ELECTRICAL INSTALLATION ENGINEER NEWS LETTER

TAMILNADU ELECTRICAL INSTALLATION ENGINEERS' ASSOCIATION 'A' GRADE (Regn. No. 211/1992)
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EDITORIAL

Dear Members, Fellow Professionals and Friends,

Seasons Greetings to Every One!

Happy Engineers Day!!

Let Us All Look For Corona Free Time Soon!!!

Engineers' Day in India is celebrated on the 15th of September every year. Our lives have been simplified in various ways by the engineers. Simplicity have been brought to every complex process and all this is only because of our supremely talented engineers. Everything is online these days including online transactions, online learning, online businesses and many more and all these are made possible by engineers only. They are coming with innovations and better versions of products every day. That is why it is relevant to celebrate our engineers and their achievements on engineering day

The month of August, which just went by, is also an important month for us to remember and celebrate as this is the month in 1942 when the struggle for Independence got accelerated resulting in our Freedom on August 15th of 1947. Initiative and Entrepreneurship is in the blood of all Indians, which helped to build ourselves slowly and steadily. The Economy started galloping from 1990 with promising decades for us right through but at present……

It is Corona time everywhere and though it is not a happy thing to refer to, we all realize that it is an unfortunate reality and we have to face it and come out of it soon to bring back normalcy. It has not spared any country or civilization in the planet and until the time of penning this editorial, the spread is only on the increase. Identification of the nature of the virus and its spread and precautions and actions to be taken are all in consensus all over the world. The cautions to be taken to avoid being infected and avoid spreading to others are also quite simple and easy to follow. It is certain that if they are followed strictly without taking any chances, the spread should stop, but it is not happening. If you look around when ever and where ever you go, following the permissions and the restrictions, you find that a sizable percentage of people still do not follow the basics at all, in spite of the fact that messages have gone into people's knowledge right across to the nooks and corners. Let us all follow the cautions strictly and help ourselves and the society around.

The Health Services and their allied service personnel, Police and the Army are all going through heavy demands on them in these difficult Corona or 'Covid' times and they all deserve our great appreciation. There are also many more whose silent contributions are helping people to face and go through the crisis times with lesser murmur. Lot of businesses and industries and the IT sector started adopting 'Work from Home' strategy and the people have also steadily adapted to the demands. Meetings of all businesses and various kinds of associations started taking place on line and many proactive businesses started arranging training programs for their executives and employees in these lean times. On line businesses and associated deliveries for all sizes of enterprises, big, small, and micro too, increased rapidly. All these created pressures to ensure uninterrupted communication networks, Wi Fi, and above all uninterrupted power availability, which are being successfully met, with dedicated work of all the personnel involved in all these services. The dish and cable networks were all maintained uninterruptedly to keep the people engaged indoors. All these people too deserve our attention and appreciation.

Governments at the Center and the States are all involved in addressing various kinds of problems and demands, providing financial help and liberal terms for loans for all sizes and types of businesses and they are working on bringing back normalcy slowly and steadily so that the economy revival can also happen. There are predictions that India will be one of the fastest reviving economy, post Covid Times.

We recently observed World Environment Day in June and many Technical and Social Associations had their functions and meetings in this connection, on line. It is interesting to know that the pollution levels have come down in all parts of the world during the Covid times.

We thank all those members who have helped us by participating in the advertisement appearing for the issue March 2020 – E Power, Elecxpo, Galaxy Earthing Electrodes Pvt. Ltd., Mahindra & Mahindra, Pentagon Switchgear, Power Square Engineers (Indotech Transformers Ltd.), Supreme Power Equipment Pvt. Ltd., Value Engineers.

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KNOW THY POWER NETWORK - 151

Let us continue further

National Power Grid = One Nation One Grid

NATIONAL POWER GRID

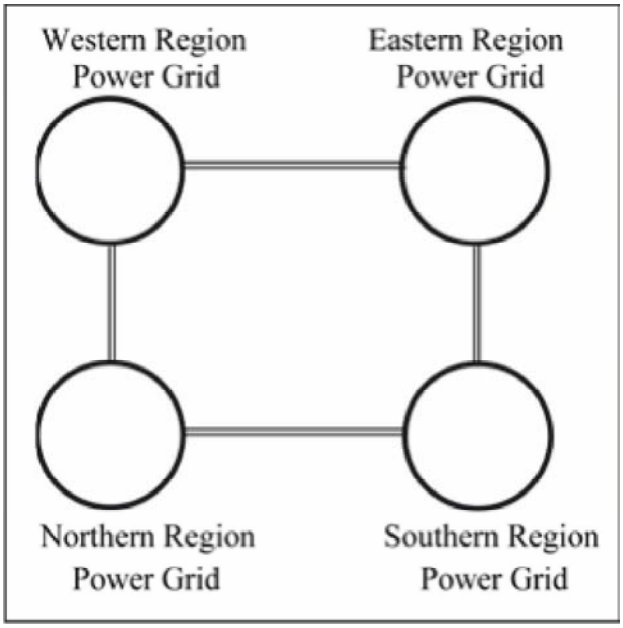

Figure 3: Schematic of National Power Grid (Installed Capacity 3,68,788 MW - As on 31.12.2019)

Now let us view briefly the function of various sectors connected with the grid and their signature features.

1. Transmission of power from the Electric Generators to the Power Grid.

The voltage at which power is generated at the generators is normally at 11KV or 22KV level. The voltage is then stepped up to 765KV, 400KV, 230KV or 110KV level by means of step up transformers (Grid Coupling Transformers) and fed into the Grid. From the transmission network of the grid, the power is delivered to sub-transmission sub-stations by means of Over-head lines or UG cables for further onward transmission to the end-consumers. The optimal power flow in these Transmission circuits is limited by surge impedance or characteristic impedance of OH lines/cables.

The surge impedances of 400KV, 230KV, 110KV lines in the transmission network are in the range of 250, 400 and 500 ohms respectively. As such the maximum power flows that can be safely carried in these lines work out to in the order of 450-500MW, 135-150MW and 35-50MW respectively. This power transfer limit holds good only for reasonably long lines. In the case of short lines, temperature rise of the conductor alone forms the criterion for safe power transfer. To cite an example, short 230KV circuit can carry safely up to 200MW. Among the factors involved in deciding the safe power transfer limit in this context are (i) Thermal Balance of Heat input due to I^2R losses and (ii) Solar Heating against Heat Dissipation experienced by the current carrying conductors due to its conduction characteristics, ambient temperature and wind chill factors.

Among the factors that draw attention, while devising the practical Power Network are fault levels (short circuit levels), satisfactory voltage profiles, active/reactive power flows and System Stability. From the above, we can note that for evacuating the Power generated from a 1000MW Power Station, either six or seven 230KV circuits or two or three 400KV circuits are generally required.

The voltage level of the Transmission line and the number of circuits to be used for Power evacuation are decided by the factors like relative cost of using various Voltage levels, right of way, maintenance needs/cost and impact suffered by grid during line outage conditions (both planned and unplanned shutdown).

The main point to be ensured in this regard is that the structure of the Power System thus planned should be adequate to transmit Power from the Generating Station in point to meet the demands in any assigned area or zone without any constraints.

In this context, the characteristic features of the reactive power assumes importance since its presence in adequate level helps to reduce energy losses in the grid and also limits the voltage drops noticed in the Power Delivery Networks. This makes us to consider / treat the excess / shortage of reactive power at any location in the grid as a local / regional problem only and not as a "Whole Grid" problem. The shortage of Active Power accompanied with the fall in frequency is always treated as "Network / Grid Problem" and it needs immediate corrective actions. *For the effective and efficient running of the grid, its reactive power needs should always be met in adequate quantities nearer to the loads i.e. large blocks of reactive power should never be transported from the generating plants in the grid.*

Before proceeding further, it is relevant to state that the conventional power plants provide a steady stream of electricity to the power pool whereas the wind electric generators often ply turbulent and spit out a irregular stream of electricity which the power grid finds it very difficult to swallow. That is why, the power from the wind electricity generators is normally treated as an "infirm power".

At this juncture it is opt to understand the power equation that controls the power flow from an electricity generating unit. It is shown here under.

$$P = \frac{E_S x E_R x Sin\emptyset}{x}$$

Where,

P = Power transmitted

E_S = Voltage behind the system reactance (sending end voltage)

E_Q = Receiving end voltage

$\emptyset$ = angle between the voltages

X = system reactance

It is not out of place to state the conditions that lead to the instability of the machines / power systems. Among them are,

- Large angular displacements (This occurs during the faults close to the machines)
- Large Voltage variations
- Machines acting in the leading sector. This occurs when there is an excess flow of Reactive Power in the grid with the attendant loss of excitation faced by the generating units.
- Slow fault clearance time of Tie lines.
- High system impedance.
- Demand side mismatch and presence of high renewable content in the generation – mix.

There are three types of Grid – Operational Stability

1. Steady State Stability - This happens when the grid experiences sudden addition / removal of generation / loads
2. Transient Stability – This occurs when the grid suddenly experience the loss of a large block of generation
3. Dynamic Stability – This occurs when the governors take control of the generators which experiences Transient Stability problem. It is nothing but the revival of the machines after a sudden load throw over (very close fault).

2. **Transmission Network**

   Transmission is the main back bone of the power system; no tapping is permitted in this network 765KV, 400KV and 230KV are the voltage levels normally adopted; 765KV, 400KV and 230KV substations are called grid coupling substations and they are the main regulating / nodal points that control, monitor and regulate flow of the electricity stream from the power pool to various parts of the power system. The stability of this network, the status of interconnected generators and the tie lines and the power evacuating capacity limitations of the connected transmission lines assume greater significance in this component line losses in this network:-1-3 percent.

3. **Sub-Transmission – Network**

   This is the radial transmission system normally used for feeding bulk power consumers and 22, 11KV substations.

   Line losses:-3-5 percent

4. **Primary Distribution Network**

   It consists of 33KV, 22KV and 11KV networks.

   Line losses in this network:-3-5 percent

5. **Secondary Distribution Network**

   This network is mainly employed for feeding HT Consumers and Distribution Transformer Substations.
   Line losses:-5-8 percent

6. **LT Network – Delivery Network for End Users**

   It is the main interface between the supplier and the End Consumers Demarcation point, Metering Point. Electricity meter is located at the selling point i.e. between the supplier and the buyer. Here the electric power is sold i.e. the flow of electricity is converted into money flow. Thus it forms the central piece of entire power system frame work.

   Line losses:-8-10 percent

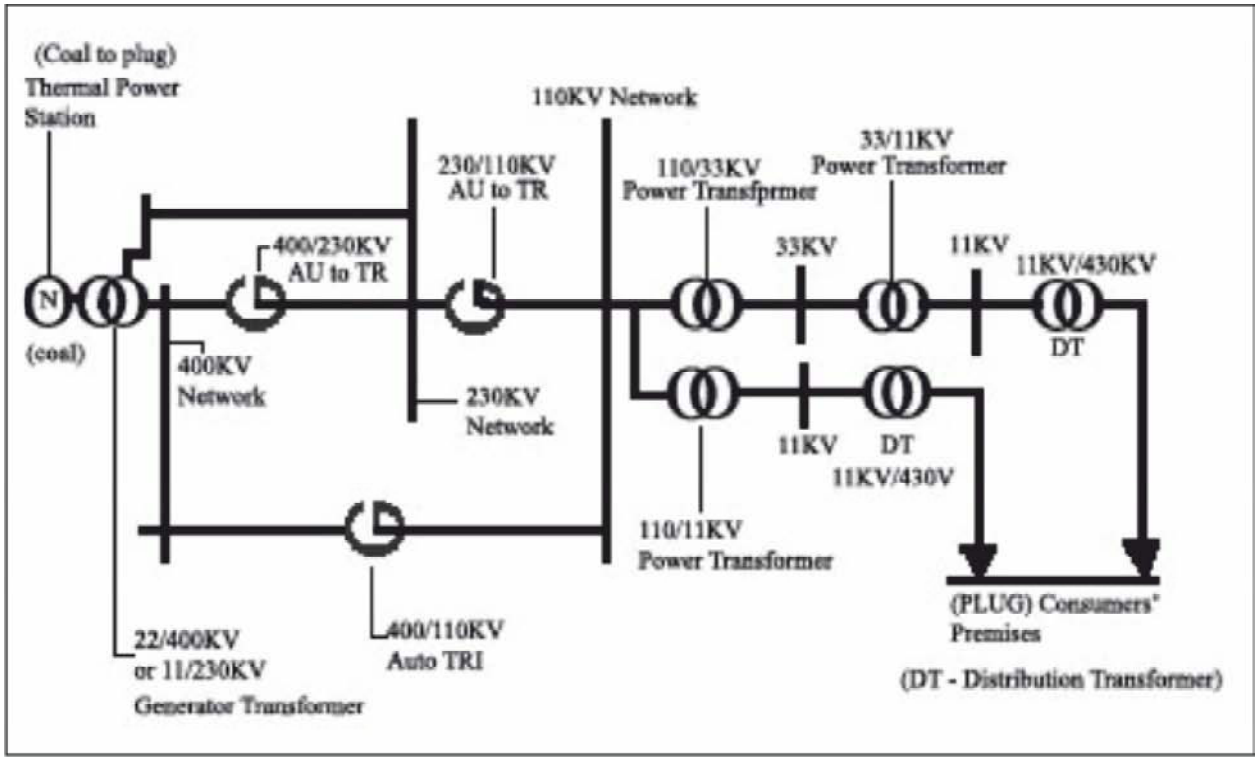

Figure 4: Schematic diagram that indicates how power is delivered from a Thermal Power Station in Tamilnadu Power Grid to consumer premised in Chennai city.

