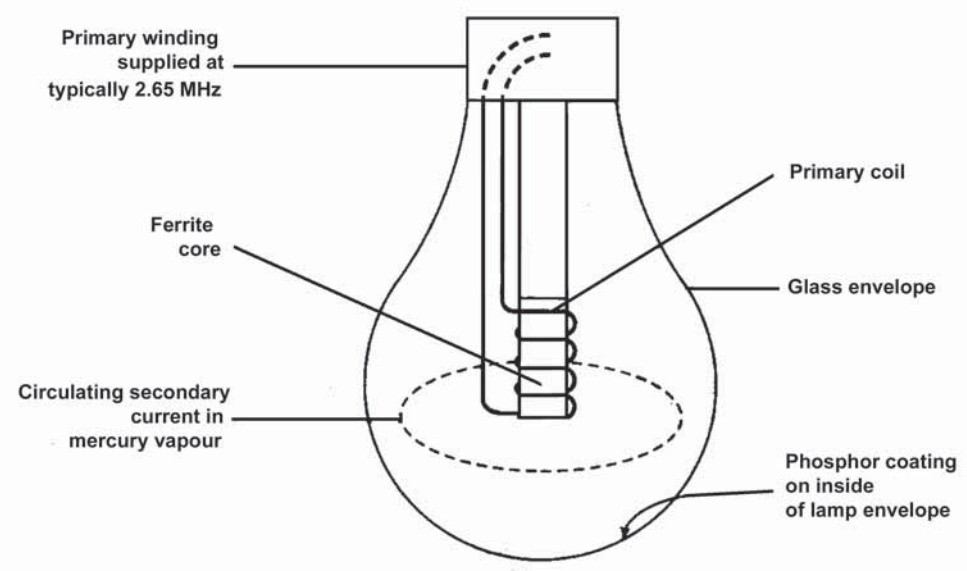


Figure 14 - Induction lamp

Initially, energy transfer using magnetism (in a similar manner to that of the electrical transformer) is employed, the low pressure mercury filling in the lamp acting as a secondary coil of the transformer. The primary coil and a ferrite core are together referred to as the antenna. An alternating electrical current in the primary winding, typically at a frequency of 2.65 MHz., is supplied from an external source. The induced current in the mercury vapour due to the magnetic field set up by the primary winding, produces emission of the ultraviolet photons which subsequently activate the phosphor coating of the outer glass envelope and produce radiation within the visible spectrum, identical manner to the production of light from a conventional fluorescent lamp.

The major benefit of the induction lamp is extended lamp life, usually quoted as 60 000 hours. In the conventional lamp some of the electron-emitting oxides become detached from the electrodes upon starting and over a period of time these oxides become totally spent. With the induction lamp, however, there are no electrodes and so lamp life is greatly increased. Additional benefits of the induction lamp include,

- increased luminous efficacy when compared to the conventional fluorescent lamp; and
- the light output is completely free of mains flicker and stroboscopic effects.

This has the effect of correcting the colour of the lamp and earlier forms of this lamp were often known as 'colour corrected mercury vapour lamps'.

Lamp designations:

Electric lamps are assigned designations. Table below shows the designations previously used together with the ILCOS (International Lamp Coding System) designation which was introduced in 1993 by the International Electrotechnical Commission (IEC).

Lamp efficacy:

Lamp efficacy is the luminous output from a lamp against electrical power required to provide the output.

By definition:

$$\text{Luminous efficacy} = \frac{\text{Luminous flux output in lumens}}{\text{Electrical power input in watts}}$$

We can be tired, weary and emotionally distraught, but after spending time alone with GOD, we find that HE injects into our bodies energy, power and strength. - CHARLES STANLEY

Lamp life:

It is impossible to specify precisely the life of a lamp; from laboratory and field testing it is possible to predict the light output from a lamp in terms of the hours glowed.

Two terms are used in connection with the output from lamps, i.e. lamp survival and lumen maintenance. Tungsten filament lamps will fail completely before the deterioration in lumen output become significant. Hence, the term average life is used.

The lumen output from the discharge lamp will deteriorate throughout the life of the lamp before the lamp fails completely. Figure 15 shows lamp survival and lumen maintenance curves of low pressure sodium lamp.

Lamp life can be affected by several factors including number of switching, operating voltage, operating temperature and the presence of vibrations. Lamp manufacturers usually base the lamp life figures for hot cathode fluorescent lamps on eight switching per day. For cold cathode fluorescent lamps the life is relatively unaffected by the rate of switching.

Lamp Characteristics: efficacy, life and colour rendering index.

Lamp type	Previous coding	ILCOS coding	Lamp efficacy (lumens / watt)	Quoted lamp life (hours)	Colour rendering Index compared to Inc lamps
Tungsten filament	GLS	I	10 to 18	1 000 to 2 000	100
Tungsten halogen	TH	HS	15 to 25	2 000 to 4 000	100
High pressure mercury	MBF	QE	30 to 60	14 000 to 25 000	47
Low pressure mercury (fluorescent)	MCF	FD (tubular) FS (compact)	65 to 95 65 to 95	6 000 to 15 000 8 000 to 10 000	11
Metal halide	MBI	M	65 to 85	6 000 to 13 000	
Low pressure sodium	SOX	LS	70 to 150	11 000 to 22 000	
High pressure sodium	SON	S	55 to 120	12 000 to 26 000	23
Induction		XF	70 to 80	60 000	

Blue light hazard:

Blue-light photochemical hazard (blue light) of a light source injures the retina of the eye when viewed directly. It is referred to as a blue light hazard as it is is mainly associated with wavelengths between 400 nm and 550nm, i.e. in the blue region of the visible spectrum. In practice, the luminance of electric lamps is usually so high that an individual is unlikely to attempt to view them directly. Blue light hazard is also important in the case of aphake individuals (those who have had a natural lens removed) and who have not been fitted with an ultraviolet (and blue light) absorbing intraocular lens.

Feelings of worth can flourish only in an atmosphere where individual differences are appreciated, mistakes are tolerated, communication is open, and rules are flexible – the kind of atmosphere that is found in a nurturing family. - VIRGINIA SATIR

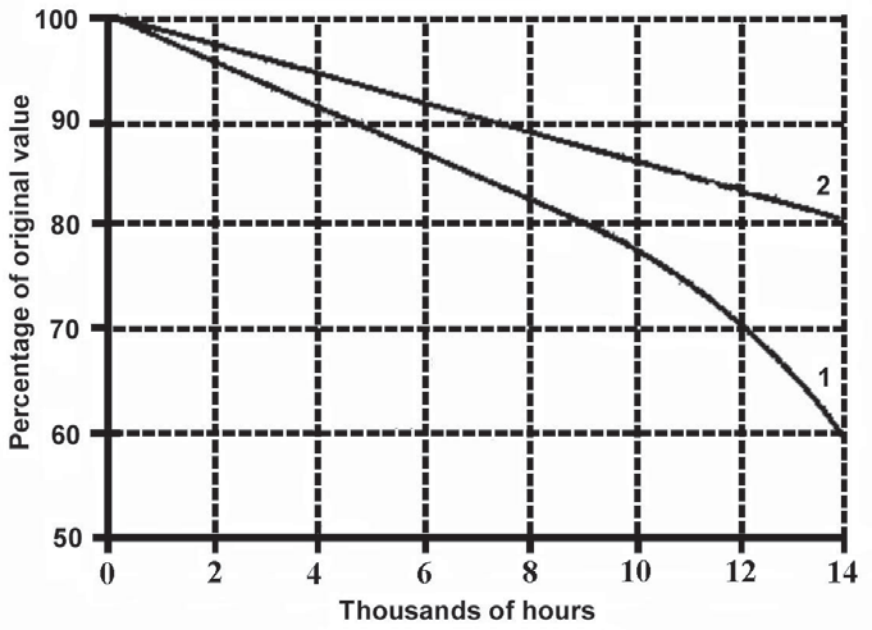


Figure 15 - Typical lamp survival (1) and lumen maintenance (2) curves.
Characteristics shown are typically those representing a low pressure sodium lamp.

Conclusion:

Since energy utilized on lighting in industries especially textile, paper, fibre, and large commercial establishments and corporate offices is quiet considerable, energy conservation activities taken in the lighting power consumption will go a long way in conserving the fast depleting source of energy, the cost of which is spiralling day by day.

Not only in planning new lighting installations, it is worth the while to revamp the existing lighting installations keeping in mind the following important aspects of energy conservation in lighting.

(i) Avoid wherever possible using incandescent lamps which are the most inefficient lighting source. It is all the more important when providing lighting in air conditioned areas as not only the energy conserved in lighting is very high but also constitutes a heavy heating load on the air conditioning.

(ii) Ambient temperature adversely affects the efficiency of discharge lamps especially the tubular fluorescent lamps. The lighting conversion efficiency of these luminars are maximum between 15 to 30 °C ambient temperature; so these lamps should be employed in such ambient conditions.

(iii) Use as much as possible monochromatic lighting source like sodium vapour lamps which have the highest efficiency of converting electrical power to lighting, provided the lighting does not warrant a good colour rendering property. Further, the human eye has got maximum response to the wave length of this light.

(iv) Discharge lamps and the applied voltage: It is a myth that higher voltages applied to the discharge lamps give better lighting. In lamps, though the light output is roughly proportional to the input voltage, it is not in linear relation. At the rated voltage area, a reduction in voltage of about 5% does not cause a proportional reduction in light output. The light output is reduced marginally only by 2%, but there is substantial reduction in the power consumption by about 10%. Similarly, a higher voltage does not give proportionally higher light output, but the power consumed is substantially high.

Hence if the prevailing voltage level is good, provide by energy savers or other means in lighting circuits to maintain a voltage level of about 200 volts.

Use high frequency sources like electronic ballasts which provide about 25 kZ AC to discharge lamps which will increase the efficiency of the light source and also avoids the huge waste of energy in electro magnetic ballasts.

Charity starts at home; let us start the conservation of energy in lighting applying the various method discussed and reduce our lighting energy consumption.

Let us right now start implementing energy conservation methods in our home.

by Sri K.R. Govindan, Kavoori Consultants

(Paper presented at the National Seminar on Building Code organised by ENFUSE and BEE July 2012)

ELECTRICAL INSPECTORS LIST

Er. S. APPAVOO, B.E.,
Chief Electrical Inspector to Government
Thiru.vi.ka. Industrial Estate, Guindy, Chennai – 600032
Ph: 044 - 2250 0184 / 0227 / 0430 / 0796 / 0915 Fax: 044 - 2250 0036
Email: ceig@tn.gov.in, ceig@tn.nic.in
Web site: http://www.tnei.tn.gov.in

Name & Address	Area of Jurisdiction
Er. V. JAYAVEL **Senior Electrical Inspector (Head Quarters)** Thiru.vi.ka. Industrial Estate, Guindy, Chennai – 600032 Ph: 044 - 2250 0227 / 0184 / 0796 Fax: 044 - 2250 0036 Email: seichn@tn.gov.in, seichn@tn.nic.in	Districts of Chennai, Kanchipuram, Thiruvallur, Vellore, Thiruvannamalai, Villupuram, Cuddalore, Ariyalur, Perambalur, Thiruchirapalli, Nagapattinam, Thiruvarur, Thanjavur, Pudukottai, Dharmapuri & Krishnagiri
Er. N. SIVARAJU **Senior Electrical Inspector (Coimbatore)** Corporation Commercial Complex, Dr. Nanjappa Salai, Coimbatore – 641 018. Ph (Off): 0422 - 2380223 Ph (Res): 0422 - 2598780 Email: seicbe@tn.gov.in, seicbe@tn.nic.in	Districts of Coimbatore, Nilgiris, Erode, Namakkal, Salem, Karur, Dindigul, Madurai, Sivagangai, Theni, Ramanadapuram, Tuticorin, Tirunelveli, Virudhunagar & Nagerkoil
Er. P. MANOHAR **Electrical Inspector / Technical & Laboratory** Thiru.vi.ka. Industrial Estate,Guindy, Chennai – 600 032. Ph: 044 - 2250 0227 / 0184 / 0796 Fax: 044 - 2250 0036 Email: eitech@tn.gov.in	Technical Section Government Electrical Standards Laboratory
Er. D. KARTHIKEYAN **Electrical Inspector / Chennai (North) (Incharge)** Thiru.vi.ka. Industrial Estate,Guindy, Chennai – 600 032. Ph: 044 - 2250 0227 / 0184 / 0796 Fax: 044 - 2250 0036 Email: eichnn@tn.gov.in	Perambur & Purasawalkam Taluk, Mylapore & Triplicane Taluk, Tondiarpet Taluk of Chennai District
Er. M. SADASIVAN **Electrical Inspector / Chennai (South)** Thiru.vi.ka. Industrial Estate,Guindy, Chennai – 600 032. Ph: 044 - 2250 0227 / 0184 / 0796 Fax: 044 - 2250 0036 Email: eichns@tn.gov.in	Egmore & Nungambakkam Taluk, Guindy & Mambalam Taluk of Chennai District
Er. D. KARTHIKEYAN **Electrical Inspector / Chennai (West)** Thiru.vi.ka. Industrial Estate,Guindy, Chennai – 600 032. Ph: 044 - 2250 0227 / 0184 / 0796 Fax: 044 - 2250 0036 Email: eichnw@tn.gov.in	Ambattur Taluk of Thiruvallur District
Er. N. HEMA **Electrical Inspector / Kanchipuram (North)** Thiru.vi.ka. Industrial Estate,Guindy, Chennai – 600 032. Ph: 044 - 2250 0227 / 0184 / 0796 Fax: 044 - 2250 0036 Email: eikpmn@tn.gov.in	Thiruvallur, Thiruttani, Pallipattu, Uthukottai, Gummidipoondi, Ponneri &Poonamallee Taluks of Thiruvallur District

