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CEEAMA
Consulting Electrical Engineers Association of Maharashtra

CEEAMA E-NEWS

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From the Secretary's Desk

Dear All,

I am happy to inform you that CEEAMA is actively following up Energy Department for the accreditation of electrical engineers to the position of Chartered Safety engineer. CEEAMA has submitted the letter to minister for taking due steps to take decision on this.

It is a matter of time only to get the accreditation to CEEAMA members. We all at CEEAMA shall be ready to grab this opportunity immediately. This will generate new business opportunities. The certificate issued by Chartered Safety Engineer will be valid and accepted by Ministry of Power and Energy.

CEEAMA wants to know following from you, if the accreditation is implemented then

1. What shall be the responsibility of the Chartered Safety Engineer.
2. What shall be the fees of the certifications issued by Chartered Safety engineer
3. What shall be the penalty for false certification.
4. Any other suggestion for the implementation of the policy.

Your suggestions are welcome. Pl send them on my email id namely suhas.keskar@ceeama.org. This will be considered while discussing with Government and Energy Ministry.

Further we have observed that many of the engineers don't possess the certificate of Chartered Engineer. In our opinion one must possess the same. For information of all I am giving the procedure as below:

1. Contact local Institute of Engineers Office. In Maharashtra the list is available on https//ieimsc.org.
2. Visit the local Centre and ask for Chartered Engineer registration form.
3. Collect the form and complete the same.
4. The local Centre will guide for the documents to be enclosed with the application.
5. Submit the document and form.
6. For recommendation signature I am or any other IEI member is available.
7. Pl note this certificate will be necessary to apply for registration as a Chartered Safety Engineer.
8. CEEAMA appeals all his members to apply at their respective IEI centers and get this certificate at the earliest.

Come let us join our hands for strengthening CEEAMA.

Best Regards,

Suhas Keskar

Hon. Secretary

In This Issue...

What is New?

High-Performance Switching for Electrical Networks

Just as a light switch is needed to turn on a living-room lamp, an electrical grid also needs switches to control its energy flows. This task is performed by switchgear that closes or interrupts electrical circuits.

In fact, the importance of switchgear is increasing as more power is generated from renewables. The reason is obvious: the supply of power from renewable energy sources is very volatile; grid operators must therefore intervene more frequently in the operation of power grids and control the flow of energy using switchgear.

One way to perform switching without SF6 is to use vacuum switching technology. This has been used successfully for decades in medium-voltage systems. Technologically, vacuum switches have many advantages. They can switch up to several hundred thousand times before requiring maintenance, which results in much lower servicing costs compared with SF6-based solutions.

It is therefore quite conceivable that the future belongs not to one technology or the other but to hybrid solutions, especially in the field of high-voltage systems.

Link for Further Reading:

High-Performance Switching for Electrical Networks

By Siemens

Contributed By Mangesh Shirgaonkar

Technical note

Subject: Effects of Low & High Voltage on Motor

Mr Surendra Modi, wishes to share his experience of high voltage on motors. As per him Motor burning rate was High appx 10-12% of total per month in the textile mill where he worked.

The factory Mafatlal Industry received power supply at 6.6KV from Tata Power. Power fed from 6.6KV / 415V transformers were unregulated, due to OFF load transformers. The voltage levels were high during night time touching 480/500V.

As the load requirement increased, the incoming supply voltage was changed from 6.6KV to 22KV with the installation of one number 22KV/6.6KV off load transformer, along with associated switchgear. Here too the voltage level was un regulated.

With no support from Tata power on the problems of high voltage, engineers at Mafatlal adjusted the tap of their 6.6KV/415V transformer, so that the output voltage comes to 380/415V. As a result of this the motor burn out was reduced to 3-4%.

Analysis of the above situation:

Ideally in a case like this the utlity has unregulated supply voltage at 6.6KV or 22KV, while the voltage level of 11KV is regulated. (Transformers are having ON load tap changer). When the utility supplies unregulated voltage, the consumer has to provide ON load Tap changer for their distribution transformers. Which was not provided by Mafatlal Industry. Hence controlling of voltage levels was a difficult task.