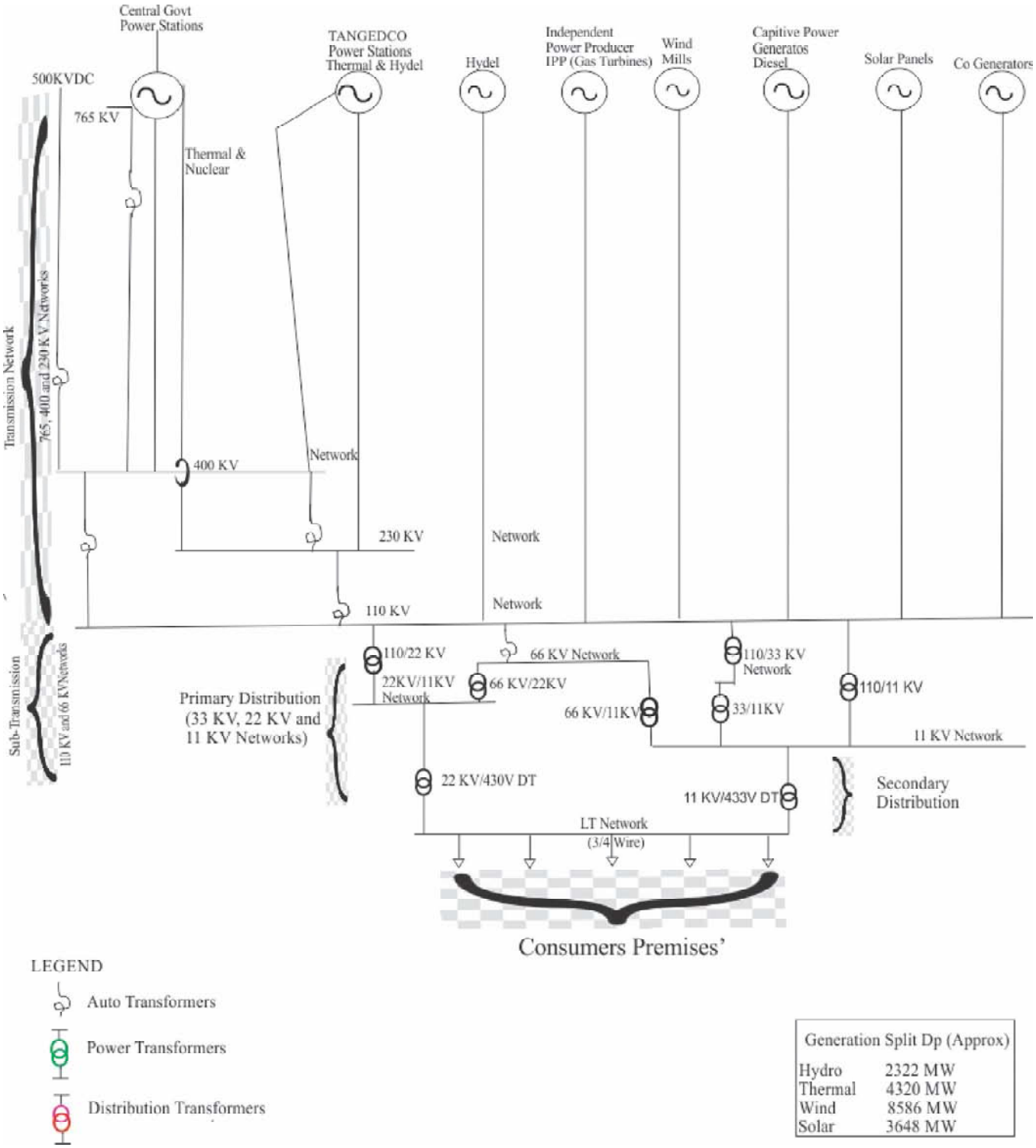

Figure 5: Tamil nadu Power Grid (Schematic Diagram)

Let us sign off now.

(To be continued)

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ABSTRACT OF IS 1255
(INSTALLATION & MAINTENANCE OF CABLE) – 1

1) Route Indicator

- Power cable route indicators should be provided at an interval not exceeding 200 M and also at turning points of the power cable route wherever practicable"

2) Electrolytic corrosion:

- Where the possibility of electrolytic corrosion exists, for example, adjacent to dc traction system, the potential gradient along the pipe-line and the cable sheath should be specified.

3) Neutral

- The neutral point is earthed in such a manner that during a line-to-earth fault the highest rms voltage to earth of a sound phase(s) expressed as a percentage of the highest line-to-line voltage, does not exceed 80 percent, irrespective of the fault location,

4) Earthing

- The neutral point is not earthed but a device is installed which automatically and instantly cuts out any part of the system which becomes accidentally earthed,
- In case of ac systems only, the neutral point is earthed through an arc suppression coil with arrangement for isolation within one hour for the non-radial field cables and within 8 hours for radial field cables, of occurrence of the fault provided that the total of such periods in a year does not exceed 125 hours.

5) Tensile Strength

- Maximum Permissible Tensile Strength for Cables: PVC and XLPE insulated armored power cables P = 9 D2 , P = Pulling Strength(N), D = Outer Diameter of Cable (mm)
- Maximum Permissible Tensile Strength for Cables: PVC and XLPE insulated unarmored power cables P = 5 D2
- Maximum Permissible Tensile Strength for Cables: Paper insulated armored power cables P = 5 D3

6) Cable Pulling

1. For Cables Pulled by Pulling Eye :
2. Expected Pulling Force When Pulling Cables by Winch :
   - If the cables are pulled by gripping the conductor directly with pulling eye, the maximum permissible tensile stress depends on the material of the conductor and on their cross-section as given below: For aluminum conductors 30 N/mm^2 and For copper conductors 50 N/mm^2
   - The following values of pulling force are expected = (approximately percentage of cable weight):
   - In trenches without large bends 15 - 20 percent
   - In trenches with 1 or 2 bends of 90° each 20 - 40 percent
   - In trenches with 3 bends of 90° each (assuming the use of easy-running support and corner rollers) 50 - 60 percent
   - In ducts with bends totaling 360° Up to 100 percent"

7) Laying Direct in Ground

- This method involves digging a trench in the ground and laying cable(s) on a bedding of minimum 75 mm riddled soil or sand at the bottom of the trench, and covering it with additional riddled soil or sand of minimum 75 mm and protecting it by means of tiles, bricks

Depth — The desired minimum depth of laying from ground surface to the top of cable is as follows:

- High voltage cables, 3.3 kV to 11 kV rating = 0.9 m
- High voltage cables, 22 kV, 33 kV rating = 1.05 m
- Low voltage and control cables = 0.75 m
- Cables at road crossings = 1.00 m

8) Cables at railway

- Cables at railway level crossings (measured from bottom of sleepers to the top of pipe)=1.00m"

9) Cable Clearance

- Clearances — The desired minimum clearances are
- Power cable to power cable = Clearance not necessary; however, larger the clearance, better would be current carrying capacity.
- Power cable to control cables = 0.2 m
- Power cable to communication cable = 0.3 m
- Power cable to gas/water main = 0.3m
- Inductive influence on sensitive control cable on account of nearby power cables should be checked"
- The power cable should not be laid above the telecommunication cable, to avoid danger to life of the person, digging to attend to the fault in the Telecommunication cable.

10) Crossing

- Cables Laid Across Roads, Railway Tracks and Water Pipe Lines:
- Steel, cast iron, plastics, cement or earthenware ducts, or cable ducting blocks should be used where cables cross roads and railway tracks.
- Spare ducts for future extensions should be provided.
- Spare duct runs should be sealed off.
- Buried ducts or ducting blocks should project into footpath or up to the edge of road,
- where there is no footpath, to permit smooth entry of cable without undue bending

11) Diameter of Pipe

- The diameter of the cable conduit or pipe or duct should be at least 1.5 times the outer diameter of cable.
- The ducts/pipes should be mechanically strong to withstand forces due to heavy traffic when they are laid across road/railway tracks.

12) Bending Radius

- The bending radius of steel or plastics ducts should not be less than 1.5 m.

13) Over Bridge

- On bridges, the cables are generally supported on steel cable hooks or clamped on steel supports at regular intervals.
- While designing a cable layout on a bridge; expansion of bridge due to changes in atmospheric temperature should be taken into account.
- On most of the rail-cum-road bridges, the cables are subjected to vibrations.
- For such conditions, round wire armored and lead alloy 'B' sheathed cables are preferred.
- Cables can be laid on bridges duly suspended from catenary wire at regular intervals

(To be Continued)

Courtesy: ***Jignesh.Parmar***

ABSTRACT OF IS: 5613 (PART 1, 2, 3) - 2

19) Earthing Wire Size

- The cross-sectional area of the earth conductor Sims not be less than 16 mm^2 if of copper, and 25 mm^2 if of galvanization or steel.

20) Conductor Clearance

- Fixing Cross Arm in Low and Medium Voltage in Horizontal Configuration:

P-P-N Clearance

Voltage	Description	
Up to 650V	Horizontal "V" Shape Cross arm: (P-P(Street Light)-Neutral)	Phase to neutral=750mm, Phase to Phase(Streetlight at Top of pole)=325mm, Last Phase-Cross Arm end=80mm
650V to 11KV	Horizontal Cross arm: (P-P(Street Light)-N)	Phase-Phase=300mm, Phase-Phase(Street Ltg)=300mm, Phase-Neutral=300mm, Last Phase-Cross Arm end=80mm
Low and Medium Voltage Line	(Horizontal Configuration):	Less than 75cm Sag (P-P)=30cm, 76cm to 120cm Sag (P-P)=45cm, 121cm to 145cm Sag (P-P)=60 cm
Low and Medium Voltage Line	(Vertical Configuration):	Less than 70cm Sag (P-P) =20cm, 71cm to 100cm Sag (P-P)=30cm
High Voltage Line	(Horizontal Configuration):	Up to 120cm Sag (P-P) =40 cm, 140cm to 225cm Sag (P-P)=65cm Double Circuit on Same Pole at Different Level:Distance between two Circuit=120cm

21) O/H Conductor

- Choice of Conductors — The physical and electrical properties of different conductors shall be in accordance with relevant Indian Standards. All conductors shall have a breaking strength of not less than 350 kg.
- However, for low voltage lines with spans less than 15 m and installed either on owner's or consumer's premises, conductors with breaking strength of not less than 140 kg may be used.

22) Voltage Variation

- In accordance with the Indian Electricity Rules voltage variation for low voltage lines should not be more than ± 6 percent and for high voltage lines should not be more than ± 6 percent to –9 percent.

23) Span (Up to 11KV)

- Recommended Span Lengths — The recommended span lengths for lines up to 11 kV are 45, 60, 65, 75, 90, 105 and 120 meters

- There are no fixed rules for spacing arrangement of overhead line conductors. However, the following formula gives an economical spacing of conductors: **D=500+18U+(L*L/50)**
- Where D=Spacing between conductor(mm), U=Voltage(p-p in kv),L=Span in meter

24) Clearance (Up to 11KV)

Min height of any Overhead conductor	
Type of Crossing	**Clearance**
Across any street (Low Medium Voltage)	5.8 Meter
Across any street (High Voltage)	6.1 Meter
Along with street (Low Medium Voltage)	5.5 Meter
Along with street (High Voltage)	5.8 Meter
Line(Bare) erected elsewhere(Low &Medium Voltage)	4.6 Meter
Line(Bare) erected elsewhere(High Voltage)	4.6 Meter
Line(Insulated) erected elsewhere(Low &Medium Voltage)	4.0 Meter
Line(Insulated) erected elsewhere(High Voltage)	4.0 Meter
Line conductor from buildings(Low &Medium Voltage)	2.5 Meter
Line conductor from buildings(High Voltage)	3.7 Meter

25) Span

System Voltage	**Number Of Circuit**	**Span**
33 KV (over Pole)	Single	90 Meter to 135 Meter
33 KV	Single	180 Meter to 305 Meter
33 KV	Double	180 Meter to 305 Meter
66 KV	Single	204 Meter to 305 Meter
66 KV	Double	240 Meter to 320 Meter
220 KV	Single	320 Meter to 380 Meter
220 KV	Double	320 Meter to 380 Meter

(To be continued)

Courtesy: Jignesh Parmar

"Performance in management, therefore, means in large measure doing a good job of preparing today's business for the future."