Er. T.Al. THENAPPAN **Electrical Inspector / Kanchipuram (South)** Thiru.vi.ka. Industrial Estate, Guindy, Chennai – 600 032. Ph: 044 - 2250 0227 / 0184 / 0796 Fax: 044 - 2250 0036 Email: eikpms@tn.gov.in	Tambaram, Thirukkazhukundram, Thiruporur, Chengalpet & Cheyyur Taluks of Kanchipuram District
Er. D. SELVARAJ **Electrical Inspector / Kanchipuram (East)** Thiru.vi.ka. Industrial Estate, Guindy, Chennai – 600 032. Ph: 044 - 2250 0227 / 0184 / 0796 Fax: 044 - 2250 0036 Email: eikpme@tn.gov.in	Kanchipuram, Sriperumpudur, Uthiramerur & Madurantagam Taluks of Kanchipuram District
Er. G. JOSEPH AROCKIADOSS **Electrical Inspector / Vellore (Incharge)** No.16, 7th East Cross Road, Gandhi Nagar East, Vellore - 632 006. Ph (Off.): 0416 - 224 3588 Ph (Res.): 0416 - 224 3388 Email: eivlr@tn.gov.in	All Taluks of Vellore & Thiruvannamalai Districts
Er. K. JAYAKRISHNAN **Electrical Inspector / Cuddalore** No.4/7, Kesava Nagar, Thiruppapuliyur, Cuddalore - 607 002. Ph (off): 04142 - 223764 Email: eicud@tn.gov.in	All Taluks of Cuddalore, Nagapattinam & Villupuram Districts
Er. T. ELAMBOORANAN **Electrical Inspector / Trichy** 13, N.M. Bungalow Road, T.V.S. Tollgate, Trichy - 620 020. Ph (Off.): 0431 - 2465770 Ph (Res.): 0431 - 2780322 Email: eitry@tn.gov.in	All Taluks of Trichy, Ariyalur, Perambalur, Pudukottai, Thanjavur & Thiruvarur Districts
Er. G. JOSEPH AROCKIADOSS **Electrical Inspector / Krishnagiri** 10-C, 3rd Cross Street, First Floor, Mohan Rao Colony, Krishnagiri - 635 001. Ph (off): 04343 - 233266 Email: eikrg@tn.gov.in	All Taluks of Krishnagiri & Dharmapuri Districts
Er. C. KARTHIKEYAN **Electrical Inspector / Namakkal** L.M.R.R.Gate-2nd Floor, Salem Main Road, Namakkal - 637 001. Ph (off): 04286 - 275777 Email: einkl@tn.gov.in	All Taluks of Namakkal & Karur Districts
Er. B. SEKAR **Electrical Inspector / Salem** 26-J, Sangeeth Theatre Complex, Pulikuthi, 4th Street, Gugai, Salem - 636 006. Ph (off): 0427 - 2461333 Email: eislm@tn.gov.in	All Taluks of Salem District
Er. K. VEERAMANI **Electrical Inspector / Coimbatore (Central)** Corporation Commercial Office Complex, II Floor, Dr. Nanjappa Salai,Coimbatore – 641 018. Ph (Off.): 0422 - 2380223 Ph (Res.): 0422 - 2689592 Email: eicbec@tn.gov.in	Coimbatore Corporation, Coimbatore - South & North Taluks of Coimbatore District

Er. D. SENTHIL KUMAR **Electrical Inspector / Coimbatore (South)** Corporation Commercial Office Complex, II Floor, Dr. Nanjappa Salai, Coimbatore – 641 018. Ph: 0422 - 238 0223 Email: eicbes@tn.gov.in	Pollachi, Valparai & Udumalpet Taluks of Coimbatore District
Er. D. SENTHILKUMAR **Electrical Inspector / Mettupalayam** 64-B, Ponnia Goundar Street, L.S. Puram, Mettupalayam - 641 301.Ph (off): 04254 - 224 243 Email: eimtp@tn.gov.in	Mettupalayam & Avinashi Taluks of Coimbatore District All Taluks of Nilgiris (Ooty)
Er. N. MYTHILI **Electrical Inspector / Tiruppur** 5/9B, 7th Street, MGR Nagar, PN Road, Tiruppur - 641 602. Ph (off): 0421 -224 1900 Email: eitpr@tn.gov.in	Palladam & Tiruppur Taluks of Coimbatore District
Er. V. RAMAKRISHNAN **Electrical Inspector / Erode (North)** 106, Gandhiji Road, Jawans Bavan-1st floor, Erode - 638 001. Ph (off): 0424 - 221 5512 Email: eieden@tn.gov.in	Sathyamangalam, Gopi, Anthiyur & Perundurai Taluks of Erode District
Er. K. SELVAM **Electrical Inspector / Erode (South)** 106, Gandhiji Road,Jawans Bavan-1st floor, Erode - 638 001. Ph (off): 0424 - 221 5512 Email: eiedes@tn.gov.in	Dharapuram, Kangeyam, Bhavani, Kodumudi & Erode Taluks of Erode District
Er. P. PALANI **Electrical Inspector / Dindigul (Incharge)** No.68/1, East Arokia Mada Street, Nagal Nagar, Dindigul - 624 003. Ph (off): 0451 - 242 0450 Email: eidgl@tn.gov.in	All Taluks of Dindigul District
Er. P. PALANI, Electrical Inspector / Madurai 618, Karpaga Nagar, 10th Street, K.Pudur, Madurai- 625 007 Phone / Fax (off):0452 - 253 5561 Email: eimdu@tn.gov.in	All Taluks of Madurai, Theni & Sivagangai Districts
Er. B. DHINAKAR BABU **Electrical Inspector / Virudhunagar** Thai complex, 2/610-9, V.O.C.Nagar, Soolakkarai Medu West, Virudhunagar - 626 003. Ph (off): 04562 - 252 912 Email: eivnr@tn.gov.in	All Taluks of Virudhunagar & Ramanathapuram Districts
Er. B. DHINAKAR BABU **Electrical Inspector / Tuticorin (I/c)** N.P.S.Complex, 2nd Floor, Polpettai, Tuticorin - 628 002. Ph(off): 0461 - 234 6339 Email: eitut@tn.gov.in	All Taluks of Tuticorin & Nagerkoil Districts Windmills at 1. Kayathar SS 2. Ayyanaroothu SS 3. Perumpattu SS 4. Vannikkonendal SS 5. Thoothukudi SS 6. Karungulam SS in Radhapuram Taluk 7. Vadakankulam SS 8. Perungudi SS 9. Pazhavoor SS
Er. S. BALAMURUGAN **Asst. Elec. Insp. and Elec. Insp. / Thirunelveli (I/c)** No.58, Thiruvanandapuram Road, OPP: V.O.C.Ground, Palayamkottai Thirunelveli - 627 002. Ph (off): 0462 - 257 4343 Email: eitin@tn.gov.in	All Taluks of Thirunelveli District Windmills at 1. Muppandal SS 2. Aralvaimozhi SS 3. Radhapuram SS

UNDERGROUND CABLE FAULT LOCATING

- Time Domain Reflectometry
- Arc Reflection Method
- Pinpointing

Time Domain Reflectometry

The pulse reflection method, pulse echo method or time domain reflectometry are several terms applied to what is referred to as cable radar or a TDR. The technique, developed in the late1940's, makes it possible to connect to one end of a cable, actually see into the cable and measure distance to changes in the cable. The original acronym Radar (Radio Detection And Ranging) was applied to the method of detecting distant aircraft and determining their range and velocity by analyzing reflections of radio waves. This technique is used by airport radar systems and police radar guns where a portion of the transmitted radio waves are reflected from an aircraft or ground vehicle back to a receiving antenna. For cable radar, when applied to underground cable, short time duration pulses are transmitted at a high repetition rate into the cable between the phase conductor and shield (neutral). A liquid crystal or CRT display shows reflections of the transmitted pulses. Reflections are caused by changes in the characteristic impedance of the cable. Any reflections are displayed on the screen with elapsed time along the horizontal axis and amplitude of the reflection on the vertical axis. Since we can now measure elapsed time and if we know the pulse velocity as it travels down the cable, distance to the reflection point can be calculated. For airport radar and police radar guns the velocity of propagation (Vp) of the radio waves through air is very nearly the speed of light or 984 ft/ms. Pulses transmitted through the insulation of our underground cable travel at about half that or about 500 ft/µs. A good cable analysis system should include two movable cursors which, when positioned at zero and a reflection point, provide a measurement of distance to that point, in feet.

A TDR sees each increment of cable, say each foot, as the equivalent electrical circuit shown in Figure 1. The combination of these components is referred to as the characteristic impedance (Z_0) of the cable. If every increment of cable is perfect and exactly the same, all components of the equivalent circuit of every foot are also exactly the same. This perfect run of cable will produce no reflections until the end of the cable appears. At the end of the cable the pulses see a high impedance, an open circuit, causing an upward (+100%) reflection. See Figure 2.

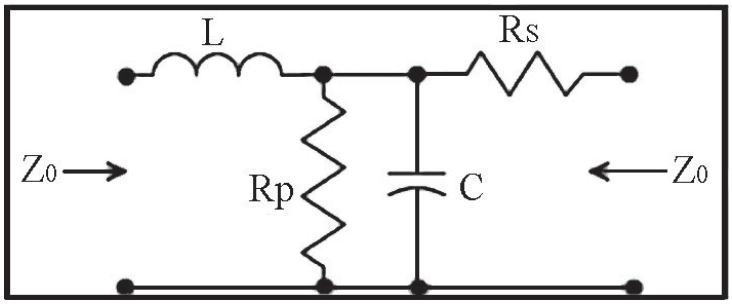


Figure 1. Cable Incremental Equivalent Circuit

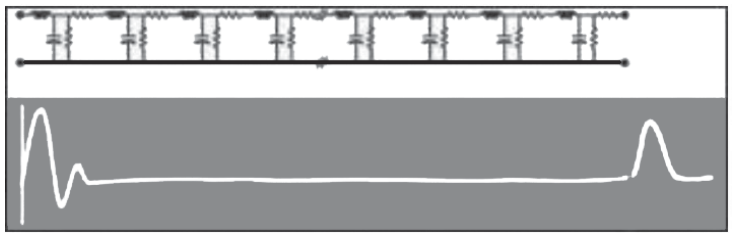


Figure 2. Equivalent Circuit and Low-Voltage TDR Trace with Open End

If the cable end is grounded, a short circuit, the pulses see a low resistance and a downward (-100%) reflection is caused. See Figure 3.

*An **idealist** is a person who helps other people to be prosperous* – **HENRY FORD**

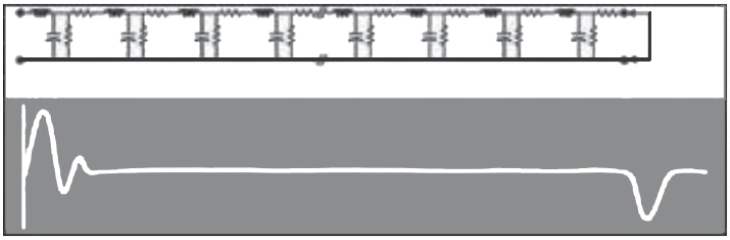


Figure 3. Equivalent Circuit and Low-Voltage TDR Trace with Grounded End

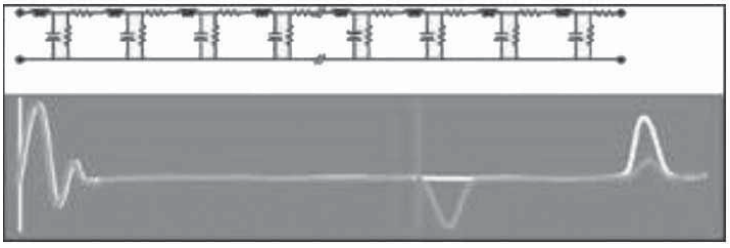


Figure 4. Equivalent Circuit, TDR Traces showing Fault Location

A low voltage TDR is an excellent tool for the pre-location of open circuits and conductor-to conductor shorts. For shielded power cables, faults with a resistance higher than 200 ohms are almost impossible to distinguish from normal clutter reflections on the cable. Unfortunately almost all faults on primary underground distribution cable are high resistance faults in the area of thousands of ohms or even megohms. Due to the reflection characteristics of these high resistance faults they are impossible to see using only the low voltage TDR.

Arc Reflection Method

Use of the arc reflection method combined with a high capacitance surge generator and state-of the-art pinpointing devices for underground cable fault locating will find faults in less time and with less risk of damaging good cable than classical techniques

The arc reflection method of fault pre-locating combines the use of a TDR (cable radar) and a surge generator (thumper). By using an arc reflection filter, a low voltage TDR and a high voltage surge generator can both be connected to the faulted cable and the TDR can be looking down the cable while thumping. The filter protects the TDR from the surge generator high voltage pulses and routes the low voltage pulses down the cable. This method utilizes the fact that when an arc is created at the fault, its resistance is reduced to a very low value, less than 200 ohms, which will reflect radar pulses. The arc location will appear as a downward going reflection on the TDR cable trace. See Figure 4. The cable analysis systems should capture and store the complete trace including the downward going fault location in memory so measurements can be made easily. Rather than thumping and walking the cable route to discover the fault location, the cable analysis system should provide a prelocation measurement with as little as one or two thumps and about 95% of the time gets you within 10 to 20 feet of the fault. Pinpointing efforts can then be concentrated within a well defined section of the cable. This technique substantially reduces the amount of high voltage exposure to the cable, preventing the initiation of new faults, which will surface after the cable is put back into service.

Surge Generator

The device is basically a high voltage pulse generator consisting of a dc power supply, a high voltage capacitor and some type of high voltage switch. The power supply is used to charge the capacitor to a high voltage and then a contact closure discharges the capacitor into the cable under test. If the voltage is high enough to break down the

fault, the energy stored in the capacitor is rapidly discharged through an arc at the fault creating a detectable sound or "thump" at ground level. The important specifications of a thumper are how high a voltage can be developed and how much energy is delivered to the fault. The energy output of any surge generator measured in Joules (Watt-Seconds) is calculated as follows:

$$E = V^2 \longleftrightarrow \frac{C}{2}$$

E = Energy in Joules, C = Capacitor in mf, V = Voltage in kV

The classical fault locating process is to hook up the surge generator, crank up the voltage and walk the cable route until the thump is heard or better yet felt. This process pinpoints the fault allowing a repair crew to dig a hole and repair the cable. The higher the voltage, the bigger the bang and the easier it is to find the fault. In some cases it takes hours (or days) to locate the fault and all that time the cable is being exposed to high voltage thumping. A few years after polyethylene cable began to be installed underground, evidence began to surface that due to "treeing" in the insulation, high voltage thumping of this plastic cable was doing more harm than good. Due to this information many utilities have issued work rules reducing the voltage to be used for fault locating. Another fact of life is that from the point of discharge at the fault to the isolated end, the cable sees a peak-to-peak voltage wave of double the surge voltage at every thump. A very common surge generator in use for many years included a 4 microfarad capacitor that generated 1250 Joules at a voltage of 25 kV. If the fault locating crew is told that the maximum output voltage of the thumper must be limited to 12.5 kV (one half of 25 kV), the output energy of their thumper is reduced by a factor of four down to 312 Joules. In a practical world, the threshold for hearing a thump at ground level with no acoustic amplification and no background noise is in the range of 300 to 400 Joules. If the thump at the fault cannot be heard, voltage will have to be increased in order to find the fault, make a repair and get the lights back on.