Single-phase motors tend to be more sensitive to overvoltage than do 3-phase motors.

Overvoltage can drive up amperage and temperature even on lightly loaded motors. Thus, high voltage can shorten motor life even on lightly loaded motors.

Efficiency drops with either high or low voltage.

Power factor improves with lower voltage and drops sharply with higher voltage.

Inrush current goes up with higher voltage.

Low voltage can lead to overheating, shortened life, reduced starting ability, and reduced pull-up and pullout torque. The starting torque, pull-up torque, and pullout torque of induction motors all change, based on the applied voltage squared. Thus, a 10% reduction from nameplate voltage (100% to 90%,)

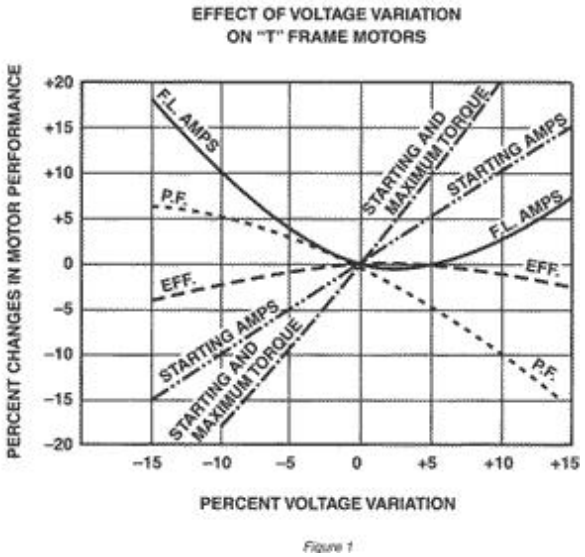


Figure 1

would reduce the starting torque, pull-up torque, and pullout torque by a factor of .929. The resulting values would be 81% of the full voltage values. At 80% voltage, the result would be .828, or a value of 64% of the full voltage value.

High voltage on a motor tends to push the magnetic portion of the motor into saturation. This causes the motor to draw excessive current in an effort to magnetize the iron beyond the point where magnetizing is practical.

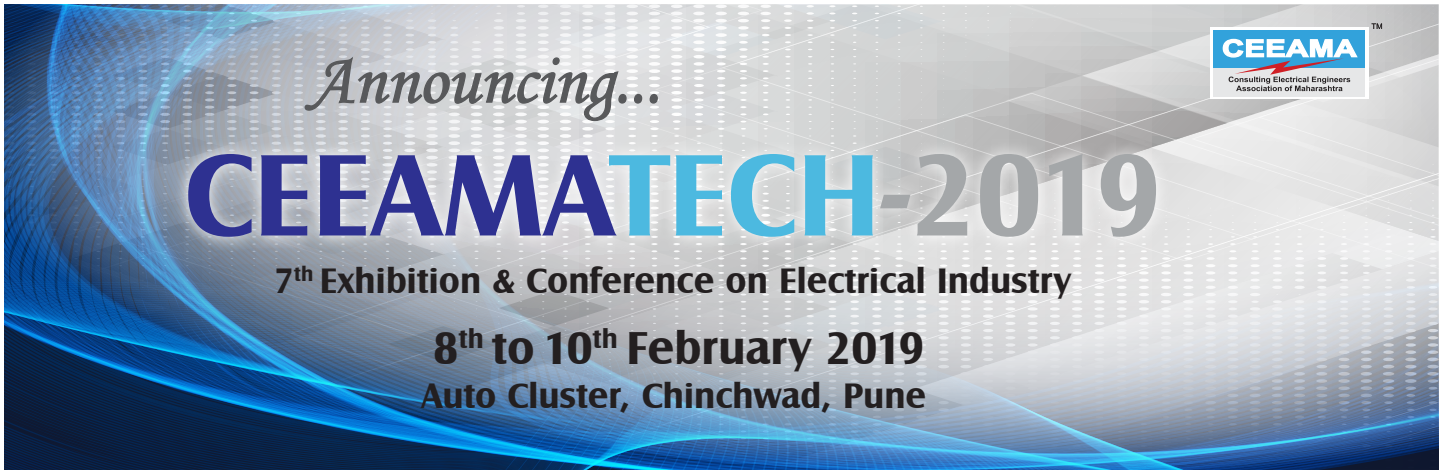
Motors will tolerate a certain change in voltage above the design voltage. However, extremes above the design voltage will cause the amperage to go up with a corresponding increase in heating and a shortening of motor life.