- PETER DRUCKER

ELECTRICAL Q & A PART - 3

11) Can 60 Hz transformers be used at higher frequencies?

- Transformers can be used at frequencies above 60 Hz up through 400 Hz with no limitations provided nameplate voltages are not exceeded.
- However, 60 Hz transformers will have less voltage regulation at 400 Hz than 60 Hz.

12) What is meant by regulation in a transformer?

- Voltage regulation in transformers is the difference between the no load voltage and the full load voltage. This is usually expressed in terms of percentage.
- For example: A transformer delivers 100 volts at no load and the voltage drops to 95 volts at full load, the regulation would be 5%. Distribution transformers generally have regulation from 2% to 4%, depending on the size and the application for which they are used.

13) Why is impedance important?

- It is used for determining the interrupting capacity of a circuit breaker or fuse employed to protect the primary of a transformer.
- **Example:** Determine a minimum circuit breaker trip rating and interrupting capacity for a 10 KVA single phase transformer with 4% impedance, to be operated from a 480 volt 60 Hz source.
- Calculate:
- Normal Full Load Current = Nameplate Volt Amps / Line Volts = 10,000 VA / 480 V = 20.8 Amperes
- Maximum Short Circuit Amps = Full Load Amps / 4% = 20.8 Amps / 4% = 520 Amp
- The breaker or fuse would have a minimum interrupting rating of 520 amps at 480 volts.
- **Example:** Determine the interrupting capacity, in amperes, of a circuit breaker or fuse required for a 75 KVA, three phase transformer, with a primary of 480 volts delta and secondary of 208Y/120 volts. The transformer impedance (Z) = 5%. If the secondary is short circuited (faulted), the following capacities are required:
- Normal Full Load Current = Volt Amps / $\sqrt{3}$ x Line Volts = 75,000 VA / $\sqrt{3}$ x Line Volts $\sqrt{3}$ x 480 V = 90 Amps
- Maximum Short Circuit Line Current = Full Load Amps / 5% 0020 = 90 Amps / 5% = 1,800 Amps
- The breaker or fuse would have a minimum interrupting rating of 1,800 amps at 480 volts.
- **Note:** The secondary voltage is not used in the calculation. The reason is the primary circuit of the transformer is the only winding being interrupted.

14) What causes flash-over?

- Flash-over causes are not always easily explained, can be cumulative or stepping stone like, and usually result in an outage and destruction. The first flash-over components are available voltage and the configuration of the energized parts, corona may be present in many areas where the flash-over occurs, and flash-over can be excited by stepping stone defects in the insulating path.

15) What are taps and when are they used?

- Taps are provided on some transformers on the high voltage winding to correct for high or low voltage conditions, and still deliver full rated output voltages at the secondary terminals. Taps are generally set at two and a half and five percent above and below the rated primary voltage.

16) Can Transformers be reverse connected?

- Dry type distribution transformers can be reverse connected without a loss of KVA rating, but there are certain limitations. Transformers rated 1 KVA and larger single phase, 3 KVA and larger three phases can be reverse connected without any adverse effects or loss in KVA capacity.
- The reason for this limitation in KVA size is, the turns ratio is the same as the voltage ratio.
- Example: A transformer with a 480 volt input, 240 volt output— can have the output connected to a 240 volt source and thereby become the primary or input to the transformer, then the original 480 volt primary winding will become the output or 480 volt secondary.
- On transformers rated below 1 KVA single phase, there is a turn's ratio compensation on the low voltage winding. This means the low voltage winding has a greater voltage than the nameplate voltage indicates at no load.
- For example, a small single phase transformer having a nameplate voltage of 480 volts primary and 240 volts secondary, would actually have a no load voltage of approximately 250 volts, and a full load voltage of 240 volts. If the 240 volt winding were connected to a 240 volt source, then the output voltage would consequently be approximately 460 volts at no load and approximately 442 volts at full load. As the KVA becomes smaller, the compensation is greater—resulting in lower output voltages.
- When one attempts to use these transformers in reverse, the transformer will not be harmed; however, the output voltage will be lower than is indicated by the nameplate.

17) What is the difference between "Insulating", "Isolating", and "Shielded Winding" transformers?

- Insulating and isolating transformers are identical. These terms are used to describe the separation of the primary and secondary windings. A shielded transformer includes a metallic shield between the primary and secondary windings to attenuate (lessen) transient noise.

18) How many BTU's of heat does a transformer generate?

- The heat a transformer generates is dependent upon the transformer losses. To determine air conditioning requirements multiply the sum of the full load losses (obtained from factory or test report) of all transformers in the room by 3.41 to obtain the BTUs/hour.

  For example: A transformer with losses of 2000 watts will generate 6820 BTUs/hour.

19) What is a transformer and how does it work?

- A transformer is an electrical apparatus designed to convert alternating current from one voltage to another. It can be designed to "step up" or "step down" voltages and works on the magnetic induction principle.
- A transformer has no moving parts and is a completely static solid state device, which insures, under normal operating conditions, a long and trouble-free life. It consists, in its simplest form, of two or more coils of insulated wire wound on a laminated steel core.
- When voltage is introduced to one coil, called the primary, it magnetizes the iron core. A voltage is then induced in the other coil, called the secondary or output coil. The change of voltage (or voltage ratio) between the primary and secondary depends on the turns ratio of the two coils.

20) Factors Affecting Corona Discharge Effect:

- Corona Discharge Effect occurs because of ionization if the atmospheric air surrounding the voltage conductors, so Corona Discharge Effect is affected by the physical state of the atmosphere as well as by the condition of the lines.
- **(1) Conductor:** Corona Discharge Effect is considerably affected by the shape, size and surface conditions of the conductor .Corona Discharge Effect decreases with increases in the size (diameter) of the conductor, this effect is less for the conductors having round conductors compared to flat conductors and Corona Discharge Effect is concentrated on that places more where the conductor surface is not smooth.
- **(2) Line Voltage:** Corona Discharge effect is not present when the applied line voltages are less. When the Voltage of the system increases (In EHV system) corona Effect will be more.
- **(3) Atmosphere:** Breakdown voltage directly proportional to the density of the atmosphere present in between the power conductors. In a stormy weather the ions present around the conductor is higher than normal weather condition So Corona Breakdown voltage occurs at low voltages in the stormy weather condition compared to normal conditions
- **(4) Spacing between the Conductors:** Electro static stresses are reduced with increase in the spacing between the conductors. Corona Discharge Effect takes place at much higher voltage when the distance between the power conductors increases.

(To be continued)

Courtesy: ***Jignesh.Parmar***

HANDBOOK ON INSTALLATION & MAINTENANCE OF SOLAR PANEL - 2

2.3 Primary phases of designing an SPV system

The primary phases of designing a Photovoltaic system consists of the following steps:

1. Planning
2. Collection of information/data
3. Load calculation
4. Sizing Solar Array
5. Deciding Battery capacity
6. Selection of Charge Controller
7. Deciding Inverter capacity
8. Structure
9. Wiring

2.3.1 Planning

Before designing a solar photovoltaic system, several considerations are to be kept in mind such as

- The cost of the system should not be unusually high and at the same time the quality should also not suffer.
- Initial costs and lifetime costs shall also be taken into consideration.
- The system should be simple in design as far as possible with high reliability and efficiency.
- Whether central generation is beneficial or distributed is to be worked out.
- The system to be planned so as to cater for expected future growth.
- Prevention of improper load to be ensured.

2.3.2 Collection of Information/data

Following types of information are to be gathered

(i) Load/ Application

- Voltage system e.g. AC or DC or both
- Operating voltage range of load
- Daily consumption
- Daily duty cycle
- Criticality of loads
- Monthly / Weekly load profile

(ii) Climatic conditions

- Insolation
- Latitude, Longitude
- Temperature
- Accessibility to site
- Terrain
- Local Knowledge

(iii) User compatibility

- Understanding technical issues.

- Maintenance schedules and mentality.
- Whether the controls are field adjustable.
- Budget constraints
- Understanding of managing energy budget.

2.3.3 Load calculation

For DC Loads

Load Amps X Operating Hours per Day = Amp Hour Per Day (AHPD)

(If Load is available in watts, divide the wattage by system voltage to get Amps)

(Multiply by % duty cycle if data available)

For AC Loads

AC Watts X Operating Hours per Day = Watt Hours Per Day (WHPD)

AHPD = WHPD / (Inverter Efficiency X Nominal System Voltage)

2.3.4 Sizing Solar Array

No. of Series Modules = Nominal DC System Voltage / Nominal Voltage of Solar Module

No. Of Parallel Modules = AHPD / {(1- Module derating*) x Battery AH Efficiency x Im of Module x Solar Insolation of the worst Month}

** Derating ~10% on account of dust, mismatch, orientation etc*.

No of Modules in Solar Array = No of Series Modules X No of Parallel Modules

Capacity of Solar Array = No of Modules X Capacity of Each Module

2.3.5 Deciding Battery capacity

For calculating the capacity and number of batteries, first the number of back up days are to be decided, based on No. of Consecutive sunless days.

For Example Back up days for residential load = 3 to 5 days

Back up days for Industrial Load = 7 to 14 days

Back up days for poor weather = 7 to 14 days

Check Manufacturer's Recommended Maximum Depth of Discharge (DOD) Normally it is

80% for deep cycling

59% for shallow cycling

Check the temperature variations of site and determine the Maximum DOD as per data given by battery manufacturer.

Battery Capacity (In AH) = (AHPD X No. of back up days) / Max DOD

No of series Batteries = System DC Voltage / Battery Voltage

No of Parallel Batteries = Total AH Required / AH of Individual Battery

2.3.6 Selection of Charge Controller

Charge controllers are included in most PV systems to protect the batteries from overcharge and/or excessive discharge. The minimum function of the controller is to disconnect the array when the battery is fully charged and keep the battery fully charged without damage.

The charging routine is not the same for all batteries. A charge controller designed for lead- acid batteries should not be used to control NiCd batteries. Charge controllers can be used in parallel to add more modules to a battery bank.

Salient feature of Charge controller

- Power devices should be of Solid state, High efficiency with Two stage charging technique.

- Protection against Transient/Surge.
- Prevent discharge of battery through solar panel during night.
- Protection against overcharge of the battery.
- Protection against reverse connection of battery and module.
- Robust enclosure and cooling with heat sink.
- Control, temperature compensated set points and equalization.
- Suitable MCB's provided at Solar input of 100 Amp.

Typical per cell voltages at ambient temperature 24c - 25c C

Boost charging upto: 2.34 V

Float stage voltage maintains: 2.29 V

Boost stage reactivates at: 2.14 V

Battery low at: 1.74 V

Calculate total current that Charge Controller will control

No. of Parallel Modules X Isc X 1.25 = Charge Controller Capacity

(Few manufacturers already have built in extra current capacity)

2.3.7 Module mounts

While mounting the modules, following points should be considered for getting maximum output from the solar modules:

- Modules should be oriented to face the Sun.
- The Modules produce more power when cooler.
- The mounting and color of the modules can sometimes be chosen to blend with the architecture.
- Tracking the Sun increases the amount of power from an array

2.3.8 Structure

Select type of structure i.e Ground Mount, Rooftop Mount, Pole Mount or Tracker. A group of Modules mounted on single unit of structure and interconnected together is called PANEL.

Calculate Number of Structures by following formula

No. of Structures = Total No. of Modules / No. of Modules on single unit of st.

Group of panels connected through junction box will make Array.

While designing structure provision for future growth should be considered

2.3.9 Wiring

Selecting the correct size and type of wire will enhance the performance and reliability of PV system. The size of the wire must be large enough to carry the maximum current expected without undue voltage losses.

All wire has a certain amount of resistance to the flow of current. This resistance causes a drop in the voltage from the source to the load. Voltage drops cause inefficiencies, especially in low voltage systems (12V or less).

Typical Values of Module current and voltages are provided by the manufacturer. Based on system voltage and current decide size of wire/cable to be used for module interconnection.

Calculate output current and voltage of the panel and decide specifications of wire/cable for panel interconnection. Always use minimum possible wire lengths.

Always use suitable lugs, connecters etc for connection.

Decide number and type of switches, fuses and circuit breakers as per load, system and user requirement.

Courtesy: CAMTECH Gwalior

ELECTRICAL MAINTENANCE UNIT - 1

(QUESTION & ANSWERS)

1. What is static electricity?

   Static electricity means electricity at rest. If we join a charged conductor to another conductor, electricity flows from one to the other. This way an electric current is produced, which lasts for a moment only. Static electricity is no use. Rubbing of two different materials having different electrons produces this.#

2. What is current?

   Flow of electrons in any conductor is called electric current. Its symbol is 'I' and measuring unit is Ampere measured by ammeter or ampere meter.

3. What is electro-motive force (emf) or voltage?

   It is the pressure that moves the electrons to flow in any conductor. It is also known as electromotive force voltage. Its symbol is 'E' or 'V' and measuring unit is volt measured by voltmeter.