Ideally, a surge generator that uses a 12 microfarad capacitor, which allows thumping at lower voltages while still delivering reasonable energy to the fault, is required. Thumping at 12.5 kV, as above, now produces a very audible 937 Joules. The surge generator, when thumping at its maximum voltage of 16 kV, produces 1536 Joules and should include both a built-in arc reflection filter and surge pulse pickup.

Pinpointing

Before digging in order to repair the faulted cable, some type of pinpointing technique must be used. The classical methods all revolve around some means to enable hearing the sound produced by the discharge of energy at the fault. The simplest and well-used method is the fault locator ear-on-the-ground-butt-in-the-air technique. Other approaches involve traffic cones, shovel handles and a length of conduit. Slightly more modern equipment uses electronic amplification and an acoustic pickup positioned on the ground. These techniques all assume that the sound travels directly from the fault to the earth's surface unimpeded and that the loudest sound is directly above the fault. If the cable is in duct or conduit or under paving this assumption may not be valid. A surge detector/fault pinpointer that combines an electromagnetic surge pickup and one or two acoustic pickups to zero in on the fault is the instrument of choice here. The receiver measures and displays the elapsed time between surge and sound. As the fault is approached, this time interval decreases to a minimum directly over the fault. This technique relies on the timing between the two events, not just simply on the volume of the sound. If dual acoustic pickups are used, the receiver will also indicate which direction to move toward the fault.

Conclusion

Using the combination of a cable analysis system, a surge generator and a surge detector/fault pin pointer, the process of underground fault locating becomes more efficient, gets service restored quicker and minimizes the possibility of creating additional faults while finding the present fault.

Courtesy: Mr. Vishnu, Emmar Electricals, Mobile - 9840936400

IIT-MADRAS TO PLAY MAJOR ROLE IN SOLAR PROJECT

The Indian Institute of Technology, Madras (IIT-M) will not only coordinate part of the much-awaited national programme, Solar Thermal Project, but will also integrate the efforts of all the other IITs involved in the project. The three-year Rs. 15 crore project, funded by the Department of Science and Technology, aims to use solar energy to find solutions to the country's energy problems.

"Two years ago, all IITs were asked to present their proposals on energy generation. Expert committees were set up and feasibility studies conducted on the proposals, after which the project, divided into three parts has been sanctioned to different IITs," said T. Sundararajan, head, department of mechanical engineering at IIT-M, who is coordinating the project. The foundation stone of the project was laid at Thirukalukundram on Sunday.

Prof. Sundararajan, along with Srinivasa Reddy, another professor from IIT-M and Prof R. P. Saini from IIT-Roorkee, are involved in the first part of the project, which is the establishment of a pilot solar thermal power generation system.

"The project is on a much larger scale compared to regular academic projects. What we will do, is concentrate solar power using flat mirrors – fresnel reflectors, in an array on tubes carrying water, to create steam at high pressure and temperature," said Prof. Sundararajan.

The unique part of the project, said the professor, is that it can take steam up to 400 degree Celsius, much higher than the temperatures attained in other existing projects. "With high temperature steam, we are looking at better energy conversion. We hope to generate at least 75-100 kilo watts of electric power with the project," he added.

The power generated on a pilot basis, will look at satisfying the energy needs of Pathashala, a school run by the Krishnamurthy Foundation of India, in Vallipuram, a village in Kancheepuram, about 80 km from Chennai. The project needed an open area for this mode of power generation and so this locality was selected, said the coordinators.

"There are nearly 110 students and many teachers there. We will provide power to this community and any excess power can be sent to neighbouring villages," said Prof. Sundararajan.

The project, unlike many others that are de-centralised, has a distributed way of transmitting power and will be used to provide electricity to remote villages and mountainous terrains.

Since the energy is derived from steam, it can also be used for cooking and washing purposes, the professor added. The first part of the project will run into two phases of 18 months each. IIT-Bombay will meanwhile look into air-conditioning options through solar power while IIT-Guwahati will look at ways of storing thermal energy to be utilised later.

"Both these projects will be integrated with our solar thermal plant project at Vallipuram," said Professor Sundararajan.

Courtesy: The Hindu, dt: 20.02.2013

Pure water is the World's first and foremost Medicine – **SLOVAKIAN PROVERB**

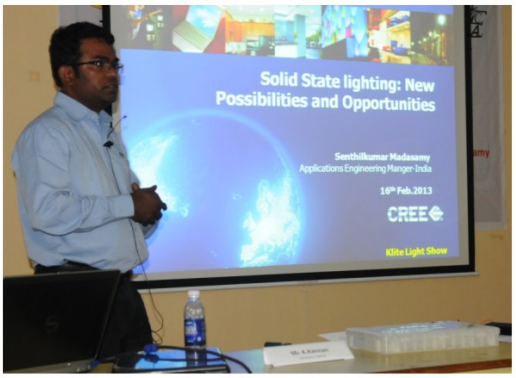
TECHNICAL SEMINAR ON 16.02.2013 PHOTOS

L to R: **Mr. K. KANNAN**, Secretary, TNEIEA; **Mr. U. BASKARAN**, President, TNEIEA; **Mr. P. KUMAR**, General Manager, Power Gear Ltd, MEPZ; **Mr. DILIP KUMBHAT**, CEO, K-Lite Industries; **Dr. P.C. BARJATIA**, Director, MIT School of Energy and Lighting, Pune; **Mr. SENTHIL KUMAR MADASWAMY**, FAE Manager, CREE, Bangalore; **Mr. G. VENKATESH**, Joint Secretary, TNEIEA

Mr. P. KUMAR, General Manager, Power Gear Ltd, MEPZ, presenting his papers

Dr. P.C. BARJATIA, Director, MIT School of Energy and Lighting, Pune, presenting his papers

Honouring **Mr. DILIP KUMBHAT**, CEO, K-Lite Industries by our Secretary **Mr. K. KANNAN**



Mr. SENTHIL KUMAR MADASWAMY, FAE Manager, CREE, Bangalore, presenting his papers

TECHNICAL SEMINAR - 16.02.2013 - A BRIEF REPORT

Light is one of the basic and vital elements for the living of human beings. It is considered as the "Daughter of God". In the present day world, green energy is a must. In consideration of all these, Our Association and M/s. K-Lite Industries, Chennai have jointly organized a Special Meet and Technical Session on Energy Efficient Lighting Systems, at AIEMA Technology centre, Chennai – 58 on 16.2.2013. The topics chosen for this special meet evoked much excitement and interest among the practicing engineers and 'A' Grade Contractors. Nearly one hundred persons have participated in this technical meet.

The inaugural address was given by **Thiru. DILIP KUMBHAT**, *CEO*, K-Lite Industries.

Thiru. U. BASKARAN, *President*, **Tamilnadu Electrical Installation Engineers Association 'A' Grade** delivered the welcome address. In his address, he briefly explained the activities of our association and also explained the significance of Energy Efficient Lighting Installations.

Thiru. P. KUMAR, *General Manager*, **Power Gear Ltd**, MEPZ in his technical presentation,

- has described in detail the civil, electrical and erection and commissioning aspects of 1 MW Solar Power Plant undertaken by his company.
- has given "A complete Scenario" of 1MW Solar Power Plant with the aid of video clippings and
- explained the job opportunities in developing solar power plants and the need for skill development in rural areas to meet this development.
- It was virtually a practical tour to a Solar Farm.

Dr. P.C. BARJATIA, *Director*, **MIT School of Energy and Lighting**, *Pune*, one of the key speakers of the Technical Session, described the practical aspects of the use of Solar Energy for Lighting in rural areas and also the difficulties/constraints by the Small Scale Industries while undertaking such work.

Thiru. SENTHIL KUMAR MADASAMY, *FAE Manager*, **CREE**, *Bangalore*, another key speaker in the Technical Session, have elaborately explained the latest trends in Lighting Technology with a special focus on Solid State Lighting Systems. He described the possibilities and opportunities available with the new technology. He also described the merits and demerits of LED Lighting Systems.

Finally there were interesting question and answer session; lively discussions were held then. Thus, special meet and technical session ended with a vote of thanks by **Thiru. K. KANNAN**, *Secretary*, **Tamilnadu Electrical Installation Engineers Association 'A' Grade**.

Thiru. G. VENKATESH, *Joint Secretary*, **Tamilnadu Electrical Installation Engineers Association 'A' Grade** coordinated the entire session.

In sum, it can be stated that this technical seminar was a great occasion for all the participants and it literally lighted up their lives.

Mr. P. KUMAR

- Member of IEEE, member of Institution of Engineers UK,
- Worked at Auroville Pondicherry, In their renewable Energy centre
- Heading the Power sector in Generation & Distribution in Ministry of defence Engineering services, Govt of Oman
- Technical head – B&G solar, installing 1 MW solar power plant in Nagapattinam District
- Project head, Zynergy, installing 1 MW solar power plant in Usilampatti, Madurai
- Now heading the Solar division of Power Gear Ltd MEPZ, Chennai

Mr. SENTHIL KUMAR MADASWAMY

- Having extensive work experience in the field of Optics & lighting.
- Worked at Baba Atomic Research Centre for four & a half years in developing optical components & subsequently in GE Lighting.
- Worked with Nova LED AG in Germany.
- He has more than 11 publications in International Journal.
- He holds a Master Degree in Applied Optics from IIT Delhi.

Don't be afraid to fail. Don't waste energy trying to cover up failure. Learn from your failures and go on to the next challenge. It's OK to fail. If you're not failing, you're not growing. - H. Stanley Judd

Dr. PRAKASH BARJATIA

- Dr. Prakash Barjatia, basically an Electrical Engineer and Post Graduate in Management Scienceretired from the Central Institute of Road Transport (CIRT) as Scientist – E (Dy.Director) afterserving for 25 years. Before that he served for 10 years in Vehicles Research & Dev.Estt. (Min.of Defence), Ahmednagar. As such his whole career was in the field of Testing, Quality Control, Standard Formulation & Performance Evaluation of components and assemblies.
- Presently Dr.Barjatia is the Director of MIT Academy of Skill Development : Centre for Lighting Technology & Management, Pune and is instrumental in conceptualizing, designing, and implementation of first ever unique Post Graduate Program (MBA) in Lighting Technology &Energy Management in 2007.
- As Chairman of Mumbai State Centre of Indian Society of Lighting Engineers (ISLE) for 8 years, several National / International Events were conducted during this period, specifically for bringing awareness about the subject of Lighting / Illumination amongst student community.
- Presently he is the Governing Body Member (2011-15) of ISLE.
- By profession as a System Expert and as a Lead Assessor for NABL (ISO/IEC 17025)
- Dr. Prakash in last 15 year has conducted more than 60 Assessments of Laboratories throughout the country.
- 50 papers presented in National/International Seminars/Conferences
- 20 papers published in Journals/Periodicals/Reference Books including Lighting India, Sourcing Electricals & Lighting etc.
- Dr. Barjatia is also approved / appointed as a Service Provider / Technical Expert by TUV Rheinland, China / Japan for the World Bank Project on Energy Saving & Improvement for Street Lighting, and also for CFL Lighting Scheme – Bachat Lamp Yojana of Bureau of Energy Efficiency (BEE).

LIGHT SHOW 2013 – A SUCCESS STORY

K-Lite industries, true to their traditions, proved their mantle again during the recently concluded Light Show 2013 from 15th to 20th February 2013. It was an exclusive event, as a special show with emphasis on Green Building Concepts and integration of wind, solar and LED for hybrid street lighting .It was organized in an indoor / outdoor area of a multi storied unit at G8 Ambattur Industrial Estate.

Dominating the show was the live demo of LED luminaires, grouped and segregated application wise. The outdoor lighting applications were exhibited with an exquisite range of decorative poles. The poles were scaled down for showcasing them indoors. Solar / wind hybrid lighting system attracted the attention of many visitors. Solar lighting with LED street lights designed for exclusive usage in remote areas was also on display

The lighting display with LED included the luminaires for office lighting, commercial lighting, industrial lighting, façade lighting, area lighting, street lighting, aviation obstruction lighting, signage lighting and emergency lighting. The elite visitors and lighting designers were all appreciative of the demonstration of total lighting management and cost effective solutions using energy efficient luminaires.

The Association of licensed wireman / electricians in Tamil Nadu organized a special meet for their members across the whole of Tamil Nadu for a visit to Light Show and nearly 1000 members attended. It was a big gathering of the down to earth people in the field of lighting.

Concurrent to the show, and in association with the Indian Society of Lighting Engineers and the Tamil Nadu Electrical Installation Engineers Association, technical seminars were organized on the following:

- Lighting Design- Prospects and perspectives
- Lighting trends and solar power generation

Both the above events were attended by more than two hundred delegates and the faculties were drawn from across the nation.

THE STATE GOT ITS FIRST SOLAR TOILETS

The State got its first solar, sensor-based toilets, with the Tambaram municipality installing three units at the junction of Duraiswamy Reddy Street and GST Road on Wednesday. 'Namma toilets', the user-friendly units made of fibre reinforced polymer material, were inaugurated by animal husbandry minister T.K.M. Chinnayya. The initiative is a pilot project in Tamil Nadu. The toilet blocks have a stall each for elderly women and women with physical disabilities, one for men and another for women.

The lighting in all the stalls is based on solar energy, and the stalls have sensors that are connected to the lighting system. When the sensors detect movement, the lights automatically switch on. They switch off when the user has left, thereby helping in energy conservation. The design of the toilets was developed in six months to cater to all user groups. A study on cultural appropriateness in the State by the National Institute of Design, Ahmedabad, also helped in the development of the design, officials said.

Courtesy: The Hindu, dt: 28.02.2013

EARTHING - 2

5.0.4 Interconnections of earth-continuity conductors and main and branch earth wires shall be made in such a way that reliable and good electrical connections are permanently ensured.