In fact, voltage variations affect other magnetic devices in similar ways. The solenoids and coils you find in relays and starters tolerate low voltage better than they do high voltage. This is also true of ballasts in fluorescent, mercury, and high-pressure sodium light fixtures. And it's true of transformers of all types. Incandescent lights are especially susceptible to high voltage. A 5% increase in voltage results in a 50% reduction in the life of the lamp. A 10% increase in voltage above the rating reduces incandescent lamp life by 70%.

Prepared by:

Surendra Modi

A V Prasanna



CEEAMA ACTIVITIES

- *Awareness of Safety and Quality in Electrical Installations.*
- *Promote Good Quality Product in Various project with help of Manufactures.*

- *Skill Development for Contractors and Electrician who work on project.*
- *Organizes technical seminars/factory visits to assess the manufacturer's Capability, Quality Control, Machinery and Testing facilities.*

- *Organizes biannual CEEAMATECH Exhibition and CEEAMATECH Conference with more than 50 Stalls.*
- *Establish link between manufacturer and consultants and to keep all members updated on the latest product technology.*

- *Technical Seminars/Meeting are conducted in Mumbai, Pune, Nasik, Sangli, Kolhapur, and Nagpur, trying to establish Chapters in these towns and other States.*

- *Topics for discussions are selected as per the interest of Members/ participants-Green buildings, GIS Sub-station, Power Quality issues, LED light, Renewable Energy, Protections and Relays, etc.*

- *Presently we are publishing CEEAMA NEWS every year and CEEAMA E-NEWS- Every month with active participation of Associate Members and other Members.*

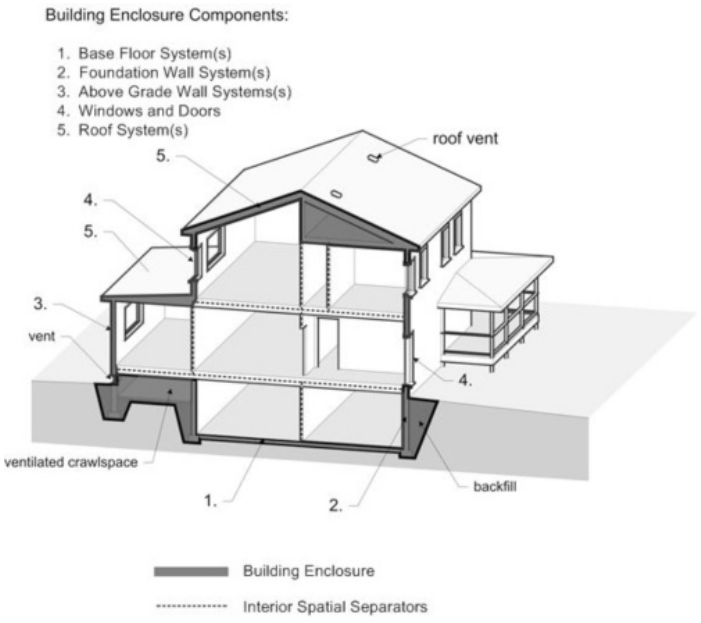
Article

ECBC – Envelope Design

In the last article, we saw about need for Energy conservation Building Code (ECBC) and with a quick recap, one can mention that, there are several uses of energy in building - for lighting, heating, cooling, power delivery to equipment and appliances, and domestic water. The amount that each contributes to the total energy use varies according to the climate, type of building, number of working hours and time of year. Industries use large quantities of energy for specialized processes whereas most of the buildings use the greatest amount of energy for human comfort.