4. What is potential difference (P.D)?

   The difference of potential between two points in a circuit is the voltage required to drive the current between them or the voltage drop between those two points is called the potential difference.

   P.D = R * I volts.

5. What is terminal voltage (VT)?

   It is the voltage available at the terminal of the source of supply. It's symbol is VT.

   V_T = emf – P.D

6. What is resistance?

   Resistance is the property of a substance, which gives opposition to flow of electrons through itself. Its measuring unit is ohm and measured by ohmmeter, multi meter, wheat stone bridge, and post office box. There are two types of resistances and they are fixed resistance and variable resistance.

7. What is ampere?

   The international ampere is defined as that steady current which, flowing through a solution of silver nitrate, deposits silver at the rate of 0.001118 gm/sec.

8. What is volt?

   The international volt is defined as 1/1.0183 of the emf of a Weston cadmium cell. It is that difference of potential which, when applied to a conductor whose resistance is 1 (one) international ohm, will cause a current of 1 (one) international ampere to flow.

9. What is matter?

   The matter is defined as anything, which possesses weight and occupies space and can be in any of three forms solid, liquid or gaseous. The matter consists of three ingredients, which are protons, neutrons and electrons.

10. What is the speed of electricity or electrons?

    The speed of electricity or electrons is 297842 km (186000 miles) per second.

11. How we get electric shock?

    On all alternators, transformers neutral is earthed. Human body is conductor and when touched to the live conductor it completes its shortest root though the body and the body gets electric shock in which its nervous system, the heart, respiratory system may cease to function.

12. What is fuse and what materials used for fuse wire?

    Fuse is a weakest point in an electrical circuit, which melts when the excess current flows through it in the electrical circuit.

    The materials, which can be used in fuses, are tin, lead, zinc, silver, antimony, copper, and aluminium etc.

13. What is fusing factor?

    The ratio of minimum fusing current and the current rating of fusing element is called the fusing factor.

    Fusing factor = minimum fusing current / current rating of fusing element. Its value is always more than 1 (one).

14. What is soldering and what is brazing?

    Soldering is the process of joining two metals with an alloy whose melting point is less that of the materials to be soldered.

    Soldering at high temperature using brass as solder is called brazing or hard soldering.

    The composition of the fine solder (soft solder) is tin 60% and lead 40%. Its melting point is 190ÚC and is widely used.

15. What are the sources of electricity?
    a. Battery (chemical source)
    b. Generator (magnetism)
    c. Thermocouple (heat generated)
    d. Light (photo electric or solar cell)
    e. Pressure (piezo electricity)
    f. Friction (static electricity)

16. What are the effects of electric current?
    a. Physical effect.
    b. Chemical effect.
    c. Magnetic effect.
    d. Heating effect.
    e. X-ray effect.

17. What is fire?

    Destructive burning of any material is called the fire. Fire is the result of combining fuel, oxygen and heat. If any one among three is separated the fire will come to end.

18. On what factor resistance of the substance depends (Laws of resistance)?
    a. The resistance of the conductor is directly proportional to the length of the conductor.
    b. The resistance of the conductor is inversely proportional to the cross-section of the conductor.
    c. The resistance of the conductor depends on the nature of the material by which it is made. That is specific resistance of the material.
    d. The resistance of the conductor depends on its temperature.

    The formula to find the resistance of the substance is below.

$$R = \frac{\rho L}{A}\ \Omega$$

    Where Á is the constant for the material called its specific resistance or resistivity

19. What is specific resistance or resistivity of the material?

Specific resistance of the material is the resistance of a piece of unit length and unit cross-section (unit cube of that material). That is the resistance between the opposite faces of unit cube of the material.

Or the specific resistance of any material is the resistance offered by the opposite face of that material.

The unit of specific resistance is ©/cm^3, ©/inch^3, ©/m^3.

20. What is the temperature co-efficient of resistance?

Temperature co-efficient of the resistance of any substance is, change in its original resistance due to the change in temperature. The temperature co-fficient of resistance of material is the ratio of increase in resistance of 1ÚC rise in temperature to the original resistance of the material (strictly at 0ÚC).

Formula for the resistance measurement is,

$Rt = R_0(1+\pm t)$

Where Rt Resistance at tÚC

R_0 Resistance at 0ÚC

á Temperature co-efficient

t Temperature rise

Courtesy: https://www.scribd.com/document/244623258/Question-and-Answers-Electrical-Maintenance-Unit

LIGHTING GLOSSARY - 2

EMI: Abbreviation for electromagnetic interference. High frequency interference (electrical noise) caused by electronic components or fluorescent lamps that interferes with the operation of electrical equipment. EMI is measured in microvolts, and can be controlled by filters. Because EMI can interfere with communication devices, the Federal Communication Commission (FCC) has established limits for EMI.

ENERGY SAVING BALLAST: A type of magnetic ballast designed so that the components operate more efficiently, cooler and longer than a "standard magnetic" ballast. By US law, standard magnetic ballasts can no longer be manufactured.

ENERGY SAVING LAMP: A lower wattage lamp, generally producing fewer lumens.

FC: (SEE FOOTCANDLE)

FLUORESCENT LAMP: A light source consisting of a tube filled with argon, along with krypton or other inert gas. When electrical current is applied, the resulting arc emits ultraviolet radiation that excites the phosphors inside the lamp wall, causing them to radiate visible light.

FOOTCANDLE (FC): The English unit of measurement of the illuminance (or light level) on a surface. One footcandle is equal to one lumen per square foot.

FOOTLAMBERT: English unit of luminance. One footlambert is equal to 1/p candelas per square foot.

GLARE: The effect of brightness or differences in brightness within the visual field sufficiently high to cause annoyance, discomfort or loss of visual performance.

HALOGEN: (SEE TUNGSTEN HALOGEN LAMP)

HARMONIC DISTORTION: A harmonic is a sinusoidal component of a periodic wave having a frequency that is a multiple of the fundamental frequency. Harmonic distortion from lighting equipment can interfere with other appliances and the operation of electric power networks. The total harmonic distortion (THD) is usually expressed as a percentage of the fundamental line current. THD for 4foot fluorescent ballasts usually range from 20% to 40%. For compact fluorescent ballasts, THD levels greater than 50% are not uncommon.

HID: Abbreviation for high intensity discharge. Generic term describing mercury vapour, metal halide, high pressure sodium, and (informally) low pressure sodium light sources and luminaires.

HIGHBAY: Pertains to the type of lighting in an industrial application where the ceiling is 20 feet or higher. Also describes the application itself.

HIGH OUTPUT (HO): A lamp or ballast designed to operate at higher currents (800 mA) and produce more light.

HIGH POWER FACTOR: A ballast with a 0.9 or higher rated power factor, which is achieved by using a capacitor.

HIGH PRESSURE SODIUM LAMP: A high intensity discharge (HID) lamp whose light is produced by radiation from sodium vapor (and mercury).

HOT RESTART or HOT RESTRIKE: The phenomenon of restriking the arc in an HID light source after a momentary power loss. Hot restart occurs when the arc tube has cooled a sufficient amount.

IESNA: Abbreviation for Illuminating Engineering Society of North America.

ILLUMINANCE: A photometric term that quantifies light incident on a surface or plane. Illuminance is commonly called light level. It is expressed as lumens per square foot (footcandles), or lumens per square meter (lux).

INDIRECT GLARE: Glare produced from a reflective surface.

INSTANT START: A fluorescent circuit that ignites the lamp instantly with a very high starting voltage from the ballast. Instant start lamps have single pin bases.

LAMP CURRENT CREST FACTOR (LCCF): The peak lamp current divided by the RMS (average) lamp current. Lamp manufacturers require <1.7 for best lamp life. An LCCF of 1.414 is a perfect sine wave.

LAMP LUMEN DEPRECIATION FACTOR (LLD): A factor that represents the reduction of lumen output over time. The factor is commonly used as a multiplier to the initial lumen rating in illuminance calculations, which compensates for the lumen depreciation. The LLD factor is a dimensionless value between 0 and 1.

LAY-IN-TROFFER: A fluorescent fixture~ usually a 2' x 4' fixture that sets or “lays” into a specific ceiling grid.

LED: Abbreviation for light emitting diode. An illumination technology used for exit signs. Consumes low wattage and has a rated life of greater than 80 years.

LENS: Transparent or translucent medium that alters the directional characteristics of light passing through it. Usually made of glass or acrylic.

LIGHT LOSS FACTOR (LLF) : Factors that allow for a lighting system’s operation at less than initial conditions. These factors are used to calculate maintained light levels. LLFs are divided into two categories, recoverable and non-recoverable. Examples are lamp lumen depreciation and luminaire surface depreciation.

LIFECYCLE COST: The total costs associated with purchasing, operating, and maintaining a system over the life of that system.

LOUVER: Grid type of optical assembly used to control light distribution from a fixture. Can range from small cell plastic to the large cell anodized aluminum louvers used in parabolic fluorescent fixtures.

LOW POWER FACTOR: Essentially, an uncorrected ballast power factor of less than 0.9 (SEE NPF)

LOW-PRESSURE SODIUM: A low-pressure discharge lamp in which light is produced by radiation from sodium vapour. Considered a monochromatic light source (most colors are rendered as gray).

LOW-VOLTAGE LAMP: A lamp (typically compact halogen (that provides both intensity and good colour rendition. Lamp operates at 12V and requires the use of a transformer. Popular lamps are MR11, MR16, and PAR36.

LOW-VOLTAGE SWITCH: A relay (magnetically operated switch) that allows local and remote control of lights, including centralized time clock or computer control.

(To be continued)

EVERYTHING YOU NEED TO KNOW ABOUT OPERATIONS & MAINTENANCE (O&M) FOR UTILITY SCALE PV SOLAR PLANTS - 2

4. Weather Conditions (snow, wind, soiling).

Finally, depending on the environmental conditions, the panels must be protected from wind, snow, and soiling (in dusty areas). Regular cleaning and maintenance will be enough in these cases. Solar DAO uses **durable crystalline silicon panels** that are built of lead-free, optically transparent, anti-reflective glass, which can withstand the tested shot of an ice ball with 35mm diameter at a speed of 30 m/s. Their serviceable life is up to 25 years, with 10 years of guaranteed performance.

5. Other issues

- Other common unscheduled maintenance requirements include but are not limited to:
- Tightening cable connections that have loosened
- Replacing blown fuses.
- Repairing lightning damage
- Repairing equipment damaged by intruders or during module cleaning.
- Rectifying SCADA faults.
- Repairing mounting structure faults
- Rectifying tracking system faults.

O&M Approaches and Activities

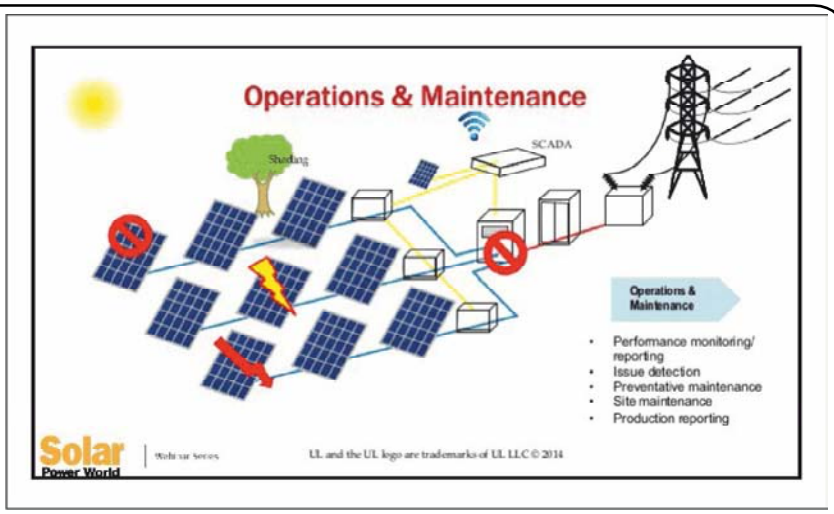
Maintenance can be broken down in two parts:

- **Scheduled maintenance:** Planned in advance and aimed at fault prevention, as well as ensuring that the plant is operated at its optimum level.
- **Unscheduled maintenance:** Carried out in response to failures.

Another way to classify the PV O&M approaches is to break them down **into three categories, each with different cost-benefit tradeoffs and risk profiles:**

- **Preventative maintenance (PM)** encompasses routine inspection and servicing of equipment — at frequencies determined by equipment type, environmental conditions, and warranty terms in an O&M services agreement — to prevent breakdowns and unnecessary production losses. This approach is becoming increasingly popular because of its perceived ability to lower the probability of unplanned PV system downtime. However, the upfront costs associated with PM programmes are moderate and the underlying structure of PM can engender superfluous labour activity if not optimally designed.
- **Corrective or reactive maintenance** addresses equipment repair needs and breakdowns after their occurrence and, as such, is instituted to mitigate unplanned downtime. The historical industry standard,

this "break-fi x" method allows for low upfront costs, but also brings with it a higher risk of component failure and accompanying higher costs on the backend (perhaps placing a premium on negotiating extended warranty terms). Though a certain amount of reactive maintenance will likely be necessary over the course of a plant's 20-year lifetime, it can be lessened through more proactive PM and condition-based maintenance (CBM) strategies.