NOTE: *Welded, bolted and clamped joints are permissible. For stranded conductors, sleeve connectors (for example, indented, riveted or bolted connectors) are permissible. Bolted connectors and their screws shall be protected against any possible corrosion.*

5.0.5 The path of the earth wire shall, as far as possible, be out of reach of any person.

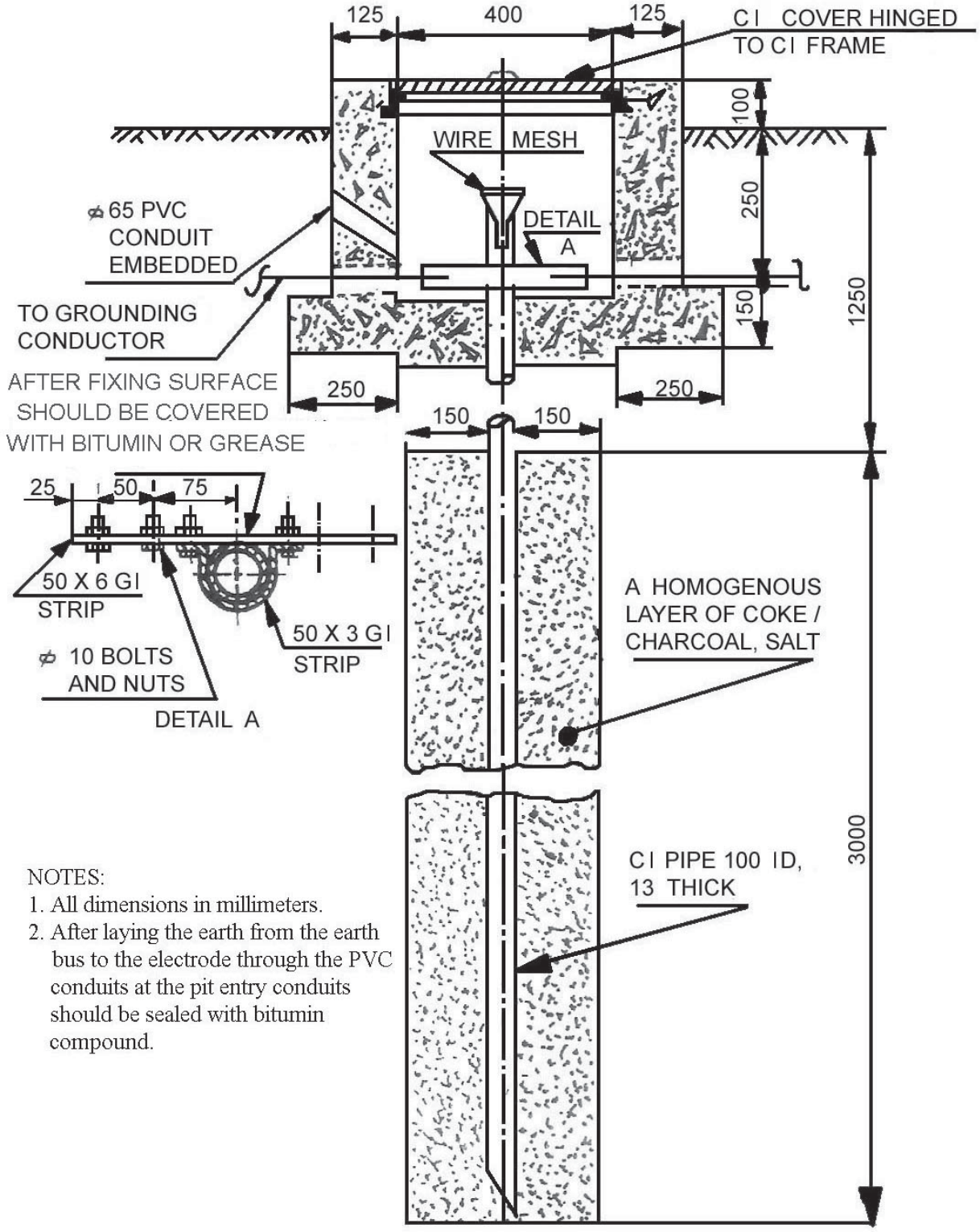
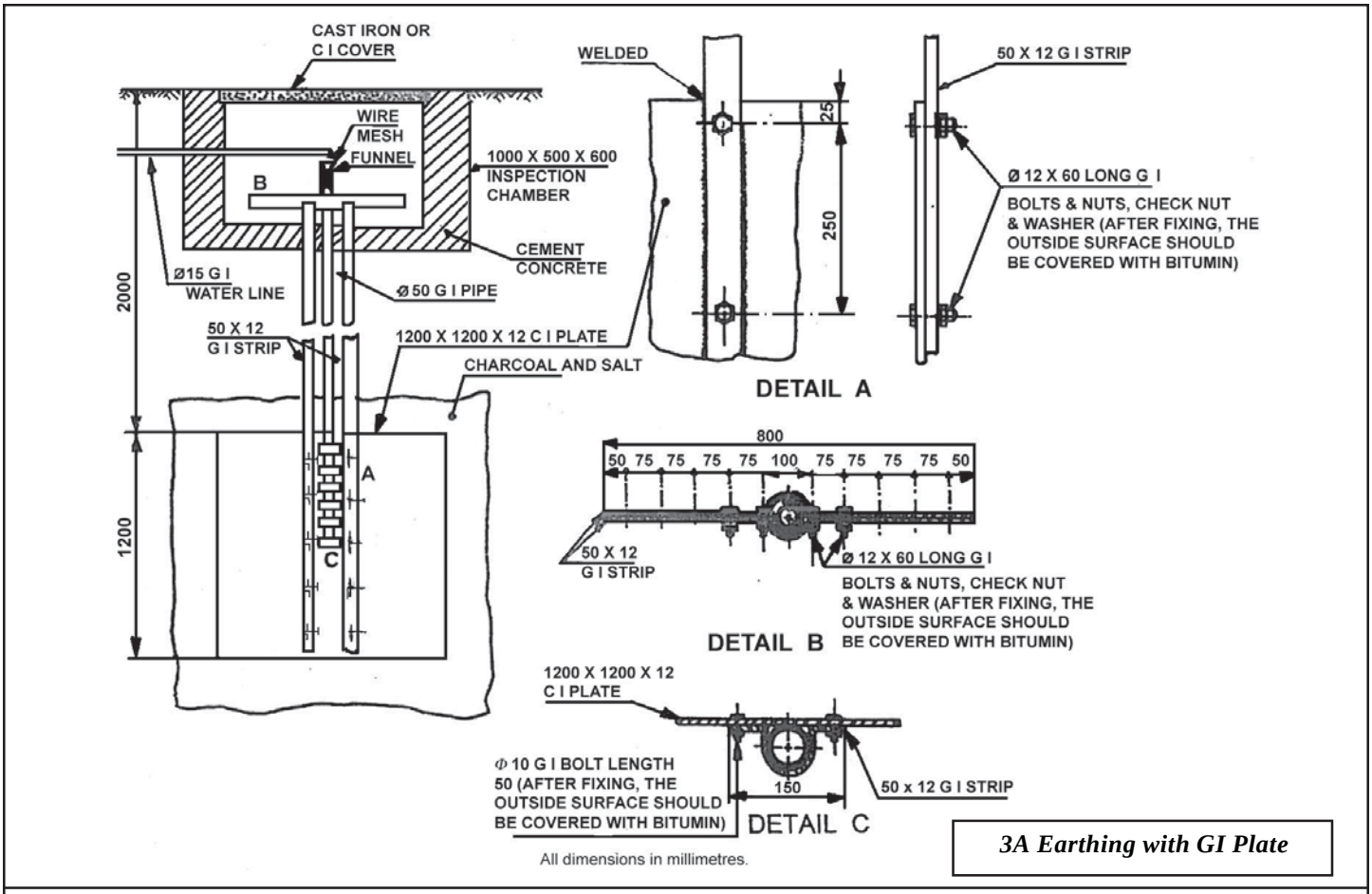
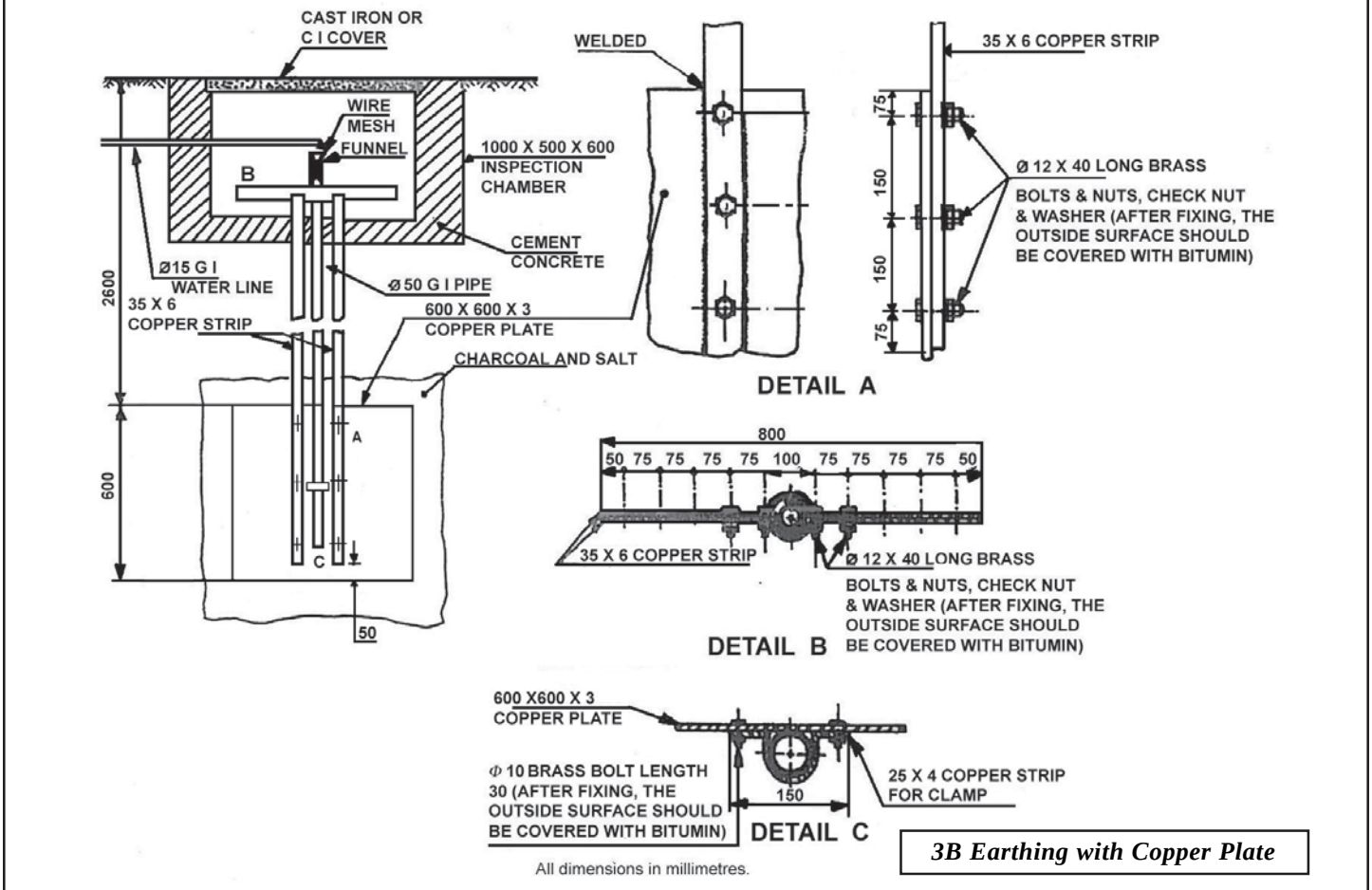


Fig.2: A Typical Illustration of Pipe Earth Electrode



3A Earthing with GI Plate



3B Earthing with Copper Plate

Fig.3: A Typical Illustration of Plate Earth Electrode

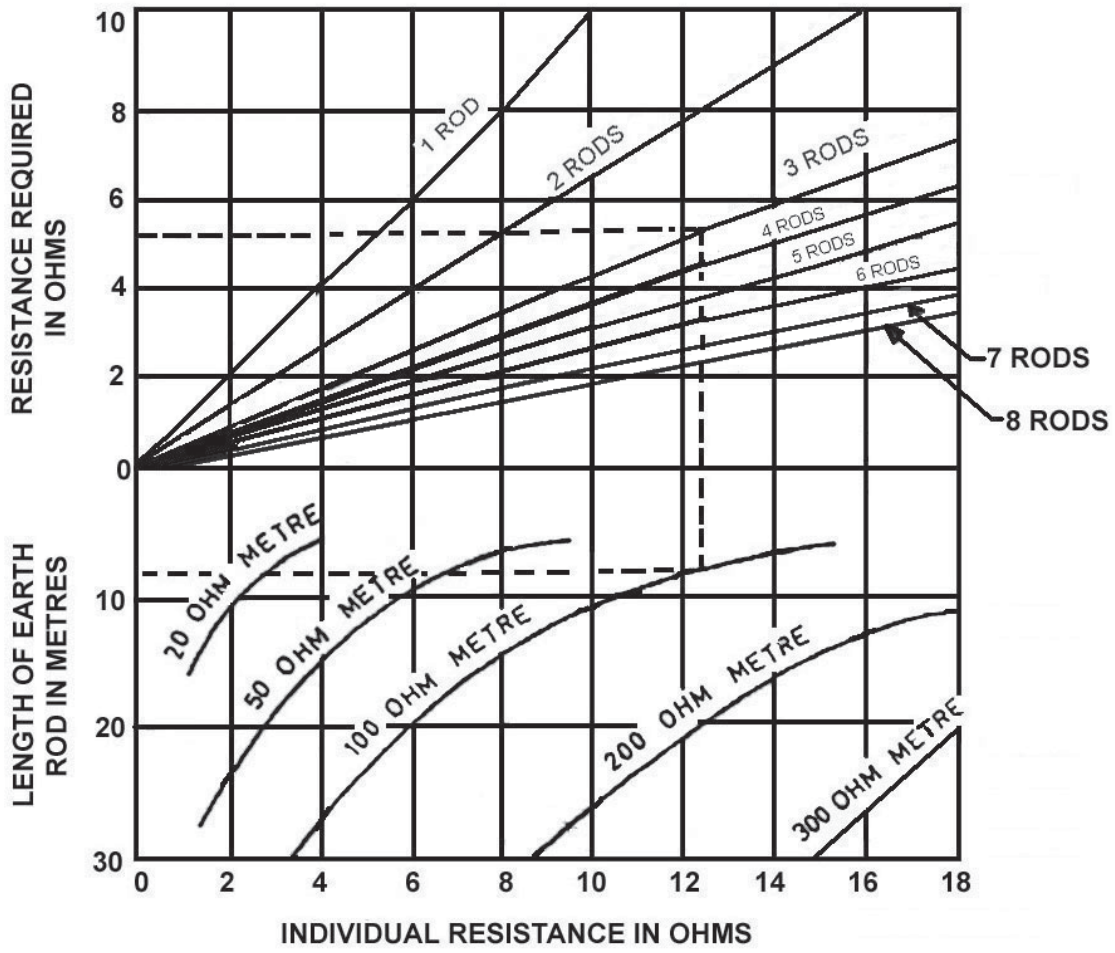


Fig.4: Resistance of Electrode at Various Depths and Soil Resistances

5.0.6 If the metal sheath and armour have been used as an earth continuity conductor the armour shall be bonded to the metal sheath and the connection between the earth wire and earthing electrode shall be made to the metal sheath.