A building envelope plays a major role in reducing energy consumption for the building for its life-time or till major changes are made to the envelope or building usage has been altered.

"Building" means any structure or erection or part of structure or erection after the rules relating to energy conservation building codes have been notified under clause (p) of section 14 and clause (a) of section 15 and includes any existing structure or erection or part of the structure or erection" For the purpose of ECBC applicability, any building having connected load of 100 kW or contract demand of 120 kVA is under purview of ECBC.



Ref: ECBC User Guide

The exterior and semi-exterior portions in the context of defining as building envelope include:

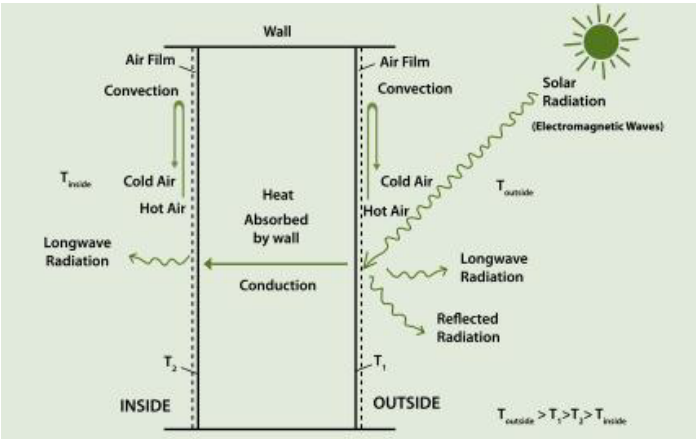
- Elements that separate the conditioned spaces from the weather conditions, or
- Elements of a building that separate the conditioned spaces of the building from the unconditioned spaces, i.e. office space from unconditioned storage.

If the building envelope's primary function is to protect its users from the heat / cold from outside climatic conditions, it would be prudent to quickly glance through the fundamentals of heat transfer.

Heat Transfer: Heat transfer takes place through walls, windows, and roofs in buildings from higher temperature to lower temperature in three ways; viz. Conduction, Convection and Radiation. Temperature difference between the indoor spaces and outdoor spaces is the main driving force. **In Indian context, for major part of the country, except for Cold climate, keeping heat at bay is the major challenge**.

The studies have proved that, Conductive heat transfer is a major contributor for the heat gain in the modern commercial and residential buildings and one of the major reasons for this is use of RCC. Both, concrete and steel used in the construction has impact on the heat gain by the structure.

Steel being a highly conductive material, and is thermally connected to various construction elements (such as beams, columns, roof slabs etc...) and facilitate easier heat transfer and on the other hand, concrete has a very high specific heat, and thus has a property to retain heat for the longer period. **Usually the temperature measured of a RCC structure (including external cement plaster), is more by at least 10 to 15 0C than the ambient temperature.**



Source: ECBC User Guide

Mode of Transfer	Definition	ECBC's role in regulating Heat Transfer
Conduction	Conduction is the transfer of heat by direct contact of particles of matter within a material or materials in physical contact.	U-factors of roofs & walls
Convection	Convection is the transfer of heat by the movement of a fluid (air or gas or liquid).	Building Envelope Sealing Requirements
Radiation	Radiation is the movement of energy/heat through space without relying on conduction through the air or by the movement of air.	R-Values of roofs & walls, Cool Roofs

Building Envelope Sealing:

Traditionally, we in India, have been using unconditioned buildings and had never focus on weather sealing the envelope. In fact, most of our structures have been permeable in nature and

allow in and out of moisture through envelope, as per the season. However, with air-conditioned buildings, the building envelope need to be sealed, caulked, gasketed, or weather-stripped to minimize air leakage and typical areas, where sealing needs to be ensured are:

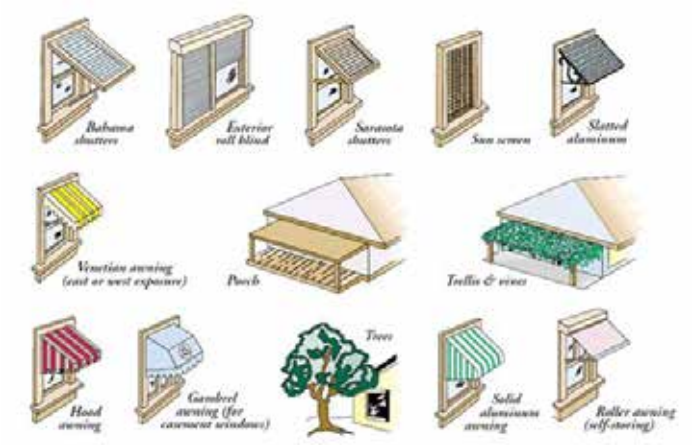
- Joints around fenestration and door frames,
- Openings between walls and foundations and between walls and roof and wall panels,
- Openings at penetrations of utility services through roofs, walls, and floors
- Site-built fenestration and doors,
- Building assemblies used as ducts or plenums and
- All other openings in the building envelope

Passive Solar Strategies:

Designing the buildings using traditional wisdom of keeping heat outside the built environment during the day and keeping warmth inside, when the outside temperature drops is known as Passive Solar design.

The strategies include:

- **Siting and orientation**: Place the buildings and plan inside spaces to avoid heat gain from outside and allow openings in the windward directions to invite wind inside the built environment.
- **Shading**: It is one of the most effective strategy, which allows light through the doors and windows (openings) and restrict entry of heat inside the leaving spaces.

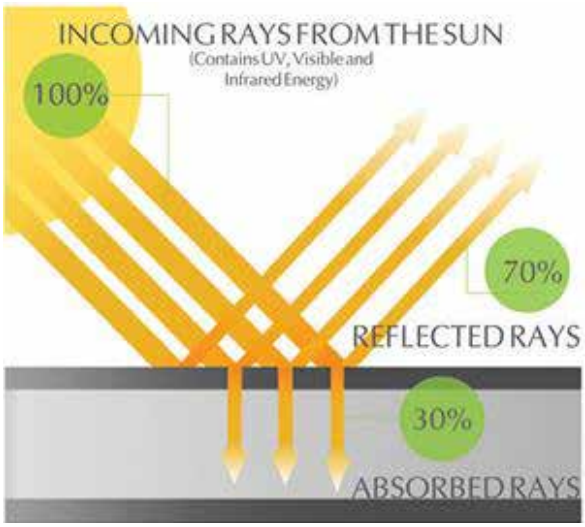


Different types of Shading devises and strategies

Solar Reflectance:

The solar reflectance is the fraction of solar radiation reflected by roof. The reflectance of building materials is usually measured across the solar spectrum, since these are exposed to that range of heat wavelength/s.

Reflectance is measured on a scale of 0 to 1, with 1 being a perfect reflector. An ideal exterior surface coating of a building in hot climate and under indoor cooling would have reflectance near Unity.



Cool Roofs:

Cool roofs" are roofs covered with a reflective coating that has a high emissivity property that is very effective in reflecting the sun's energy away from the roof surface. These "cool roofs" are known to stay 10°C to 16°C cooler than a normal roof under a hot summer sun; this quality greatly reduces heat gain inside the building and the cooling load that needs to be met by the HVAC system. As per ECBC code, Roofs with slopes less than 20° shall have an initial solar reflectance of no less than 0.70 and an initial emittance no less than 0.75.

Contributed By Shirish Deshpande
Source ECBE User Guide

Mark your Diary

19th -21st April 2018 : World build India B2B Exhibition for the Construction Industry.
Venue: Hall 1, Bombay Exhibition Centre, Mumbai.