- **Condition-based maintenance (CBM)** uses real-time data to anticipate failures and prioritize maintenance activities and resources. A rising number of third party integrators and turnkey providers are instituting CBM regimes to offer greater O&M efficiency. The increased efficiency, however, comes with a high upfront price tag given communication and monitoring software and hardware requirements. Moreover, the relative novelty of CBM can produce maintenance process challenges caused in part by monitoring equipment malfunction and/or erratic data collection.

Preventative Maintenance (PM) includes the following activities:

- Panel Cleaning
- Water Drainage
- Vegetation Management
- Retro-Commissioning (identifies and solves problems that have developed during the course of the PV system's life).
- Wildlife Prevention
- Upkeep of Data Acquisition and Monitoring Systems (e.g., electronics, sensors)
- Upkeep of Power Generation System (e.g., Inverter Servicing, BOS Inspection, Tracker Maintenance)
- Site maintenance (e.g., security, road/fence repair, environmental compliance, snow removal, etc.).

Corrective/Reactive Maintenance typically includes:

- On-Site Monitoring
- Non-Critical Reactive Repair (addresses production degradation issues)
- Critical Reactive Repair (high priority, addresses production losses issues)
- Warranty Enforcement

Condition-Based Maintenance (CBM) usually consists in Active Monitoring — Remote and On-Site Options Equipment Replacement (Planned and Unplanned) and Warranty Enforcement (Planned and Unplanned).

Contracts & Obligations

1. Key Contractual Provisos (KCP)

KCPs in O&M contracts impact the O&M budgeting considerations and approaches, and typically include:

- **Service-level agreements (SLA)** — specify compliance timeframes for responding to and resolving a range of plant conditions, based on equipment type and issue severity level.

- **Availability or "uptime" guarantees** — define the percentage of time that a system must be fully able to produce electricity. Availability guarantees are typically set at 97–99% per year.
- **Performance ratio and yield guarantees** — stipulate plant performance levels (e.g., a minimum amount of energy delivered) according to measured solar irradiation at a site, based on system design and modeled plant behavior — which can be variable, thus introducing risks. These guarantees account for Force Majeure events and warranty defects.
- **Production guarantees** — state annual plant production levels, independent of weather conditions. Insurance coverage can be used to mitigate weather risk, though it can be an expensive policy to underwrite.
- **Performance incentives** — reward/penalize for plant performance that misses, meets, or exceeds projected production levels.
- **Energy-based contracts** — links plant production (kWh/yr) with O&M service provider revenues so that associated expenses are calibrated according to low (fall/ winter) and high (spring/summer) revenue periods.

2. O&M Contract Contents

The purpose of an O&M contract is to optimise the performance of the plant within established cost parameters. To do this effectively, the O&M contract should clearly set out:

- Services to be carried out by, and obligations of the contractor.
- Frequency of the services.
- Obligations of the owner.
- Standards, legislation and guidelines with which the contractor must comply.
- Payment structure.
- Performance guarantees and operational targets.
- Methodologies for calculating plant availability and/or performance ratio.
- Methodologies for calculating liquidated damages/ bonus payments in the event of plant under- or over performance.
- Terms and conditions.
- Legal aspects.
- Insurance requirements and responsibilities.

3. O&M Contractor Services and Obligations

The O&M contract should list the services to be performed by the contractor, including the following entries:

- Plant monitoring requirements.
- Scheduled maintenance requirements.

- Unscheduled maintenance requirements.
- Agreed targets and/or guarantees (for example, response time or system availability figure) Reporting requirements (including performance, environmental, health and safety, and labour relations reporting).
- The contractor should also be contractually obliged to optimise plant performance. Additionally, it should be stipulated that all maintenance tasks should be performed in such a way that their impact on the productivity of the system is minimised.

The O&M contract will also typically define the terms by which the contractor is to:

- Provide, at intervals, a visual check of the system components for visible damage and defects.
- Provide, at intervals, a functional test of the system components.
- Ensure that the required maintenance will be conducted on all components of the system. As a minimum, these activities should be in line with manufacturer recommendations and the conditions of the equipment warranties.
- Provide appropriate cleaning of the modules and the removal of snow (site-specific).
- Make sure that the natural environment of the system is maintained to avoid shading and aid maintenance activities.
- Replace defective system components and system components whose failure is deemed imminent.
- Provide daily (typically during business hours) remote monitoring of the performance of the PV plant to identify when performance drops below set trigger levels.

In an O&M contract, the obligations of the owner/ developer are generally limited to granting the O&M contractor access to the system and all the associated land and access points, obtaining all approvals, licences and permits necessary for the legal operation of the plant providing the O&M contractor with all relevant documents and information, such as those detailed above, that are necessary for the operational management of the plant.

Courtesy: Solar Dao

"Every decision is risky: it is a commitment of present resources to an uncertain and unknown future"

ENERGY INDEPENDENCE AND ENERGY SELF RELIANCE

Sustainable Growth, Sustainable Energy and Renewable Energy

From the times of Former President Dr. A P J Abdul Kalam, India has been discussing about Energy Freedom, apart from Energy Security – Energy Security was India's important and immediate priority then and even now, so we made oil and gas deals with various countries and started importing coal too from various countries to ensure energy security which is by and large attained as of now, with hiccups now and then, which are sorted out.

Question of Sri APJ Abdul Kalam to young Engineers of India

Will you be remembered for promoting energy independence for the nation through the development of renewable energy system?

Corona times have forced everyone to think about revised strategies for ensuring survival and growth, and Indian Government too announced "Self Reliant India" as the direction to formulate our new strategies and actions for the entire economy of the country. Economy consists of three three major activities as pillars, namely Agriculture, Manufacturing and Services and for all the three, "Energy" is one most important component.

As we all know, primary energy sources such as Coal, Oil, Nuclear, Renewables and more such, help produce the secondary or useable forms of Energy such as Electricity, Fuel and Heat.

Let us first have a look at Primary Energy consumption of our country, by different sources as at present and look at how the "Self Reliance" is being addressed by the Government.

The figures of Units below are in MTOE (Million Tons of Oil Equivalent)

Present Global consumption stand approximately at about 12,000 MTOE and India's at about 800 MTOE

The figures are given for 2017 and projected figures for 2040 (by a Global agency)

Primary Source	2017 consumption	2017 % of total	2040 projection	2040 % of total
Total MTOE	754	100%	1926	100%
Oil	219	29%	400	23%
Gas	45	6%	150	8%
Coal	424	56%	917	48%
Nuclear	8	1%	43	2%
Hydro	37	5%	56	3%
Renewables (Solar, Wind, Biomass and all sources)	22	3%	306	16%

It can be seen from the above figures that the predominant sources are Coal, Gas and Oil totaling to 91% in 2017 and even in 2040 as per 'Business as Usual' or progresses as per present trends and mixes, the percentages of Coal, Gas and Oil total to 79%. The figures indicate substantial contributions by renewables in the future. Can the shares of Renewables in the coming years be more or even much more than meagre 16% in the future, commencing immediately, is the subject matter of this article. These actions can simultaneously address the Self Reliance part too with substantial reductions in Carbon Foot Prints also. Looking at the above Energy sources and consumptions figures again, it is found that, from out of 91% (Oil Gas and Coal in 2017), almost 45%

relies on imports and the balance (mostly Coal) is met from our own sources. The question of Self Reliance or Energy Freedom therefore purely depends on achieving near 0% import of Oil, Gas and Coal. In this connection the following recent announcements by Central Government are important, setting the directions of what are planned to be done for 'Self Reliance' in energy in the immediate years that follow.

'Covid-19 an opportunity, taught India to become self-reliant': PM Modi

The prime minister had held meeting with the chief ministers for two days where he discussed the Covid-19 situation in the country.

New Delhi Jun 18, 2020

Prime Minister Narendra Modi addressing the launch of auction of 41 coal mines for commercial mining, via video conference on Thursday. (ANI Photo)

India will turn the coronavirus crisis into an opportunity, Prime Minister Narendra Modi said on Thursday. He was addressing the launch of auction of 41 coalmines for commercial mining, via video conference.

PM Modi called the auction a major step in making India self-reliant in the energy sector.

"India will turn this Covid-19 crisis into an opportunity. It has taught India to be self-reliant. India to reduce its dependence on imports," the prime minister said.

"For decades, the country's coal sector was entangled in a web of captive and non-captive. It was excluded from competition, and there was a big problem of transparency," said PM Modi.

"After 2014, several steps were taken to change this situation. Coal sector got strengthened due to steps taken," he said, adding that India should be the world's largest coal exporters considering the size of reserves it has.

The auction is expected to garner Rs 33,000 crore of capital investment in the country over next 5-7 years.

The prime minister said that the government has set an aim of gasification of 100 million tons of coal by 2030 with an investment of Rs 20,000 crore.

The prime minister had held meeting with the chief ministers for two days where he said that, instead of a lockdown, India now needs to focus on the next phase of unlocking the country and speeding up economic activities.

He also reiterated the fact that the economy was witnessing a revival.

In his address to the nation last month, PM Modi had said that the Covid-19 crisis has given India an opportunity. "We did not manufacture personal protective equipment, made N-95 masks for namesake when the disease

first broke out here. Today, we manufacture two lakh PPEs in a day and two lakh N-95 masks in a day. This is because we turned the challenge into an opportunity," he had said.

He also said that it is the responsibility to every person of the country to make 21st century India's century. "There is only one way to do this - to become self-reliant," the prime minister had said.

India must reduce coal imports, become self-reliant in energy: PM Modi

"Allowing private sector in commercial coal mining is unlocking resources of a nation with the world's fourth largest reserves," the Prime Minister said, while addressing an event during the auction of 41 Coal Mines via video conferencing in New Delhi on 18 June 2020.

Prime Minister Narendra Modi on Thursday launched the auction of 41 coalmines for commercial mining and reiterated his call for India to become self-reliant in energy by reducing imports. Despite having the world's fourth-largest coal reserves and being the second-largest producer, the country is the second-largest importer.

"India will turn this Covid-19 crisis into an opportunity. The country will reduce its dependence on imports. To make India self-reliant in the energy sector, a major step is being taken today," Prime Minister Modi said while addressing at the launch of auctioning 41 coalmines for commercial mining.

"We are not just launching the auction for commercial coal mining but bringing the coal sector out of decades of lockdown," he said addressing the gathering by video conferencing. The roll out of commercial coal mining is part of the series of announcements made by the Centre under the Atmanirbhar Bharat Abhiyan. It is expected to boost private sector participation, which will, in turn, lead to higher production and enhance competition.

"Allowing private sector in commercial coal mining is unlocking resources of a nation with the world's fourth largest reserves," the Prime Minister said. "It has been decided to open up the coal and mining sector for competition, capital, participation and technology," he added.

The Prime Minister said reforms related to coal sector will prove to be big in making tribal belts as well as eastern and central India into pillars of development. Commercial coal block auction is a win-win for industry users. New resources will open up, states will get more revenue and new employment opportunities will be generated, he said.

A two-stage electronic auction process is being adopted for allocation of the coalmines, according to an official statement. Upon attainment of peak rated capacity of production of 225 million tons, these mines will contribute about 15 per cent of the country's projected total coal production in 2025-26.

The move will provide direct employment to about 70,000 people and indirect employment to 2.1 lakh people. It is expected to generate Rs 33,000 crore of capital investment in the country over the next five to seven years. These mines will contribute Rs 20,000 crore in revenue annually to the state governments.

Allowing 100 per cent foreign direct investment (FDI) is likely to bring in international practices, the latest technologies and mechanisation in mining operations. Self-reliance with substitution of imports by independent thermal power plants and captive power plants will result in saving of foreign currency.

The initiative will ensure sustained coal stocks for industries with greater reliability. It will move the sector towards a free-market structure with the implementation of a National Coal Index. Commercial mining of coal will promote the practice of efficient use of clean energy and reduce the scourge of environmental pollution with an incentive to coal gasification and liquefaction.

Oil

Let us understand what is **CRUDE OIL** and what products are created from it.

Crude oil is a naturally occurring, unrefined petroleum product composed of hydrocarbon deposits and other organic materials. Crude oil can be refined to produce usable products such as gasoline, diesel and various forms of petrochemicals. It is a **non renewable** resource, also known as a fossil fuel, which means that it can't be replaced naturally at the rate we consume it and is therefore a limited resource. Crude oil is pumped from

the ground in the Middle East (e.g., Saudi Arabian Arab Light), West Africa (e.g., Nigerian Bonny Light), the Americas, and Asia (Russia), pumped into ships called tankers, and sailed across the ocean to oil refineries on the Delaware River.