5.0.7 If a clamp has been used to provide connection between the earth wire and the metal sheath and armour, it shall be so designed and installed as to provide reliable connection without damage to the cable.

5.0.8 The neutral conductor shall not be used as earth wire.

5.0.9 The minimum sizes of earth-continuity conductors and earth wires shall be as given in the relevant part of the Code.

6 MEASUREMENT OF EARTH ELECTRODE RESISTANCE

6.1 Fall of Potential Method

In this method two auxiliary earth electrodes, besides the test electrode, are placed at suitable distances from the test electrode (*see* Fig.5). A measured current is passed between the electrode '*A*' to be tested and an auxiliary current electrode '*C*' and the potential difference between the electrode '*A*' and the auxiliary potential electrode '*B*' is measured. The resistance of the test electrode '*A*' is then given by:

$$R = \frac{V}{I}$$

Where R = resistance of the test electrode, in ohms; V = reading of the voltmeter, in V; and I = reading of the ammeter, in amperes.

There are two ways of meeting difficulties; you alter the difficulties, or you alter yourself to meet them. - PHYLLIS BOTTOME

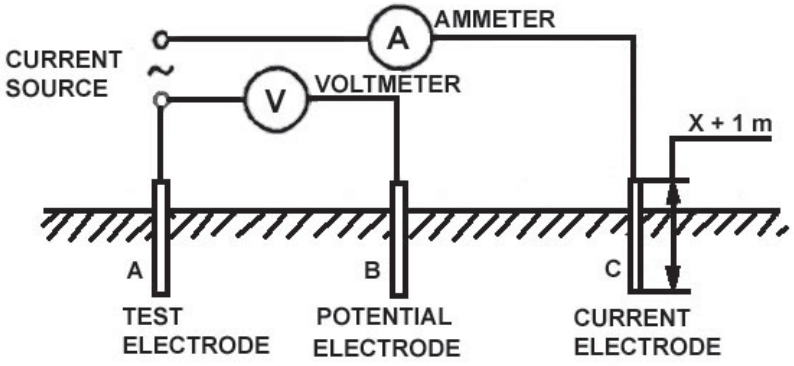


Fig.5: Method of Measurement of Earth Electrode Resistance

6.1.1 If the test is made at power frequency, that is, 50 Hz, the resistance of the voltmeter should be high compared to that of the auxiliary potential electrode 'B' and in no case should be less than 20 000 Ω.

NOTE: *In most cases there will be stray currents flowing in the soil and unless some steps are taken to eliminate their effect, they may produce serious errors in the measured value. If the testing current is of the same frequency as the stray current, this elimination becomes very difficult and it is better to use an earth tester incorporating a hand-driven generator. These earth testers usually generate direct current and have rotary current-reverser and synchronous rectifier mounted on the generator shaft so that alternating current is supplied to the test circuit and the resulting potentials are rectified for measurement by a direct-reading moving-coil ohm-meter. The presence of stray currents in the soil is indicated by a wandering of the instrument pointer, but an increase or decrease of generator handle speed will cause this to disappear.*

6.1.2 The source of current shall be isolated from the supply by a double wound transformer.

6.1.3 At the time of test, where possible, the test electrode shall be separated from the earthing system.

6.1.4 The auxiliary electrodes usually consist of 12.5 mm diameter mild steel rod driven up to 1 m into the ground.

6.1.5 All the test electrodes and the current electrodes shall be so placed that they are independent of the resistance area of each other. If the test electrode is in the form of rod, pipe or plate, the auxiliary current electrode '*C*' shall be placed at least 30 m away from it and the auxiliary potential electrode '*B*' shall be placed midway between them.

6.1.6 Unless three consecutive readings of test electrode resistance with different spacings of electrodes agree, the test shall be repeated by increasing the distance between electrodes '*A*' and '*C*' up to 50 m and each time placing the electrode '*B*' midway between them.

6.2 Alternative Method

6.2.1 The method described in **6.1** may not give satisfactory results if the test electrode is of very low impedance (1 ohm or less). This applies particularly while measuring the combined resistance of large installations. In these cases, the following method may be adopted.

6.2.1.1 Two suitable directions, at least 90° apart, are first selected. The potential lead is laid in one direction and an electrode is placed 250 to 300 m from the fence. The current lead is taken in the other direction and the current electrode located at the same distance as the potential electrode. A reading is taken under this condition. The current electrode is then moved out in 30 m steps until the same reading is obtained for three consecutive locations. The current electrode is then left in the last foregoing position and the potential electrode is moved out in 30 m steps until three consecutive readings are obtained without a change in value. The last readings then correspond to the true value of earth resistance.

7 EARTHING OF INSTALLATIONS IN BUILDINGS

7.1 The earthing arrangements of the consumer's installation shall be such that on occurrence of a fault of negligible impedance from a phase or non-earthed conductor to adjacent exposed metal, a current corresponding

to not less than three-and-a-half times the rating of the fuse or one-and-a-half times the setting of the overload earth leakage circuit-breaker will flow except where residual current operated devices or voltage operated earth leakage circuit-breakers are used and make the faulty circuit dead. Where fuses are used to disconnect the faulty section of an installation in the event of an earth fault, the total permissible impedance of the earth fault path may be computed from the following formula (for a normal three-phase system with earthed neutral).

$$Z = \frac{\text{Phase-to-earth voltage of system}}{\text{Minimum fusing current of use x Factor of safety}}$$

where Z = permissible impedance, in ohm.

NOTE: *The factor of safety in calculating the permissible impedance should be left to the discretion of the designer.*

7.1.1 The factor of safety in the above formula ensures that in most cases the fuse will blow in a time which is sufficiently short to avoid danger and allowing for a number of circumstances, such as the grading of fuse rating, increase of resistance due to drying out of the earth electrodes in dry weather, inevitable extensions to installations involving increase in length of the circuit conductors and the earth-continuity conductors, etc.

7.1.2 It will be observed that this requirement determines the overall impedance and does not contain a specific reference to any part of the circuit such as the conduit or other earth-continuity conductor together with the earthing lead. In fact, in large installations the overall impedance permissible may be less than 1 ohm, so that considerably less than this might be allowable for the earth-continuity system.

7.2 It is desirable when planning an installation to consult the supply authority or an electrical contractor having knowledge of local conditions, in order to ascertain which of the two, namely, the use of fuses of overload circuit-breakers, for protection against earth-leakage currents is likely to prove satisfactory.

7.3 It is recommended that the maximum sustained voltage developed under fault conditions between exposed metal required to be earthed and the consumer's earth terminal shall not exceed 32 V rms.

7.4 Only pipe, rod or plate earth electrodes are recommended and they shall satisfy the requirements of **4.5**.

7.5 Earth-Continuity Conductors

7.5.1 Connection to earth of those parts of an installation which require to be earthed shall be made by means of an earth-continuity conductor which may be a separate earth conductor, the metal sheath of the cables or the earth continuity conductor contained in a cable, flexible cable or flexible cord.

7.5.2 *Earth-Continuity Conductors and Earth Wires not Contained in the Cables*

The size of the earth-continuity conductors should be correlated with the size of the current carrying conductors, that is, the sizes of earth-continuity conductors should not be less than half of the largest current carrying conductors, provided the minimum size of earth-continuity conductors is not less than 1.5 mm^2 for copper and 2.5 mm^2 for aluminium and need not be greater than 70 mm^2 for copper and 120 mm^2 for aluminium. As regards the sizes of galvanized iron and steel earth-continuity conductors, they may be equal to size of current-carrying conductors with which they are used. The size of earth-continuity conductors to be used along with aluminium current-carrying conductors should be calculated on the basis of equivalent size of the copper current-carrying conductors.

7.5.3 *Earth-Continuity Conductors and Earth Wires Contained in the Cables*

For flexible cables, the size of the earth-continuity conductors should be equal to the size of the current-carrying conductors and for metal sheathed, PVC and tough rubber sheathed cables the sizes of the earth-continuity conductors shall be in accordance with relevant Indian Standards.

"Success is going from failure to failure without losing enthusiasm." - WINSTON CHURCHILL

7.5.4 *Cable Sheaths Used as Earth-Continuity Conductors*

Where the metal sheaths of cables are used as earth-continuity conductors, every joint in such sheaths shall be so made that its current-carrying capacity is not less than that of the sheath itself. Where necessary, they shall be protected against corrosion.

Where non-metallic joint boxes are used, means shall be provided to maintain the continuity, such as a metal strip having a resistance not greater than that of the sheath of the largest cable entering the box.

7.5.5 *Metal Conduit Pipe Used as on Earth-Continuity Conductor*

Metal conduit pipe should generally not be used as an earth-continuity conductor but where used as very high standard of workmanship in installation is essential.

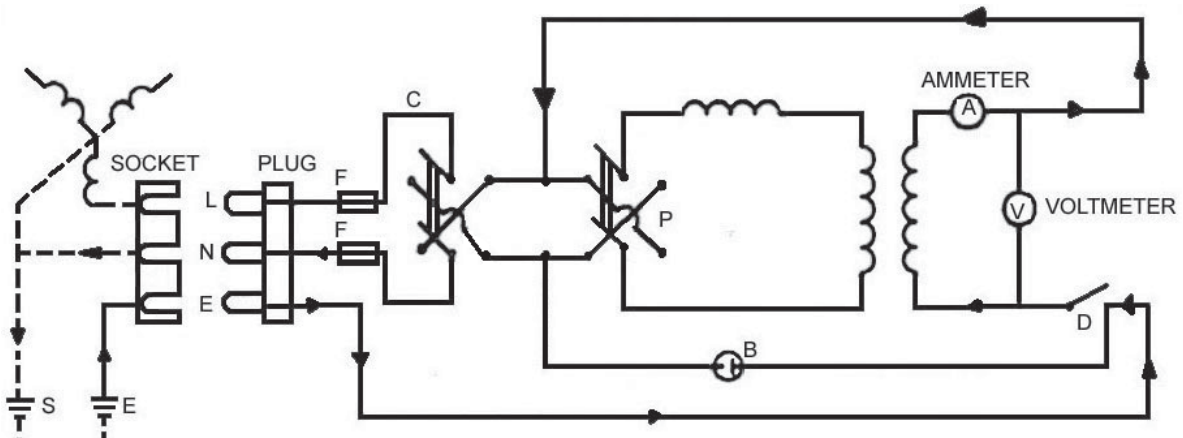
Joints shall be so made that their current-carrying capacity is not less than that of the conduit itself. Slackness in joints may result in deterioration and even complete loss of continuity. Plain slip or pin-grip sockets are insufficient to ensure satisfactory electrical continuity of joints. In the case of screwed conduit, lock nuts should also be used.

7.5.6 *Pipes and Structural Steel Work*

Pipes, such as water pipe, gas pipe, or members of structural steel work shall not be used as earth-continuity conductor.

8 MEASUREMENT OF EARTH LOOP IMPEDANCE

8.1 The current which will flow under earth fault conditions and will thus be available to operate the overload protection depends upon the impedance of the earth return loop. This includes the line conductor, fault, earth-continuity conductor and earthing-lead, earth electrodes at consumer's premises and substations and any parallel metallic return to the transformer neutral as well as the transformer winding. To test the overall earthing for any installation depending for protection on the operation of overcurrent devices, for example, fuses, it is necessary to measure the impedance of this loop under practical fault conditions. After the supply has been connected this shall be done by the use of an earth loop impedance tester as shown in Fig.6. The neutral is used in place of the phase conductor for the purpose of the test. The open-circuit voltage of the loop tester should not exceed 32 V.



A = ammeter
B = neon indicator
C = main switch
D = test switch
E = consumer's earth electrode
F = supply fuse
P = polarity switch
S = substation earth electrode
V = voltmeter

At FF, jacks are provided for insertion of plugs for connection to external neutral and/or earth conductors, if desired.

NOTES

1 Arrows shows current flow in neutral or earth loop.
2 Supply system is shown in dotted.

Fig.6: Circuit Diagram of Earth Loop Impedance Tester

(To be Continued)

Courtesy: National Electrical Code 2011

HELP LINE

Query:

Is there is any standards regarding Rubber Mats used in Electrical Installations?

Mr. B. Paalanikumar, Sivasakthi Electricals, Chennai

Explanation:

Insulation Rubber Mat for Electrical Purposes are used as Floor covering for the protection & prevention of workers from Electric-Shock while working in Electricity generation, Transmission & its distribution or any other related work on AC and DC installations

Indian Standard specification for Insulating mats for electrical purposes IS 15652: 2006 – (superseding IS 5424:1969) has been published. The objective of this standard is to take care of the technological advances and developing consumer needs in the field of insulating mats for electrical purposes. While incorporating practices and experiences of the Indian industry, the standard is on the line of relevant IEC 61111-2002-06 Matting of insulating materials for electrical purposes and sampling plans have been adapted from therein and align with International practice.

Classification:

Electrical Rubber Insulation Mats as per BIS Standard 15652-06 are divided in to three classes depending upon Voltage Ratings. The three classes vary in terms of Thickness of Mats, Voltage Grade, Proof Voltage & their break down voltage.

VOLTAGE RATINGS				
Class	**Thickness**	**Grade KV**	**Proof Voltage**	**B/Down voltage**
A	2.0 mm	3.3	10KV/3 minutes	30 KV
B	2.5 mm	11	22KV/3 minutes	45 KV
C	3.0 mm	33	36KV/3 minutes	65 KV

Construction: Made from Highly Electrical resistant Elastomers, free from any insertions. "Elastomer" (a generic term that includes rubbers, Latex and elastomeric compounds that may be natural synthetic or a mixture or a combination of both). High Voltage Resistant Electrical Insulation Matting is made up of 100% virgin compound.

Colour: Any colour without metallic derivatives.

Surface: Anti-skid (rough on top & smooth at bottom to avoid slippery effects).

Size: Standard size- 1mtr x 2mtr or in Long rolls form.

Working Temperature Range: –10°C to +60°C.

Marking: Mats should be marked with Class, Lot No. and Manufacturer Identity.

Packing: Should be packed in Gunny /Jute /Hessian /HDPE bags to avoid any mechanical damage to the mats.

Silent Features of Electrical Insulating Mats:-

- High Di-Electric Strength up to 65KV.
- Complies to IS:15652-2006 (latest).
- Insulation Resistance Up to 1494000 Mega Ohm.
- Resistant to Fire.
- Hold Excellent Physical Properties so that can withstands movement of instrument involved in Electrical Equipment & Foot Traffic. Resistant to wide range of Acids, Alkalis & Oils.
- Withstands both AC & DC electrical installations.
- Can be Pasted/Installed on Floor if required, not mandatory. Water & moisture proof.
- Exhibit good Elongation & Tensile Strength Properties.