CRUDE OIL RESERVES IN INDIA :-

India had about 750 Million metric tonne of proven oil reserves as April 2014 or 5.62 billion barrels as per EIA estimate for 2009, which is the second-largest amount in the Asia-Pacific region behind China. Most of India's crude oil reserves are located in the western coast (**MUMBAI HIGH**) and in the northeastern parts of the country, although considerable undeveloped reserves are also located in the offshore **BAY OF BENGAL** and in the state of **RAJASTHAN**. The combination of rising oil consumption and fairly unwavering production levels leaves India highly dependent on imports to meet the consumption needs. In 2010, India produced an average of about 33.69 million metric tonne of crude oil as on April 2010 or 877 thousand barrels per day as per EIA estimate of 2009. As of 2013 India Produces 30% of India's resources mostly in Rajasthan

What amount of crude oil does India produce?

India produces a little under a quarter of its crude oil demand. According to the **PPAC** (**Petroleum Planning & Analysis Cell**), in fiscal year 2014 the country produced ~37,800 TMT (thousand metric tons) of crude oil. The total consumption for the year was 158,400 TMT. As a result, 77.6% of the requirement was fulfilled by imports. This trend continues to date. In November 2014, India's crude oil production only accounted for 22% of its domestic consumption.

Report on India's production and import :-

Now let us come to the question. India can only become self sufficient in crude imports, only in the utopian world (?). So, in India's case, self sufficiency in oil production is only a dream (it looks).

This is because the domestic **production** of **oil** has **fallen** for the **fourth straight year** in 2015–16 and to add to this the consumption of oil is increasing day by day in country, as of current it has **increased** by **11%.**

Acc. to the study titled "**ENERGY SECURITY OUTLOOK" 2015**, projects that under a reference case scenario, the import dependencies of crude oil will rise to 91 % and in 2031–32 also, it will be as high as 77%.

The Country's largest oil producers like ONGC are failing to cope up with the increasing demand. The output of ONGC witnessed a decline from 18.6 mt in 2014-15 to 18.5 mt in 2017 year. Their inability to bring fresh big reserves into production lately has kept production stagnant

PM has set an ambitious target of reducing imports to 67% by 2022. The government has unveiled new exploration policies for its oil and gas blocks lately, aiming to plug loopholes in its previous policies that encouraged only limited participation of resource-rich foreign oil companies and could not dramatically boost the domestic output.

So, India (under these circumstances) can never become self sufficient in crude oil in this century. It can reduce it's import dependency by researching for new reserves and using the current reserves in the best possible way.

If India will become self sufficient in crude oil, the country will easily become economically developed, as it's Forex reserves could be used for the development of other sectors of economy. As of now, though it looks like a distant dream, there appear to be ways through focus on Researching or Adopting certain new technologies, which are suitable for the kind of resources and inputs available in India.

India will soon be zero petroleum import country: Nitin Gadkari

Despite low prices,India at present is incurring a massive Rs 4.5 lakh crore on crude imports which was earlier Rs 7.5 lakh crore, said Nitin Gadkari.

NEW DELHI: With the Centre focusing more on developing alternative fuel economy, India will soon stop importing petroleum products, Union Minister Nitin Gadkari said today.

"We are going to develop this country where our import of petroleum will be zero. We are promoting alternative fuel like **Ethanol, Methanol, Bio-CNG...**this will boost the rural and agriculture centre and create huge employment and the Road Transport and Highwaysm, Minister said. .

India is one of the fastest growing economy in the world. At present, it is "golden opportunity" to cash on its agriculture, bamboo, surplus coal and power.

"The time has come to diversify agriculture," the minister asserted stating that it has the potential to change the entire rural economy, at a time when more than 10,000 farmers in Vidarbha region had committed suicide.

"The socio-economic situation is not good, agriculture is facing acute problems. This alternative fuel economy is going to change socio-economic picture of agriculture and rural economy. This is time for the country to plan the way by which we can save the life of people in rural and agriculture sectors. We can make ethanol from biomass that is cotton straw, wheat straw, rice straw and bagasse. Even from municipal waste we can make ethanol," the minister said.

Stressing on "waste to wealth", he said manufacturing ethanol and biogas from waste could result in savings to the tune of Rs 5 lakh crore annually.

The minister said ethanol is generated from biomass in Europe. One tonne of rice straw can get 400 litres of ethanol. In North East, bamboo could be used for making ethanol, he said.

He added, it will eliminate pollution too as farmers in states like Haryana burnt wheat straw which caused pollution. Besides municipal waste, waste of vegetables and fruits could be used in manufacturing bio-fuel.

He stressed the need for use of science, technology, entrepreneurship and research. He also said Niti Aayog is taking initiatives in this regard.

"We have finalised standard norms for bio-diesel, bio-CNG and ethanol and electricity," Gadkari said.

Taking a jibe at bureaucracy, the minister said somewhere there is a need to expedite the entire decision-making process. "If there is a will, there is a way if there is no will there is no way. There will only be committees, discussions and research groups," Gadkari added.

The minister also stressed on the need to generate methane from coal blocks and said some of the companies who were allotted the blocks were not doing anything, which is not fair.

Actions now and the way ahead:

The Government's intentions and initiatives reproduced from recent announcements as above, clearly indicate the moves for alternative fuels and one of the massive program launched already is **Bio CNG** program, with goals of 15 to 20 Million Tons per annum, which is already commenced in many states of India. A 15.0 Tons/Day, Bio CNG Facility in Tamilnadu, at Namakkal is just inaugurated on the 21st of June.

There are technologies developed in Europe, US and Canada for production of **Bio Coal** and **Bio Crude** from different kinds of biomass, particularly wastes from agriculture and plantations. There is an estimate that just the 'Trashes and Tops' generated after cutting of Sugarcane crops, (India is the second largest producer in the world with production of around 360 Million Tons per annum) which are just left and burnt in the fields, can help produce about 25 Million Tons of **Bio Crude.** There are also technologies to produce **Bio Carbon** from dry, wet and highly moist Biomass, including sewage sludge. We have been writing in these coloums about some of the technologies like Torrefaction for Bio Coal, Pyrolysis for Bio Crude, Carbonization and Hydro Thermal Carbonization for producing Bio Carbon and so on and there are substantial potentials of biomass for all these in India. All these can help attain self-sufficiency of Coal and Oil and help increase percentages of Renewable Energies as well.

(To be continued)

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COVID-19

Be careful, not fearful

Dispel the myths of corona scare,
Imbibe correct knowledge & become aware,
Follow cough etiquettes, hand hygiene & personal care,
Spread a word of precaution through your share.

What is COVID-19?

COVID-19 is an infectious disease caused by a new recently discovered novel Corona Virus.

How does it transmit?

- When a person suffering from this disease sneezes or coughs, a lot of droplets spread in the air or fall on the ground and nearby surfaces.
- If another person is nearby and inhales the droplets or touches these surfaces and then touches his face, eyes or mouth, he can get the infection.
- The chances are more if one is within a distance of less than 1 meter from the infected person.

What happens to a person who develops the disease?

- Majority of the people (80%) will require no treatment as such and will recover on their own.
- A small proportion (<20%) may need hospitalization.
- A very small proportion (mainly with underlying chronic illness) may need admission in intensive care unit (ICU).

What is the age group in which this disease spreads? Does it occur in children as well?

- This disease is known to occur in all age groups.
- It can spread to children as well through the other person suffering from the disease in the household.
- The infection is generally mild in children.
- Older persons and persons with pre-existing medical conditions (such as high blood pressure, heart disease, lung disease, cancer or diabetes) are at a high risk to develop serious illness.

How long does the Corona Virus survive over the surfaces or objects?

- It is not certain how long the virus that causes COVID-19 survives on surfaces, but it seems to behave like other Corona Viruses.
- Studies suggest that Corona Viruses (including preliminary information on the COVID-19 virus) may persist on surfaces for a few hours or up to several days.
- This may vary under different conditions (e.g. type of surface, temperature or humidity of the environment).
- If you think a surface may be infected, clean it with simple disinfectant to kill the virus and protect yourself and others.
- Clean your hands with an alcohol-based hand rub or wash them with soap and water.
- Avoid touching your eyes, mouth, or nose.

The aim is to prevent the transmission from contaminated surfaces to your hands and face/mouth/eyes.

What are the common symptoms?

The symptoms include:

- Fever, Sore throat, Cough and Shortness of breath.
- These are similar to the symptoms of any viral infection like common cold, influenza etc.

Whom should I consult?

You should consult your family physician if you are having clinical symptoms of a respiratory infection plus any of the following:

- Travel history to a Corona Virus-affected area.
- Close contact with a person infected with Corona Virus.

What tests are to be done and where to get them done?

You are not required to get tested for COVID-19 if you do not have any symptoms (Cough, fever or difficulty in breathing)

If you have any of the above symptoms and have travelled to any of the COVID-19 affected countries or you are a contact of a laboratory confirmed positive case **then immediately call the State Helpline Number or Ministry of Health & Family Welfare, Government of India's 24x7 helpline i.e. 011-23978046 and Toll Free No: 1075**

The helpline desk will note down your contact details and contact you with the testing protocols of COVID-19.

If you qualify as a case for testing as per the protocol, you will be tested at a government approved lab only.

Is there any treatment for Corona Virus Infection?

- As on date there is no specific treatment for Corona Virus infection.
- Treatment for Corona Virus infection consists of symptomatic treatment.
- Since it is a viral infection, so in more than 80% of the cases it recovers within few days.
- A small proportion may need admission in hospital/ICU if they are having symptoms of severe disease.

COVID-19

Are there any specific medications available to treat Corona Virus infection?

- No, as of now there is no specific anti-viral medication available to treat the symptoms of the infection however majority of the people recover without any problem just like in any other viral illness.
- Some drugs which have been used for other Corona Virus infections are being tried in very sick patients.

How can I protect myself and my family members?

You can reduce your chances of being infected or spreading COVID-19 by taking some simple precautions:

- Regularly and thoroughly clean your hands with an alcohol-based hand rub or wash them with soap and water after coming from outside or after visiting a patient with Corona Virus infection.
- Maintain at least 1 meter (3 feet) distance between yourself and anyone who is coughing or sneezing.
- Avoid touching eyes, nose and mouth.
- Make sure you, and the people around you, follow good respiratory hygiene. This means covering your mouth and nose with your bent elbow or tissue when you cough or sneeze. Then dispose of the used tissue immediately.
- Stay home if you feel unwell. If you have a fever, cough and difficulty in breathing, seek medical attention.

Who should wear mask?

Persons having no symptoms are not to use mask

Medical masks should not be used by healthy persons who are not having any symptoms because it creates a false sense of security that can lead to neglecting other essential measures such as washing of hands.

In such situation, more effective steps are:

I. Wash hands frequently with soap and water for 20 seconds. An alcohol based hand sanitizer with 70% alcohol must be used for 20 seconds. If hands are dirty or soiled, do not use alcohol based hand sanitizer, but wash hands preferably with soap and water.

II. While coughing or sneezing cover nose and mouth with handkerchief, paper tissue. If handkerchief or tissue paper is not available, cough into the flexed elbow. Dispose off tissue immediately after use and wash hands.

III. Refrain from touching face, mouth, nose and eyes.

IV. Stay at least a meter away from those coughing or sneezing.

V. Monitor your body temperature.

When and who should use medical masks (apart from health care worker)?

- When a person develops cough or fever. Use of medical three layer masks when ill, will prevent your infection from spreading to others. However, you also need to wash your hands frequently to avoid spreading infection to others.
- While visiting a healthcare facility.
- When you are caring for an ill person.
- Close family contacts of such suspect/confirmed cases undergoing home care should also use triple layer medical mask.

What is the role of hand sanitizers?

- Hand sanitizers are to be used when you are caring for the patients infected with Corona Virus.
- In general, washing hands frequently with soap and water for 20 seconds is the recommended option.
- If hands are dirty or soiled then do not use alcohol based hand sanitizer, but wash hands preferably with soap and water.

Is there any role of specific foods/drinks in the treatment of Corona Virus infection?

There is no specific recommendation on this however one can continue to take his/her regular diet which includes fruits, vegetables etc. to stay healthy.

Is there any vaccine available for the treatment of Corona Virus infection?

- As of now, there is no vaccine available for the treatment of Covid-19 infection.

Are we well equipped to deal with the Corona Virus crisis?

- The Ministry of Health and Family Welfare has taken adequate steps in this direction to equip the designated healthcare facilities to take care of the infected Corona Virus patients, should they require an admission.
- The relevant SOPs for isolation and home quarantine, sample testing, laboratory facilities and discharge of the admitted patients are well available in the public domain on the website of Ministry of Health and Family Welfare (MoHFW).

What are the few common myths?

1. Does the disease spread through food especially eating chicken, eggs and meat?

There is no conclusive evidence that the properly cooked food transmits the disease.

2. Does the disease spread through pets?

The transmission of disease has not been seen through pets.

3. Does the dead body of a person infected with Corona Virus transmit the infection?

There is no transmission of Corona Virus infection from the dead body of the person.