TECHNICAL SPECIFICATION IS:15652-2006				
Sl. No.	**Characteristics**	**Standard Values**		
1	Thickness	2.0mm	2.5mm	3mm
2	Tensile Strength (N/mm^2)	15	15	15
3	Elongation (%)	250	250	250
4	Insulation Resistance with water at 500V	1,000,000MO	1,000,000MO	1,000,000MO
5	Leakage Current at 11KV	10mA	10mA	10mA
6	Dielectric Strength	30KV	45KV	65KV
7	Flame Retardance	5.0sec	5.0sec	5.0sec
8	Effect to Acid, Alkali, Transformer Oil Acid: Tensile Str.(N/mm^2) Elog(%)	% Change from Original Value	% Change from Original Value	% Change from Original Value
9	Alkali: Tensile Str.(N/mm^2) Elog(%) Diesel: Tensile Str.(N/mm^2) Elog(%) T.Oil: Tensile Str.(N/mm^2) Elog	Tensile Strength 20% Elongation 20%	Tensile Strength 20% Elongation 20%	Tensile Strength 20% Elongation 20%
10	Ageing Properties at 70 ±1 (°C) for 168 hrs. Tensile Strength (Elongation %)	% Change from Original Value T.S 25%	% Change from Original Value T.S 25%	% Change from Original Value T.S 25%

Relevant European Standards : BS EN 61111:2009

This standard can be attributed to the International Electro-technical Commission (IEC) and the European Committee for Electro-technical Standardization (CENELEC), which is both committed to electrical safety and the associated European standards. Back in 1992, an official standard was created by the IEC - which would come to be known as BS EN 61111. It was revised back in 2009, so is now referred to as BS EN 61111:2009. All other standards that posed a conflict of interest with this one were withdrawn from the industry.

IEC 61111:2009				
Class	**Thickness**	**Max. Use Voltage**	**AC Proof Voltage**	**Di-electric Strength**
2	3.0mm	17.0 KV	20 KV	30 KV
3	3.0mm	26.5 KV	30 KV	40 KV
4	4.0mm	36.0 KV	40 KV	50 KV

Note: *All the Electrical Rubber mat users henceforth make sure rubber mats are IS 15652: 2006 complied, for their requirements.*

Courtesy : Electric Guru

Anger is the only thing to put off till tomorrow. - Slovakian Proverb

ENERGY STORY IN BRIEF (Part 29)

Renewable Energy – Review of "Biomass Energy"

1. **Renewable Energy:** "Exploration and utilization of renewable energy is the only way to deal with the increasingly severe problems of energy shortage and environmental pollution, and it is also the only way to the sustainable development of our society."

   "Centralized production schemes need to be developed if biomass energy is going to contribute as significantly as it should to meeting the government's goals."

   Energy from Biomass seems to have a Great and Glorious past, a Significant present and a very high potential future.

2. **Bio Mass:** Biomass has been one of the main energy sources for the mankind ever since the dawn of civilization, although its importance dwindled after the expansion in use of oil and coal (Fossils) in the late 19th century. There has been a resurgence of interest in the recent years in biomass energy in many countries considering the benefits it offers. It is renewable, widely available, and carbon-neutral and has the potential to provide significant productive employment in the rural areas. Biomass is also capable of providing firm energy.

Biomass in brief include all wastes from Agriculture, Plants and Trees, wastes from animals, cattle and Poultry, Wastes from Industries and Solid and Sewage wastes from Municipalities. The term Bio Energy refers to all Energy derived from Biomass, to cater to all the types of Energy needs of Heat, Fuel and Electricity. The "Huge" potential in Bio Energy, that it can help Decentralized Distributed Generation of all the three forms of Energy and meet a major portion of demands for Energy, is not fully realised and tapped. India in general and Tamilnadu in particular possess very high potential in this regard and Technology Developments and Application of appropriate Technologies can prove to be a big boon.

3. **Bio Energy Technologies:** Biomass fall broadly under 2 categories of Biodegradables and Combustibles and in terms of applicable Technologies, can be classified into categories that can be subjected to 'Bio Chemical and Thermo Chemical Processing for deriving Energy along with other useful Bi-Products'.

   a. ***Bio Chemical Technologies:*** Technology of Biomethanation and Biogas production in case of Biodegradables has come a long way now but the need here is more and more of High Tech and large capacity Plants and 'Value Adding' Processes. The need for technology applications for 'Enrichment' and various uses of the Biogas including use as Auto fuel in place of Petrol/ Diesel are some of the urgent areas to be addressed.

   b. ***Thermo Chemical Technologies:*** In case of combustibles, Gasification and Combustion technologies are already in application in quite a few places, but the potential is large and the needs are application of appropriate technologies for different kinds of Biomass. Another important Technology for Biomass is Pyrolysis and Bio Refineries for production of 'Pyro oil', which can address the Industrial Heating and Power Generation applications in place of Furnace Oil.

4. **Energy Security and Energy Freedom Concerns:** For India, 'Oil' is a major concern as Petroleum needs is met through large imports of Crude, which, apart from burdening our economy, increases our 'Energy Security' challenges. Around 100 Million Tons of Crude is imported out of total requirements of 130 Million Tons as at present, costing the exchequer about Rs. 3 Lakh Crores.

The major annual consumption of Petroleum Products, based on detailed Statistics, for all Industrial, Commercial, Domestic and Transportation uses, can be summed up as below:

10 to 15 Million Tons of LPG

10 to 15 Million Tons of Petrol

60 Million Tons of Diesel

10 Million Tons of Furnace and Heavy Oils

Technologies are now available for Combustion and Gasification of 'Difficult' and 'Most Difficult' Biomass materials like all kinds of Agriculture and Plantation wastes and Poultry Litter and wastes etc including Municipal Solid waste, with medium and high moisture contents up to 35/40 % and requiring least preparation of Biomass.

Some of the Biomass Technologies of recent origin dealing with Processing of Biomass to 'Oil' and 'Enriched Gas' for replacement of Petroleum Products for 'Heat' 'Auto Fuel' and 'Electricity Generation' can go a long way in helping India to go forward in Energy Security and Energy Freedom. These are already in successful use in many countries and in India too, Pilot Projects are done successfully. Urgent needs are Commercialization and large scale Plants.

5. Bio Energy Questions: The Questions are:-

1) Is it possible to meet, entirely, or at least a 'Good Portion' of, the Oil requirement through "Biogas Energy"?

   Yes, the Technology of 'Enriching and Compression' of Biogas can go to meet almost entirely the Cooking needs of LPG and to a Good extent the fuel Needs of Petrol and Diesel.

2) The Technology of 'Pyrolysis' of Biomass to produce Bio Crude or "Pyro Oil" can go to meet the Industrial Needs of 'Heating' and 'Captive Power Generation' almost completely. Sugar cane 'Trash' forms a very suitable material for this process, which is otherwise burnt in the fields. Any other leafy or woody biomass can all be subjected to Pyrolysis Process.

3) Is it possible to employ the 'Bio Electricity' Technologies to meet the entire or most of the requirements of Electrical Energy needs?

The answer can be positive considering that the present total annual Energy Consumption of the Country is about 700 Billion Units, which will soon go up to 1000 Billion Units, with the following important dimensions of the solutions.

a) Presently, most of the Electrical Energy is derived from Coal, supported by other important sources like Water and Nuclear. Bio Electricity can become a 'Firm Energy' if only the Fuel Supply Chain is organised and maintained, which is definitely possible with multi various sources including Agriculture, Plantations, Agro and other Industries and Municipal wastes. Other 'Infirm Energy' sources like Solar, Wind and Water can support substantially, to meet the present and future total needs.

b) Bio Electricity in essence is only 'Distributed Generation' and thus can help reduce the Transmission and Distribution losses component of the total requirement which is around 30% and more today.

c) Bio Electricity Generation through 'Thermo Chemical' routes have a number of solutions developed already and they require scaling up and full exploitation. Combustion of anything combustible with Calorific Values, Gasification Technologies like Oxygen Free Gasification and Plasma Gasification etc are some of the important Technologies that need to be employed widely.

6. Bio Energy and the State: Tamilnadu is one of the States considered to be rich in Biomass and the following can substantiate.

44 Million Tons of Sugar cane Production per annum

Population of 10 to 12 Crores Coconut Trees and 6 to 8 Crores Palmyra Trees

25 to 30% of total Indian Poultry activities

More than 1 Crore Cattle

Large tracts of "Velikaruvai" or Prosophys…….and so on.

There is Good Scope to employ the various latest Technologies in sizable scale in the State.

7. Action Plan feasible to harness "Bio Energy" Potentials

Rural areas hold substantial potentials for utilization of Biomass for Generation of Electricity and other forms of Energy for meeting their own needs and to export to the common pool resulting in reduction of Carbon Emission and dependence on 'Fossils'. Taluka level approach and Decentralized Distributed Generation can help in all ways for meeting the Energy Needs of growing India.

8. Decentralized Distributed Generation (DDG) and Decentralized Distributed Energy (DDE)

The Government conceived the Idea of DDG mainly as a Solution to address the problem of Remote and interior Rural areas of the Country, which can't be reached easily and economically for providing access to 'Grid Connected Power'. In the present situation of fairly advanced Economy and advancement of Technology and feasible Solutions, it will be appropriate to address the problem and Solution for all kinds of Energy Needs including Electric Power, for all areas**.** The Energy Needs mainly comprise of 3 kinds, namely – Heat, Auto Fuel (Petroleum or suitable equivalent) and Electricity, for Homes, Communities and Industries. Addressing a solution for all Energy Needs comprehensively in a decentralized manner can be the DDE. The DDG or the concept of DDE should also look into the Renewable Sources of Energy, in place of the FOSSIL SOURCES (Coal and Petroleum) of Energy, which are non-renewable and are the most widely used source at present. Fossils are considered as the major contributors to 'Global Warming' and are only available in concentrations in some parts of the Country/World and have to be moved or imported. Detailed Survey of all the Renewable sources available and accessible in a sample area of a Taluka in Tamilnadu , illustrates that, with the application of Technologies available at present, it is possible to address all the Energy Needs through Renewable Sources with probable surplus to share with other areas with deficiency. The different kinds of Energy Needs and Resources and Solutions will be discussed in the following parts.

(To be continued)

S. Mahadevan, B.E., F.I.E., M.B.A., Consultant, Energy and Energy Efficiency
Mobile: 98401 55209

WIND ENERGY SECTOR GETS A FILLIP

One of the major gainers of the Union budget is the wind energy sector, with Finance Minister P. Chidambaram announcing the reintroduction of the Generation Based Incentive (GBI). A sum of Rs. 800 crore is to be provided to the Ministry of New and Renewable Energy (MNRE) for this purpose. "The non-conventional wind energy sector deserves incentives," he said.

The announcement has brought cheers to the players in the sector. They had been demanding this ever since the GBI was withdrawn on April 1 last year. Sources said there was a fall in new installations in the last 10 months. The approximate investment for one MW is Rs. 6 crore and the country lost about Rs. 10,000 crore in wind turbine installations this year. At a budget meeting in Chennai, Indian Wind Turbine Manufacturers' Association (IWTMA) Chairman Ramesh Kymal said: "We are very relieved… the industry was bleeding and about to die… this will be an encouragement."

Describing the reintroduction of GBI as a timely intervention, he said it would rejuvenate the sector with more investments. It assumed greater significance as an ambitious capacity-addition plan was being pursued in the current Plan period.

Courtesy: The Hindu, dt: 01.03.2013

INTERNATIONAL WOMEN'S DAY [MARCH 8]

History

International Women's Day first emerged from the activities of labour movements at the turn of the twentieth century in North America and across Europe. In 1909, The first National Woman's Day was observed in the United States on 28 February. The Socialist Party of America designated this day in honour of the 1908 garment workers' strike in New York, where women protested against working conditions. In 1910, The Socialist International, meeting in Copenhagen, established a Women's Day, international in character, to honour the movement for women's rights and to build support for achieving universal suffrage for women. The proposal was greeted with unanimous approval by the conference of over 100 women from 17 countries, which included the first three women elected to the Finnish Parliament.

Top 5 Reasons you should CARE about International Women's Day

Today marks the 101st anniversary of International Women's Day. Although the status of women worldwide may look significantly different today than it did in the early 1900s when the holiday was first established, now is an opportune time to reflect not only on the great strides that have been made towards female empowerment in the last century, but also on all the work that remains to be done. Here are a few poignant examples of the pervasiveness of women's marginalization and lack of equality around the world to serve as reminders for why everyone, both men and women, should see female empowerment and gender equality as an utmost global priority:

(1) Violence against Women is Rife Worldwide – The pervasiveness of violence against women is best illustrated by the simple fact that today, one in three women will be the victim of violence. That's *over 1 billion individuals.* It goes without saying that existing efforts and global awareness need to be increased exponentially in order to effectively begin chipping away at this pervasive injustice. While innovative initiatives like the V-Day Campaign are committed to leading the charge against this, given the scale of the problem, it goes without saying that existing efforts and global awareness need to be increased exponentially in order to effectively begin chipping away at this pervasive injustice.

(2) Women are Under-Represented in Politics – Comprising over half the world's population, women occupy less than 20% of parliamentary seats worldwide. In the United States, women make up 17% of Congress (a decline in recent years).Without sufficient representation in government, societies will continue to undervalue and ignore the challenges uniquely or disproportionately faced by their female populations.

(3) Women are Disproportionately Affected by Conflict – Nearly 80% of the world's 27 million refugees who are displaced by conflict are women and children. Furthermore, the systematic rape of women historically has and continues to be a tactic frequently deployed during war, resulting in the consistent degradation of women living through conflict.

(4) Women are More Likely to Suffer from Poverty and Lack of Education – Estimates state that 70% of the world's poor are women, and while some debate may exist surrounding how this statistic was developed, it is well known that women consistently are underpaid for performing the same work as men in several countries. What's more, nearly two-thirds of the world's billion illiterate adults are female.

(5) Double Standards Exist on how our Societies Perceive, Value, and Judge Men and Women – and finally, the recent political hullaballoo surrounding the issue of healthcare coverage for contraception – including the absence of a single woman on the panel of a Congressional hearing to contraception coverage, and Rush Limbaugh's slander of Sandra Fluke, and the support he has received – reminds us that much progress remains to be made for changing the way our own society perceives women. Regardless of one's opinion on the issue itself, the fact that his and many similarly derogatory remarks have been seen as acceptable to a significant degree should be cause enough for alarm and serious reflection on the way our society today perceives and values women.