How can I help in containing the disease?

- One can help by following good personal hygiene, handwashing and cough etiquettes.
- One can also avoid/restrict unnecessary travel, participation in public gatherings and can ensure a reasonable social distancing.
- This can contribute greatly in breaking the chain of active transmission.

What are the helpline numbers to be contacted in case of need?

The Helpline Number for

Corona Virus is +91-11-23978046

Toll Free No: 1075

For any updates, visit the website of Ministry of Health and Family Welfare.

All India Institute of Medical Sciences (AIIMS), New Delhi

ABOUT CORONAVIRUS

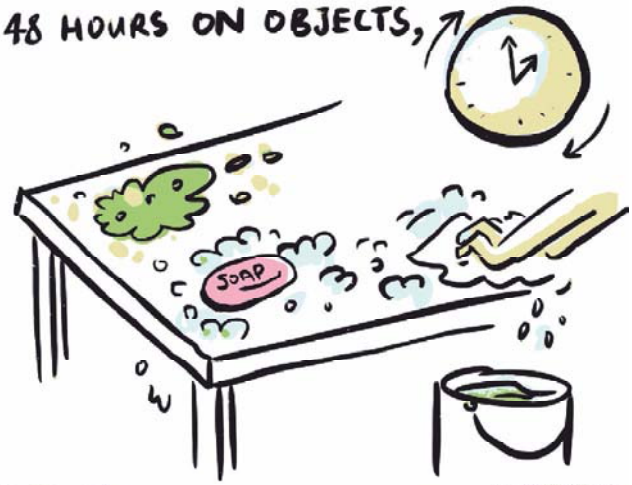
AND IN GENERAL, IT'S A GOOD IDEA TO AVOID CROWDS, BECAUSE YOU DON'T KNOW WHO MIGHT BE SICK.

HOWEVER, SOMETIMES A SICK PERSON'S SALIVA CAN GET ON OTHER THINGS...

AND IF YOU TOUCH ANY OF THESE THINGS BY ACCIDENT, AND THEN TOUCH YOUR FACE,

YOU MIGHT ALL FALL SICK.

VIRUSES CAN LAST FOR UP TO 48 HOURS ON OBJECTS,



AND THE ONLY EFFECTIVE WAY TO GET RID OF THEM IS TO WASH THEM OFF WITH SOAP.

WHICH IS WHY IT IS ALSO GOOD TO FOLLOW THESE

PRECAUTIONS

1 WASH YOUR HANDS THOROUGHLY WITH SOAP AND WATER FOR AT LEAST 20 SECONDS AFTER TOUCHING A SUSPECTED CONTAMINATED SURFACE

weimankow
DRAWINGS CREDIT

CORONAVIRUS: RESTARTING EARLY CAN BOOST INDIA'S ROLE IN GLOBAL ECONOMY

India is well-positioned to step in as an alternative global manufacturing hub for the world, given its emergence as a credible economy and the support it has provided to the global community during the pandemic. Will we step up?

HIGHLIGHTS

- Recovery in India after Covid-19 requires a multi-pronged approach
- With reduced confidence in China, the world may look at other potential manufacturing hubs
- If India initiates the recovery process early, it could boost its position in global economy

The whole world is in a synchronised lockdown. Both advanced and developing economies are grappling with recession precipitated by the Covid-19 crisis.

The IMF World Economic Outlook growth projections present a grim reality in terms of the annual percentage change in the real GDP. The Eurozone leading the projected de-growth estimates in the year 2020 at minus 7.5 per cent and modest projected growth of 4.7 per cent next year, assuming that global recovery starts in the second half of the year 2020.

In India's context, there is some light at the end of the tunnel with growth projected at 1.9 per cent in 2020 and 7.4 per cent in 2021, as against a contraction of the global economy projected at least minus 3 per cent in 2020 and 5.8 per cent growth in 2021.

While there is hope for a quick recovery in India, we have to make concerted efforts to realise this including an integrated multi-pronged approach through public policy support, private sector participation and citizens' support.

RBI has already stepped up announcing measures to infuse much-needed liquidity apart from incentivising banks to encourage credit flows via NBFCs, HFCs and MFIs to the MSME and consumer segments (auto and housing) to counter the severe impact on MSME cash flows and sustainability.

In addition, the government needs to step in decisively and lead the turnaround through focused public policy and public spending.

Unlike the 2008 financial crisis, this time the crisis has hit harder as the lockdown has jammed all production and operational activities, in particular the Business to Company (B2C) channel with severe impact on labour, employment, supply chain, capacity utilisation, overheads and cost of capital.

Moratorium on loans provided relief to some extent, but much more will be needed to preserve the production capacities, which can help kickstart the economy post lockdown.

The developed countries are pumping in enormous amounts of money in shoring up the household incomes and such measures need to be evaluated by the Indian government.

There is an urgent need to support not only lives but livelihoods as well. Preservation of livelihood requires us to resume production and operations as soon as possible.

Restarting economy

The government should consider the resumption of work on infrastructure and construction projects all over the country that was abruptly halted due to the lockdown. This will have the immediate effect of creating employment and ensure wages to labourers.

Supply chain disruption globally has driven multinational companies to look at diversifying their supply chains. Japan recently announced setting up of a $2.2-billion fund to help its manufacturers shift production out of China. US, too, has indicated a strong intent to diversify manufacturing away from China.

India needs to step up as a viable alternative. For manufacturing a strong infrastructure base is crucial. The government should consider:

1. A task force to provide single clearance window as a point of approval, common application and approval forms for licenses, warehousing and easy compliances.

2. Easy availability of land and power through land acquisition reforms and impetus to renewable energy capacity building.

3. Fiscal incentives could be linked to job creation like income tax relief to companies employing more than 1,000 labourers in the manufacturing sector.

4. Robust dispute resolution mechanism that exhibits a strong commitment to align with International arbitration decisions.

However, the entire value chain should be scrutinised to be mindful of the possible impact of both the upstream and downstream activities with particular emphasis on diversification of the supply chain.

This will prevent over-dependence on any one source or distribution channel to subsequently reduce piling up of inventories in the near term on account of the serious slowdown in exports.

Opportunity for India

This anti-China sentiment should be viewed as an opportunity for India that could be monetised by positioning India as an able contender to service the value chains and attract FDI.

This will bring about a global realignment depending on how the geopolitics plays out in the post-Covid world.

The job losses due to the economic fallout originating from Covid-19 pandemic also presents a unique opportunity for India — the availability of skilled and trained labour to anyone looking to manufacture in India.

The government and Indian companies could partner to ensure that the people that lose their jobs are available to MNCs looking to shift base into India and thus provide Indian companies and labour immediately relief.

To emerge as a leader in the global supply chain in the post-Covid-19 era, India needs to act fast, as here too China has the first-mover advantage; its economy is up and running and the rest of the world is still reeling under the impact of Covid-19.

While China may retain a chunk of the market share in the global supply space, India is well-positioned to step in as an alternative global manufacturing hub for the world, given its emergence as a credible economy and the support it has provided to the global community during the pandemic. Will we step up?

(Article courtesy **INDIA TODAY -** *The author of the article is Ritika Agarwal, who is an experienced chartered accountant and Senior Director at Rajeshree Sabnavis & Associates. All views expressed are personal.)*

"In turbulent times, managers cannot assume that tomorrow will be an extension of today."

MENTAL HEALTH TIPS FOR WORKING PROFESSIONALS: HANDLING STRESS & DEPRESSION

Dr. K. JANAKIRAMAN, PhD., CCP., CMH., MIAAP., MNAOP

Psychologist & Psychotherapist

Depression is a major public health problem in India, contributing to significant illness, disability as well as impermanence causing significant socio economic losses. Root cause for depression could be several, including biological, social, economic and cultural factors, which are triggered by environmental factors. Unfortunately Depression and suicide are closely interlinked. At its worst, depression can lead to suicide or attempts as well. Recognizing depression at an early stage is critical for reducing suicidal deaths and deliberate self-harm across the spectrum. People with depression often tend to under-perform in workplaces, thereby resulting in loosing of job and event loosing quality of life.

As per NMHS reports higher prevalence of depression is seen among women and working age adults (aged 29,42 20–69 years) has been consistently reported by Indian studies. Depression is also common among the elderly but possibly they fall less in to this trap due to experience and wisdom. Reasons could be many for a Depression resulting from complex mechanisms; there can be no single identifiable cause. However, there is conclusive evidence to reveal that several biological, social, economic, cultural and environmental factors operate in a maladaptive individual, leading to depression. One may develop depression due to the loss of a loved one, or it may unfold in the backdrop of multiple social or financial stresses, or on an account of a family history of depression, or it may begin in the background of a chronic medical condition. Some individuals can experience loneliness and feeling low for no apparent reason at all. It is crucial to note that recognition of these factors is important to provide appropriate intervention for the affected individual and to support the family.

Many a times certain feelings such as sadness, hopelessness, lethargy, lack of involvement were taken lightly or rather omitted among younger generation. When such feeling are left un-attended at the right time or given a lighter approach may possibly lead to a depressed lifestyle. It is also more important to analyze, whether these feelings happen in a combination, its duration or intensity that start to interfere with day-to-day life activity. The real benefit of such identification will help in noticing when people who are in working profession are struggling and hardly find time to get the support they need. The symptoms could be either a depressed mood, or a loss of interest or loss of pleasure in things that were once enjoyable. Many times these will just be a normal part of adolescence and nothing at all to worry about, but this depression will also lead to the indirect results such as:

- *State of Anger with high degree of irritability.*

- *The person will be reluctant and avoid spending time with colleagues in the organization.*
- Can show an *Indifferent behavior leading to collapse of good relationship with colleagues or family.*
- May make excuse to attend meetings, get-to-gethers, or events.
- Depression will make them exhausting and can make people more tired than usual, even after having spent good amount of time in sleeping. Such conditions could lead to **HYPERSOMNIA**.
- The physic may get disturbed and could lead to headaches and migraine etc.,
- There will be an imbalance in the brain chemicals such as **SEROTONIN & NOREPINEPHRINE** which are the primary cause for mood and pain.
- Due to these changes, the person may feel restless, agitated, at times excessive depression can even slow down movement and speech.
- Depression can create an emptiness that feels unbearable. This can make them end up with **Eating Disorder**.
- Various psychological studies have proven that when emotional pain feels too big or when it stops making sense, people hurt themselves by Self-Harming.

Tips to Handle :

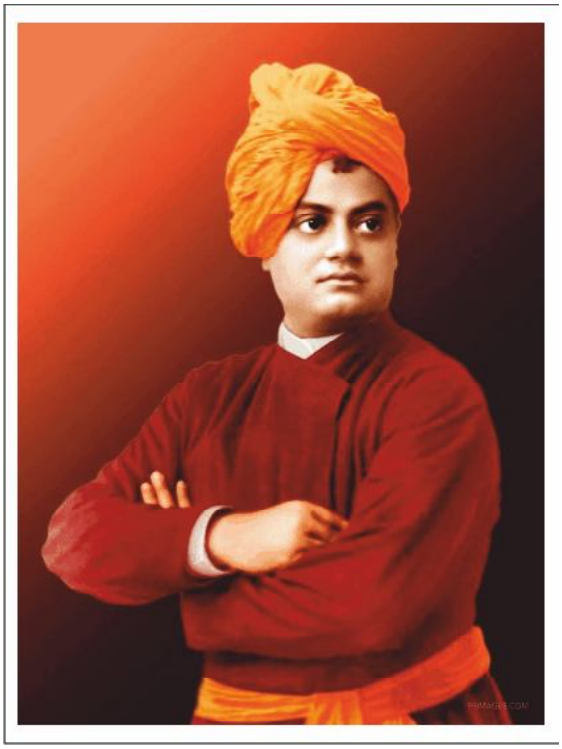
If you find the person is supposed to be depressed, the first step is observe his activities and try to show care and love as they expect. Discuss with them on their problems and try to give them comfortable environment in which they can come out of their problems. Remember do not Advise them on how to be and do not compare them with others. In case if the person is not coming out with proper reason or having a difficulty in opening up with you, approach a Counseling Psychologist who can try to fix the problem. Line of treatment comes next, since many people term the affected persons by the terminologies they know and take them for medication. Depression doesn't always need medication, but it might at an aggressive state. Some sessions of counseling can heal, if not then the psychologist should observe and recommend the client to a clinical Psychiatrist. More than working hard, succeeding in work like than studies and career growth more amount of importance is to be given to them for mental relaxation by means of meditation, yoga, take a walk, games could also be a reliever in case of stressful workday. Try to connect them with more friends and colleagues. Create a positive environment around in your workplace, this is because you spend more of your time at office / workplace. In case if the above mentioned proper care is not taken there could also be a possibility of substance addiction developed during a period of time. Keep the mental health fit and free from taking stress for a healthy and longer living. Have a happy living.

This article is published again for the third time in the interest of the members.

A MONK - INTERVIEWED BY A JOURNALIST

A Monk of the RamaKrishna Mission was being interviewed by a journalist from NY. The journalist started interviewing the Monk as planned earlier.