Courtesy: http://www.policymic.com, http://www.un.org

The greatest mystery of all time is not related to science at all, but are the WOMEN all along. Today, March 8, marked the celebration of Women's Day all around the globe, giving us all an opportunity to recognize the most "mysterious" specie God has ever invented. Roll up your greetings and spread Women's Day Messages to the world. - Famous British Scientist STEPHEN HAWKING

VELU NACHIYAR

RANI VELU NACHIYAR

Born	3 January 1730 Sivaganga, Tamil Nadu, India
Died	the exact date of her death is not known (it was about 1790). Sivaganga, Tamil Nadu, India
Occupation	Queen of Sivagangai, Tamil Nadu, Circa 1760-1799
Succeeding State	British India

Rani Velu Nachiyar was an 18th century Indian Queen from Sivaganga. Rani Velu Nachiyar is the first Queen of Tamil Origin to fight against the British in India.

Her life

She was the princess of Ramanathapuram and the daughter of Chellamuthu Sethupathy. She married the king of Siva Gangai and they had a daughter - Vellachi Nachiar. When her husband Muthuvaduganathaperiya udaiyathevar was killed, she was drawn into battle. Her husband and his second wife were killed by a few British soldiers and the son of the Nawab of Arcot. She escaped with her daughter, lived under the protection of Hyder Ali at Virupachi near Dindigul for eight years. During this period she formed an army and sought an alliance with Gopala Nayaker and Hyder Ali with the aim of attacking the British. In 1780 Rani Velu Nachiyar fought the British with military assistance from Gopala Nayaker and Hyder Ali and won the battle. When Velu Nachiyar finds the place where the British stock their ammunition, she builds the first human bomb. A faithful follower, Kuyili douses herself in oil, lights herself and walks into the storehouse. Rani Velu Nachiyar formed a woman's army named "udaiyaal" in honour of her adopted daughter — Udaiyaal, who died detonating a British arsenal. Nachiar was one of the few rulers who regained her kingdom and ruled it for 10 more years.

Velu Nachiyar is the first queen who fought for the freedom against British in India and succeeded.

The Queen Velu Nachiar granted powers to Marudu brothers to administer the country in 1780. Velu Nachiar died a few years later, but the exact date of her death is not known (it was about 1790). Marudu brothers are the sons of Udayar Servai alias Mookiah Palaniappan Servai and Anandayer alias Ponnathal. They are native of Kongulu street of Ramnad. They belonged neither to the family of the ancient poligars nor to their division of the caste.

On 31st December 2008, a commemorative postage stamp on her was released.

`

EYE HEALTH TIPS

Your eyes are an important part of your health. There are many things you can do to keep them healthy and make sure you are seeing your best. Follow these simple steps for maintaining healthy eyes well into your golden years.

Have a comprehensive dilated eye exam. You might think your vision is fine or that your eyes are healthy, but visiting your eye care professional for a comprehensive dilated eye exam is the only way to really be sure. When it comes to common vision problems, some people don't realize they could see better with glasses or contact lenses. In addition, many common eye diseases such as glaucoma, diabetic eye disease and age-related macular degeneration often have no warning signs. A dilated eye exam is the only way to detect these diseases in their early stages.

During a comprehensive dilated eye exam, your eye care professional places drops in your eyes to dilate, or widen, the pupil to allow more light to enter the eye the same way an open door lets more light into a dark room. This enables your eye care professional to get a good look at the back of the eyes and examine them for any signs of damage or disease. Your eye care professional is the only one who can determine if your eyes are healthy and if you're seeing your best.

- **Know your family's eye health history.** Talk to your family members about their eye health history. It's important to know if anyone has been diagnosed with a disease or condition since many are hereditary. This will help to determine if you are at higher risk for developing an eye disease or condition.
- **Eat right to protect your sight.** You've heard carrots are good for your eyes. But eating a diet rich in fruits and vegetables, particularly dark leafy greens such as spinach, kale, or collard greens is important for keeping your eyes healthy, too.[i] Research has also shown there are eye health benefits from eating fish high in omega-3 fatty acids, such as salmon, tuna, and halibut.
- **Maintain a healthy weight.** Being overweight or obese increases your risk of developing diabetes and other systemic conditions, which can lead to vision loss, such as diabetic eye disease or glaucoma. If you are having trouble maintaining a healthy weight, talk to your doctor.
- **Wear protective eyewear.** Wear protective eyewear when playing sports or doing activities around the home. Protective eyewear includes safety glasses and goggles, safety shields, and eye guards specially designed to provide the correct protection for a certain activity. Most protective eyewear lenses are made of polycarbonate, which is 10 times stronger than other plastics. Many eye care providers sell protective eyewear, as do some sporting goods stores.
- **Quit smoking or never start.** Smoking is as bad for your eyes as it is for the rest of your body. Research has linked smoking to an increased risk of developing age-related macular degeneration, cataract, and optic nerve damage, all of which can lead to blindness.
- **Be cool and wear your shades.** Sunglasses are a great fashion accessory, but their most important job is to protect your eyes from the sun's ultraviolet rays. When purchasing sunglasses, look for ones that block out 99 to 100 percent of both UV-A and UV-B radiation.
- **Give your eyes a rest.** If you spend a lot of time at the computer or focusing on any one thing, you sometimes forget to blink and your eyes can get fatigued. Try the 20-20-20 rule: Every 20 minutes, look away about 20 feet in front of you for 20 seconds. This can help reduce eyestrain.
- **Clean your hands and your contact lenses properly.** To avoid the risk of infection, always wash your hands thoroughly before putting in or taking out your contact lenses. Make sure to disinfect contact lenses as instructed and replace them as appropriate.
- **Practice workplace eye safety.** Employers are required to provide a safe work environment. When protective eyewear is required as a part of your job, make a habit of wearing the appropriate type at all times and encourage your co-workers to do the same.

BABY'S EYE HEALTH

In this critical first year, your baby's brain and eyes begin to coordinate images and remember what they've seen. You can participate in your newborn's eye development and health as a normal part of your time with your baby.

To your baby, *everything* is new and exciting. And your baby's vision is one of the most important links to their new world.

In their first weeks and months, babies learn to use their eyes – and their eyes actually "learn" how to see. While each eye has the physical structure it needs to begin to see, the two eyes haven't learned to work together yet.

The best way to help keep your baby's eyes healthy is through regular professional examinations. Chances are your pediatrician will examine your baby's eyes in one of the first few visits. This simple examination will determine if there are any early vision or eye concerns. Babies

should have a comprehensive eye exam by a licensed eye doctor by six months.

A balanced diet can make the difference in overall health and wellness. While your baby will not be eating from all four food groups for awhile, knowing which foods contain the nutrients that may promote eye health can help you start making these choices as part of your diet, too.

TEENAGERS'S EYE HEALTH

Teenager Eyes

What's important in this stage of eye development is that your eyes stay healthy - good vision is vital for just about every activity you choose—and you want to keep your 20/20 vision for many years to come.

How Many Teenagers Need Vision Correction?

One in every four students needs vision correction. If you're the one in four, you've probably been wearing eyeglasses for a while. The real question is when is the right time to make the switch to contact lenses? Your parents and you can talk with your eye care professional about the contact lenses that are right for you – and, most important, the commitment involved in wearing and caring for your lenses – and your eyes – every day.

What Vision Changes Do Teenagers Experience?

Your vision may change frequently during the school years. The most common problems are due to the development and progression of Nearsightedness (myopia). In addition, the existence of eye focusing and/or eye coordination problems can affect school performance in the classroom or during after-school sports and activities. The best way to protect your vision is with regular professional eye examinations. You may be at special risk for eye problems if there is a family history of eye disease, diabetes, high blood pressure or poor vision. In between examinations, if you notice a change in your vision or your eye is injured in any way, ask your parents to contact your eye doctor.

The best way to keep your eyes healthy is to get plenty of rest, eat foods rich in antioxidants, take special care when applying make-up and hair spray, and – most of all – wash your hands often to help keep your eyes free of germs and bacteria that cause eye infections.

What about Sports?

It shouldn't come as a surprise that teens are in the highest risk category for serious eye injuries, especially when playing racquet sports like tennis or racquetball. Always wear sports goggles or shields for proper eye protection. Many goggles can actually improve your sports vision whether you need vision correction or not. New technology lenses give you the edge you need by reducing glare, enhancing contrast, and substantially reducing exposure to UVA and UVB rays.

20S AND 30S EYES

Eye Safety

Most people know their eyesight is precious, but at this age they don't think as much about protecting their eyes as they should. Eye safety means taking proactive measures to ensure the same quality of eyesight you currently enjoy. If your eye is injured you should get immediate medical attention. 40% of hospital admissions for eye injuries are related to sports and 71% of those injuries happen to people under the age of 25.

Sports Safety

Goggles and shields do much more than protect your eyes from injury. Many goggles or safety glasses come with tints to reduce sun glare, light filtering capabilities that make it easier to see certain colors (like yellow tennis balls), and polycarbonate lenses that stand up to sudden, sharp impact. Choose the right goggles or shield for your sport.

Work and Home Safety

Two of the most common places for eye injuries to occur are home and work. Often, people in industrial settings are susceptible to projectiles that can injure the eye. And at home, many household cleaners can cause injury to the eyes – in addition to various home improvement projects that have a potential for danger. The best advice we can give is to use your common sense – if you're working on a project that can cause harm to your eyes, make sure you're safe with the proper protective eyewear.

Sunglasses

Sunglasses not only look good, they're good for you. Protect yourself from harmful UV rays today to help prevent damage tomorrow. Choose sunglasses with both UVA and UVB protection , A hat will help block indirect sun, which can come into the eyes around the edges of sunglasses.

At the Computer

Computer images are created from thousands of tiny dots – so there is no distinct image for your eye to actually focus on. You have to focus and refocus to keep the images sharp – and after two hours you end up with the same kind of repetitive stress in your eye muscles that the keyboard causes in your wrists.

- It won't cause permanent damage, but here are some tips to minimize eye stress:
- Keep your computer screen within 20"-24" of your eyes
- Keep the top of your computer screen slightly below eye level
- Minimize the distance between your computer screen and any documents you need to reference while working
- Use drops, such as Bausch & Lomb Advanced Eye Relief™ Dry Eye Environmental Lubricant Eye Drops, to soothe irritated, dry eyes
- Adjust lighting to minimize glare
- Take a break every 15 minutes to focus on a distant object
- Blink frequently

First Aid

If your eye is injured, it's tempting to think you can just flush it out with some cold water and it will be fine. Even

if you're doing all the right things to keep your eyes safe, accidents can happen. However, it's not easy to judge the extent or severity of any eye injury, so you should ***always get immediate, professional medical attention***.

Here are some steps you can take in the event of an eye injury:

- **Trauma to the Eye** If you are hit in the eye, rest a protective shield – such as a Styrofoam cup – on the bone around your eye. Make sure there is no pressure on the eye itself. Seek immediate, professional medical attention.
- **Foreign Body** If an object has entered your eye, do not try to remove it; you may tear delicate tissue or force the object in deeper. Rest a protective shield – again, like a Styrofoam cup – on the bone around your eye, making sure there is no pressure on the eye itself. Seek immediate professional medical attention.
- **Black Eye** If you are hit in the eye area, place an ice pack or cold cloth over your eye. Get immediate, professional medical attention.
- **Chemical Burn** If your eye has sustained a chemical burn, rinse it with fresh water for at least 20 to 30 minutes. Hold your head under the tap or use a clean container to pour water into your eye. As you rinse, use your fingers to hold your eye open as wide as possible and roll your eye to ensure the greatest possible coverage. Get immediate, professional medical attention.

The following symptoms may signal serious eye injury:

- Obvious eye pain or vision problem
- Cut or torn eyelid
- One eye that does not move as completely as the other
- One eye that protrudes more than the other
- Abnormal pupil size or shape
- Blood in the white of the eye
- Something imbedded in the eye
- Something under the eyelid that cannot be easily removed

40S AND 50S EYES

You rely on your sight to enjoy life to the fullest, but as you reach your 40s and 50s, you may notice your vision starting to change. As you age, the muscles of the eye become less flexible, and have a harder time focusing on objects that are close. You may need more light to see. You may have a harder time differentiating shades of blue and green. These are all indications of a condition called presbyopia. This condition is completely natural, and happens to almost everyone. Think of it as just another stage in your eye development.

You may also notice that just about everyone in your age group uses some type of vision correction, like eyeglasses or multifocal contact lenses. Beyond corrective lenses, there are other options to consider: If you're nearsighted (myopic), farsighted (hyperopic) or you have astigmatism and you'd like to make vision correction unnecessary, laser surgery and *Vision Shaping Treatment* (*VST*) are two safe and effective alternatives. Be sure to visit the eye doctor regularly – and learn about all the potential eye concerns related to your particular age group. By being well-informed, you can learn to recognize signs of trouble – and possibly cure or slow a sight-threatening disease. In between eye exams, if you notice a change in your vision – or if your eye becomes injured in any way – contact your doctor.

Getting the right amount of rest, regular exercise, and proper nutrition are vital for your long-term eye health. Studies have shown that antioxidant minerals and other vitamins may help defend against free radicals and help prevent related diseases. Free radicals are unstable molecules – unchecked, they can damage cells in the eye, which may lead to serious vision problems, such as cataracts and age-related macular degeneration.

60+ EYES

You've worked hard; at last there is time to focus on yourself. Time to enjoy friends or grandchildren, read a book or play a round of golf. And enjoy your continued good vision. It's a fact of life that your eyesight changes as you get older, sometimes significantly – but this doesn't have to compromise your lifestyle.

That's why regular Eye Exams are even more important as we age. Be sure to visit your eye doctor and learn about potential Eye Concerns. By being well-informed, you can recognize signs of trouble – and possibly slow the progression a sight-threatening disease.

You might not realize that other health issues can affect the strength of your vision as well. In particular, diabetes and high blood pressure can lead to vision problems – especially if these conditions are allowed to continue without treatment. When you see your eye doctor, list all of your current health issues and your family history of illness. The more your eye care professional knows, the more they can help protect your eye sight for years to come.

Long-term Eye Health is also maintained by exercise, diet, and rest. Exercise improves blood circulation, which improves oxygen levels to the eyes and removes toxins. Make sure you are eating foods rich in antioxidants and getting enough rest. Studies have shown that antioxidant minerals and other vitamins may help combat free radicals, and slow or prevent related diseases. Free radicals are unstable molecules – unchecked, they can damage cells in the eye, which may lead to serious vision problems, such as Cataracts and age-related macular degeneration (AMD). Proper eye care doesn't have to be expensive. In fact, many insurance policies will cover the cost of routine eye exams as well as any treatments your doctor may prescribe. Some may even cover or contribute to the cost of vision correction such as prescription of eyeglasses or contact lenses.

Courtesy: http://www.bausch.com

CONCEPT OF DHARMA

ROLE OF WOMEN IN PROTECTING AND TRANSMITTING CULTURAL VALUES

It is historical truth that inspite of invasion by foreigners destruction of thousands of temples which were cultural centres, devastating wars, political subjugation for centuries, our culture has survived. It is Mrithyunjaya [IMMORTAL]. We also declare that whereas many ancient civilizations were destroyed, ours could not be. What is the reason? If we make an indepth study of our family system, we are sure to realize that it is the women who played their role in the capacity of wife, mother, sister, sister-in-law and grandmother etc, and protected and preserved our cultural values. Each house was a school and a temple. It was the cultural centre and mother was the first guru. Children used to secure pre-primary oral education in basic moral values and patriotism in the house, and sense of service and sacrifice. The role of women has been one of suffering and sacrifice for the family and for the Nation. Our history speaks in volumes about the heroic and magneficient role played by women in protecting, preserving and transmitting cultural values. This is the reason for our culture, being indomitable and indestructible.

But, unfortunately on account of influence of western civilizational values, which crept into our Society during British rule, such as false sense of progress and prosperity, desire for material pleasure, self enjoyment instead of self sacrifice, the role of women has been weakened.

In this regard, views expressed by Satguru Sivyaya Subramaniyaswami of SriLanka origin who is carrying on struggle for Hindu renaissance since 1949 and who is having his head quarters at Hawai Island of Kauai, are highly enlightening and reawakening. They are extremely useful and relevant for our "Samskriti Varsha Campaign".

Some of the excerpts from his speech entitled "The hand that rocks the cradle rules the world" are:

"The Hindu women is looked upon as most precious. Two thousand years ago Saint Tiruvalluvar observed: ***"What does a man lack if his wife is worthy? And what does he possess if she is lacking worth."***

Mother's place is within the home and not out in the world working. When she is in the home all day, she brings love and security to the children, sensitivity and stability to the husband. By raising her children, she changes the course of history. How does she do that? She raises strong children, good and intelligent children. They will grow up to be the great men and women in the community, the leaders of the Nation. They will be the teachers, the doctors, then lawyers, the architects, the presidents and most importantly the spiritual leaders. They will be the scientists and men of vision, the inventors, the pioneers and poets, the artists and sculptors and creators in all dimensions of life. It is such men and women who change the course of human history. This is the great power held by the mother and by no one else; to properly mould the mind and character of her children.

The mother is the child's first guru, and she alone can shape the mind in those impressionable years. So you can all see the truth in the old saying.

"The Hand that Rocks the Cradle Rules the World".

In these words, there is a clear exposition of the role of women in producing good individuals. It is unnecessary to explain or elaborate women's role and power to keep human being on rails has been beautifully put by Satguru in an inimitable style. Not withstanding the fact that women have to take up employment or any independent avocation or profession or political, administrative or social responsibilities, their role as mother remains the same.

Satguru also added:

"Of course, she also holds the opposite power, expressed through neglect, to allow her children to grow up on their own, on the streets where they will learn a base life. Such children will surely change society and human history, but negatively.

It is a proven fact that most of the people in prison were neglected or beaten as children. It is also a proven fact that nearly all parents who mistreat their children were themselves mistreated by their parents. Unless mothers care and love their children, society will inherit an entire generation of frustrated adults who were once frustrated children. These will later be the people who rule the World."

It is only the women power "***Matru Shakti***" which can save our Nation from catastrophe.

HOME FESTIVALS

Chitrai (April/May)

This month begins with the completion of Ram Navami, the nine days of celebration of Lord Rama's birth ages ago, which started in the previous month. At the upper left we see a decorated picture of Lord Rama's coronation. Next (Proceeding clock wise) comes a Vaisnava priest telling the stories of Lord Rama's birth and life; behind him are great parts of *paanagan,* a delicious drink of sugar and ginger, and a basket of *sundal*, spiced chickpeas, served to the storyteller's guests, who also receive palm fans, as this is the hot season. Tamil New Year often falls on April 14 (as does the New Year of several other communities). The lady at upper right is shown with the new clothes and jewellery which are part of the celebration, as well as bananas, mangos and the ingredients for *vepon pu pachadi*, a combination of bitter neem blossoms, sugar and mango – a reminder to face the unpleasant in life with a sweet smile. At lower left is the marriage of Siva and Parvati, Meenakshi Kalyanam, with brother Vishnu pouring the sacred ganga water on the earth joined hands. At lower right is the dark form of Yama, Lord of Death, who figures in three stories associated with this month; that of Savitri, who won her husband back from Yama in a battle of wits; Nachiketas, the boy who extracted three boons from Him and Markandeya, who won eternal youth from Lord Yama through the worship of the Sivalinga.

(To be continued)

HUMOUR

- Principal To Student..."I Saw U Yesterday Rotating Near Girls Hostel Pulling Cigarette... ?"
- Class Teacher Once Said :" Pick Up The Paper And Fall In The Dustbin!!!"
- Once Hindi Teacher Said...."I'm Going Out Of The World To America.."
- "..DON'T TRY TO TALK IN FRONT OF MY BACK.."
- Don't..Laugh At The Back Benches...Otherwise Teeth And All Will Be Fallen Down.....
- It Was Very Hot In The Afternoon When The Teacher Entered.. She Tried To Switch The Fan On, But There Was Some Problem. And Then She Said " Why Is Fan Not Oning"
- Teacher In A Furious Mood... Write Down Ur Name And Father Of Ur Name!!
- "Shhh... Quiet... The Principal Is Revolving Around College"
- My Manager Started Like This "Hi, I Am Madhu, Married With Two Kids"
- "Will U Hang That Calendar Or Else I'll HANG MYSELF"
- LIBRARIAN SCOLDED, "IF U WILL TALK AGAIN , I WILL KNEEL DOWN OUTSIDE!"
- Chemistry HOD Comes And Tells Us... "My Aim Is To Study My Son And Marry My Daughter"
- Tomorrow Call Ur Parents Especially Mother And Father
- "Why Are You Looking At The Monkeys Outside When I Am In The Class?!"
- Lab Assistant Said This When My Friend Wrote Wrong Code.. "I Understand. You Understand. Computer How Understand??"
- Seeing The Principal Passing By, The Teacher Told The Noisy Class.. "Keep Quiet, The Principal Has Just Now Passed Away!"
- Once Teacher Told "If U Talk So Loudly I Will Stand Uping U!"
- Teacher To Students: Don't Spit Outside, The Understanding People Will Suffer!
- I Have 3 Daughters, All Are girls!

- What is the correct meaning of RELIABILITY ?

  A) "RE - LIABILITY" = The Ability to take and have LOAN agaia and again !

  B) "RE - LIE - ABILITY = The Ability to tell 'LIE' again and again !

- What is the correct meaning of PAIN ?

  POSITIVE ATTITUDE IN NEGATIVITY (Negative Situation). One must feel PAIN, not by problem but to solve any problem.

- Getting 'UPSET' can not solve any problem/thing. One must Always get 'UP' and 'SET' things, realising the PAIN !

- Wat is the expantion of "FRIEND" ?

  'F' = Faithful., 'R' = Reliable., (in its original meaning), 'I' = Ideal., 'E' = Earnest., 'N' = Nearer., 'D' = Dearer. There is no other Explanation and hence friend has that last 3 letters!

- How the name "HOTEL" came ?

  The Last three letters - "TEL"; and the First three letters - "HOT". When you go to a Hotel and 'TEL' the waiter, he brings that order very 'HOT'. This is simple you know?

- HUMOUR is DIVINE !

  The strength stands in its First 3 letters, 'HUM' ("WE" in Hindi language) and the Last 3 letters "OUR". Hence there is no " I " and " MINE ", to realise the DIVINE.

"TIRUKKURAL" ON WATER AND RAIN

As Tiruvalluvar starts writing the "Kurals", the importance of Water is stressed by him, keeping the very first chapter after the Prayers, dealing with Rain and Water.

The essence of Kurals 11 to 20 given below will illustrate the Power and the Depth.

Rain's continuance sustains existence
Life's vital ambrosia — Kural 11

thde¤dW cyfk toqf¤ tUjyhy
jhdmk¤ojk vdW z uw ghwW. — Fws 11

Rain produces wholesome food
Thus itself food — Kural 12

JgghHfFj Jggha Jgghff¤j JgghHfFj
Jggha J}ck kio. — Fws 12

Although surrounded by ocean
Rainless nations starve — Kural 13

t¤z, dW nghagg¤d t¤h¤eH t¤aDyfjJ
cse¤dW clwWk gr¤. — Fws 13

When fruitful rains diminish
Farmer's ploughs cease — Kural 14

Vh¤d cohmH cotH Ganyd Dk
thh¤ tsqFdw¤f fhy. — Fws 14

As rain ruins us
Rain raises us — Kural 15

nfLggJ}ck nfllhHfFr rhHthakwW MqNf
vLggJ}ck vyyhk kio. — Fws 15

When clouds grow shy
Even grasses fail — Kural 16

t¤Rkg¤d Js¤to¤d myyhykwW MqNf
gRkGy jiyfhz G mh¤J. — Fws 16

When clouds refuse rain
Mighty oceans diminish — Kural 17

neLqflYk jdeHik FdWk jbeJvo¤y¤
jhdeyfh jhf¤ t¤bd. — Fws 17

When drought dusts lives
Religious ritual perishes — Kural 18

r¤wgnghL G+rid nryyhJ thdk
twfFNky thNdhHfFk<z L. — Fws 18

When Heaven retains rain
Charity abandons Earth — Kural 19

jhdk jtk,uz Lk jqfh t¤adcyfk
thdk toqfhJ vd¤d. — Fws 19

As rain maintains rivers
Water sustains life — Kural 20

eH,dW mikahJ cyFvd¤d ahHahHfFk
thd,dW mikahJ xOfF. — Fws 20

WHAT IS THE DIFFERENCE?

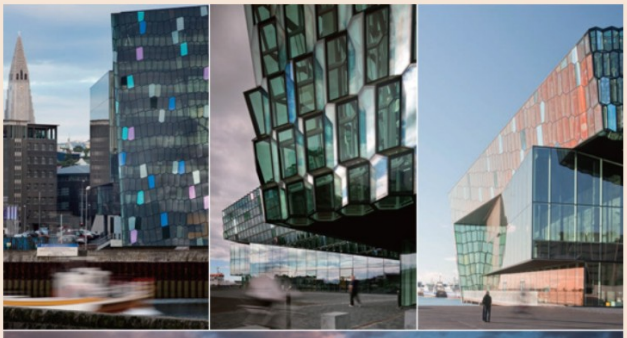
Between WAR and BATTLE

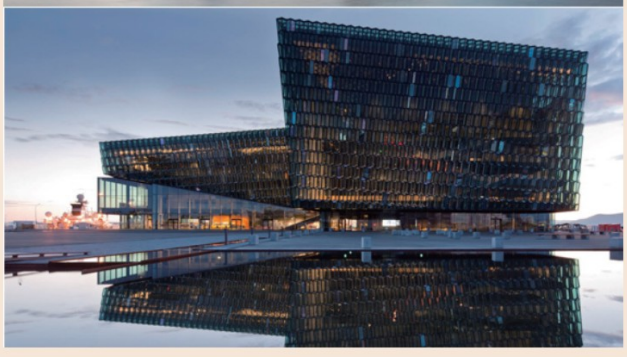
BATTLE - An encounter between opposing forces: an important battle in the Pacific campaign. Armed fighting; combat: wounded in battle. A match between two combatants: trial by battle. A protracted controversy or struggle: won the battle of the budget. An intense competition: a battle of wits.

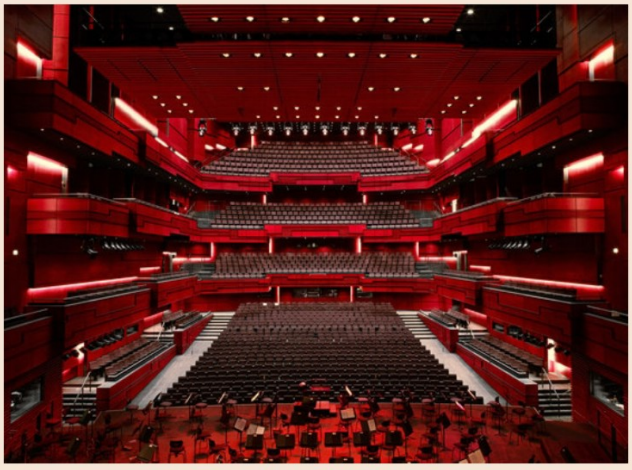
WAR - A state of open, armed, often prolonged conflict carried on between nations, states, or parties. The period of such conflict. The techniques and procedures of war; military science. A condition of active antagonism or contention: a war of words; a price war. A concerted effort or campaign to combat or put an end to something considered injurious: the war against acid rain.

"The World does not exist without Water" - Tiruvalluvar

HARPA CONCERT & CONFERENCE CENTRE







The National Concert & Conference Centre forms part of an extensive harbour development project in Reykjavik, the East Harbour Project, Iceland. Situated outside the city's building mass, the building will become a significant icon in the city - a visual attractor with a powerful and varying expression. The isolated location will mean that, to a great extent, the changing climatic and light effects will be exposed in the facades of the concert building, often in contrast to the narrow and shady streets in the rest of the city.

The Concert and Congress Centre of 29,000 m^2 is situated in a solitary spot with a clear view of the enormous sea and the mountains surrounding Reykjavik. The Centre features an arrival- and foyer area in the front of the building, four halls in the middle and a backstage area with offices, administration, rehearsal hall and changing room in the back of the building. The three large halls are placed next to each other with public access on the south side and backstage access from the north. The fourth floor is a multifunctional hall with room for more intimate shows and banquets. Seen from the foyer, the halls form a mountain-like massif that similar to basalt rock on the coast forms a stark contrast to the expressive and open facade. At the core of the rock, the largest hall of the Centre, the Concert Hall, reveals its interior as a red-hot center of force.

Henning Larsen Architects has designed the facade of the concert building in close collaboration with the local architects Batteriid and the Danish-Icelandic artist Olafur Eliasson. Transparency and light are key elements of this build; working with these the aim was to dematerialise the building as a static entity, thus making it receptive to the changes in its surroundings as well as creating shifts in its appearance when viewed from various angles in the city and from the sea. The team has worked with both artificial and natural light, partly on the basis of studies of the Icelandic.

Lighting by Zumtobel.

Courtesy: http://www.architonic.com