Journalist - "Sir, in your last lecture, you told us about Jogajog (contact) & Sanjog (connection). It's really confusing. Can you explain ? "



The Monk smiled and apparently deviating from the question asked the journalist: "Are you from New York?"

Journalist - "Yeh..."

Monk - "Who are there at home ? "

The Journalist felt that the Monk was trying to avoid answering his question since this was a very personal and unwarranted question. Yet the journalist said: "Mother has expired. Father is there. Three brothers and one sister. All married..."

The Monk, with a smile on his face, asked again: -

"Do you talk to your father?"

The journalist looked visibly annoyed...

The Monk- "When did you talk to him last?"

The journalist, supressing his annoyance said: "May be a month ago."

The Monk: "Do you brothers and sisters meet often ? When did you meet last as a family gathering?"

At this point, sweat appeared on the forehead of the journalist. Now who is conducting the interview, the Monk or the Journalist.

It seemed that the Monk was interviewing the Journalist.

With a sigh, the Journalist said: "We met last at Christmas two years ago."

The Monk: "How many days did you all stay together?"

The Journalist (wiping the sweat on his brow) said : "Three days..."

Monk: "How much time did you spend with your Father, sitting right beside him?"

The journalist looking perplexed and embarassed and started scribbling something on a paper...

The Monk: "Did you have breakfast, lunch or dinner together? Did you ask how he was? Did you ask how his days are passing after your mother's death?"

Drops of tears coming out started to flow from the eyes of the journalist.

The Monk held the hand of the journalist and said:

"Don't be embrassed, upset or sad. I am sorry if I have hurt you unknowingly...

But this is basically the answer to your question about "contact and connection (Jogajog and Sanjog)". You have 'contact' with your father but you don't have 'connection' with him. You are not connected to him. Connection is between heart and heart... sitting together, sharing meals and caring for each other ; touching, shaking hands, having eye contact, spending some time together...You brothers and sisters have 'contact' but you have no 'connection' with each other...."

The journalist wiped his eyes and said : "Thanks for teaching me a fine and unforgettable lesson"

This is the reality today. Whether at home or in the society everybody has lots of contacts but there is no connection. No communication... . Everybody is in his or her own world.

Let us not maintain just "contacts" but let us remain "connected"; caring, sharing and spending time with all our dear ones.

The Monk was none other than
SWAMI VIVEKANANDA

எல்லாருக்கும் எஸ்.எம்.எஸ்., வேண்டும்!

ஊரடங்கில் இருந்து வெளியே வந்து. வேலைக்கு செல்ல ஆரம்பித்து விட்டோம். துருப்பிடித்து போயிருந்த, நம் வாகனத்திலிருந்து, மூளை வரை, அனைத்தையும் தூய்மைப்படுத்த வேண்டிய நேரம் வந்து விட்டது.

நீண்ட பிரிவிற்கு பின், கைகொடுத்து, கட்டி அணைத்து, கண்ணீர் பெருக்கி, அன்பை பெருக்கிக்கொள்ளும் பழைய நடை முறைக்கு, இன்னும் பல மாதங்கள் தடை போடுங்கள். காரணம், கொரோனா இன்னும் நம்மை விட்டு முழுமையாக அகலவில்லை. ஆகவே, என்னிடமிருந்து உனக்கோ, உன்னிடம் இருந்து எனக்கோ, நம்மிடம் இருந்து நம் குடும்பத்தினருக்கோ, கொரோனாவை கொடுத்து விடக்கூடாது என்பதில், கூடுதல் கவனமும், தெளிவும் தேவை.

மின்சாரம் புழங்கும் இடத்தில் எலும்புக்கூடு படம் போட்டு, 'தொடாதே அபாயம்' என்று எழுதியிருப்பதை, எப்போதும் நினைவில் வைத்து, எதையும், யாரையும் தொடாமல் இருங்கள். தவிர்க்க முடியாமல் தொட வேண்டி வந்தால், உடனே சோப்பு போட்டு நன்றாக கைகழுவி விடுங்கள். முக கவசம் இப்போது நம் உயிர் கவசமாகி விட்டது.

'உங்களுக்கு என்ன சொல்லி விட்டீர்கள்... முக கவசம் மாட்டிக் கொண்டு இயல்பாக மூச்சு விட முடியவில்லை; தெளிவாக பேச்சு வரவில்லை; மூடப்பட்ட பகுதியில் அரிப்பு எடுத்தபடியே இருக்கிறது; காது மடல் வலிக்கிறது' என, முக கவசத்தை தூக்கி எறிய, 100 காரணங்களை நீங்கள் கண்டுபிடிக்கலாம்.

ஆனால், அது, நம் உயிரைக் காக்கும் என்ற ஒரே காரணத்தால், அணிய மறுக்க, மறவாதீர். ஒரு நாளைக்கு, ஒரு முக கவசத்தை மட்டும் பயன்படுத்துங்கள். பயன்படுத்திய முக கவசத்தை முறைப்படி அழித்து விடுங்கள். துணி மாஸ்க் மற்றும் மறுமுறை பயன்படுத்தும் முக கவசம் என்றால், மூக்கையும், வாயையும் நன்றாக மூடும்படியாக இருக்கட்டும்.

உங்கள் அலுவலக மேஜையில் எப்போதும், 'சானிடைசர்' எனப்படும் கிருமி நாசினி இருக்கட்டும். வேலையை துவங்குவதற்கு முன், மேஜையில் உள்ள பொருட்களை சுத்தம் செய்து விடுங்கள். உங்களுக்கும், உங்கள் பக்கத்தில் வேலை செய்பவருக்கும் குறைந்தபட்சம், 6 அடி தூரம் இடைவெளி இருக்கட்டும்.

பொதுக் கழிப்பறைகளை உபயோகிப்பதை முடிந்தவரை தவிர்க்கவும், லிப்ட் பட்டன், அலுவலக கைப்பிடி போன்ற, பலரது கை விரல்கள் படும் இடத்தில், உங்கள் விரல்கள் படாமல் பார்த்துக் கொள்ளவும். காரில், அலுவலகத்தில், இயற்கை காற்று, வெளிச்சம் இருந்தால், அதுவே போதுமானது. காணொலி கூட்டங்களே மேல்.

நாம் பத்திரமாக இருப்பது போல, மற்றவர்களும் பத்திரமாக இருப்பதற்கு, நம் அன்பும், அக்கறையும் அவசியம். உங்களுக்கு வந்துள்ளது சாதாரண காய்ச்சலாகவே இருக்கலாம். ஆனால், அது மற்றவர்களுக்கு பயத்தை ஏற்படுத்தும். ஆகவே, சளி, இருமல், காய்ச்சல் வந்தால், அலுவலகப் பக்கமே போக வேண்டாம், மூத்தோர், மாற்றுத்திறனாளிகள், உடலுக்கு முடியாதோர் வீட்டில் இருந்தே பணியாற்றலாம்.

கை குலுக்குவதை விட்டு, வணக்கம் செலுத்தவும். கண்ட கண்ட நேரத்தில் காபி, டீ குடிப்பதை விட்டு, கபசுர குடிநீர் குடிக்கவும். பார்த்ததை எல்லாம் வாங்கி சாப்பிட்டு, வயிற்றை குப்பைக் காடாக்கியதை தவிர்த்து, பாரம்பரிய விட்டு உணவுகளை சாப்பிடவும்,

நான் ஒரு மருத்துவர், என் கடமையை செய்வதில் இருந்து, தவறக்கூடாது என்பதால், இந்த கொரோனா காலத்திலும், என் மருத்துவமனையை திறந்து வைத்திருந்தேன்.

கர்ப்பிணிகளும், எதிர்பாராமல் அடிபட்டு காயம்பட்டோரும் தான் வந்தனரே தவிர, வழக்கமாக வரக்கூடிய வயிற்று வலி, காய்ச்சல், கை, கால் குடைச்சல் நோயாளிகள் யாருமே வரவில்லை.

நீங்களே உணர்ந்து விட்டீர்கள்

காரணம், அவர்களது வீட்டு உணவும், அமைதியான வாழ்க்கை முறையும் தான் என்பதை, நிச்சயமாகக் கூறுவேன். ஆகவே, உங்கள் பலரின் நோய்க்கு, எது மருந்து என்பதை நீங்களே உணர்ந்து விட்டீர்கள்; அதை, ஒரு போதும் இனி மறந்து விடாதீர்கள். இந்த கொரோனா, நம்மை விட்டு முற்றிலுமாக விடைபெறும் வரை, எல்லாருக்கும் தேவை ஒரு, **எஸ்.எம்.எஸ்.,** தான்.

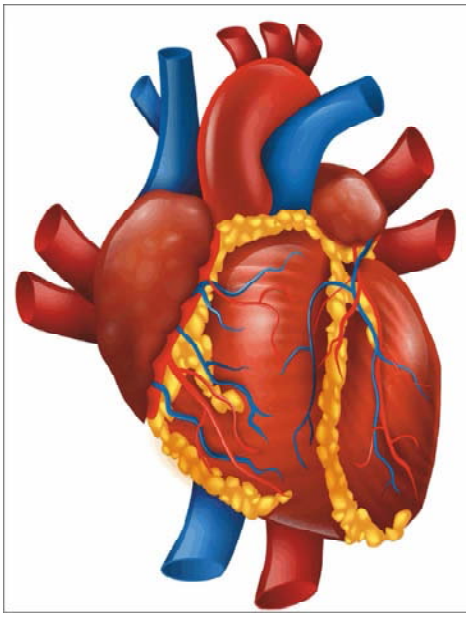
'எஸ்' என்றால், **'சோசியல் டிஸ்டன்ஸ்'** – சமுக இடைவெளி. **'எம்'** என்றால், **'மாஸ்க்'** அணிந்து இருத்தல். **'எஸ்'** என்றால், **சோப்** மற்றும் **சானிடைசர்** உபயோகிப்பது. இந்த, **எஸ்.எம்.எஸ்., வாசகங்கள், நம் கண்ணில் மட்டுமல்ல, அனைவர் கண்ணிலும் படும்படியாக ஒட்டி வைக்கவும்.**

ஒன்றுபடுவோம்; கொரோனாவை விரட்டியடிப்போம்.

– டாக்டர் ஜெயஸ்ரீ சர்மா, மகப்பேறு மருத்துவர், 80560 87139

Courtesy: தினமலர், 29.07.2020

நெஞ்சுவலி வந்தா அந்த நொடியில் உயிரை காப்பாற்ற என்ன செய்யணும்?



மாரடைப்பு எந்த நிமிடத்தில் வரும் யாரால் கணிக்க முடியும். அதிலும் குறிப்பாக தனியாக இருக்கும் போது மாரடைப்பு (நெஞ்சுவலி) வந்துவிட்டால் நம்மை நாமே யாருடைய துணையுமின்றி, யாரையும் எதிர்பார்க்காமல் எப்படி காப்பாற்றிக் கொள்வது என்ற முன்னெச்சரிக்கை நடவடிக்கைளை தெரிந்து வைத்துக் கொள்வது நல்லது தானே. மாரடைப்பு சிலருக்கு பேருந்துகளில் சென்று கொண்டிருக்கும் பொழுது, அலுவலகங்களுக்குச் சென்று திரும்பும்போது, போன்ற சமயங்களில் மாரடைப்பு ஏற்பட்டு, அடுத்தவர் உதவியை நாடி, மருத்துவமனைக்குக் கொண்டு செல்வதற்குள் இறந்து விடுவதைக் கேள்விப்படுகிறோம். அது போன்ற நிகழ்வுகள் நடந்துவிடாமல் பார்த்துக் கொள்ள சில எளிய வழிமுறைகளை மனதுக்குள் வைத்துக் கொண்டாலே போதும். தேவையில்லாத அசம்பாவிதங்களைத் தவிர்த்துவிட முடியும்.

படபடப்பு – குறிப்பாக, எந்த மாதிரி சமயங்களில் இது போன்ற நெஞ்சுவலி வருகின்றது, என்பதை முதலில் கவனிக்க வேண்டும். பொதுவாக வேலையிடங்களில் அதிக வேலைப்பளுவின் காரணமாகவும் வேறு சில பிரச்சினைகளின் காரணமாகவும் மன அழுத்தத்துடன் இருப்பார்கள். அந்த சமயங்களில் படபடப்புடன் தொய்வுடனும் காணப்படுவீர்கள். அதனால் திடீரென்று உடல் பலவீனமும் இதயத்தில் வலியும் உண்டாகும். அந்த வலியானது மேல் கை முதல் தோள்பட்டை வரை பரவ ஆரம்பிக்கும்.

ஆய்வுகள்: மாரடைப்பு ஏற்பட்டு உயிர் இழப்பவர்களில் பெரும்பாலானோர் அருகில் யாரும் இல்லாமல் தனியே இருக்கும் சமயத்தில் தான் நிகழ்ந்திருக்கிறது, என்று ஆய்வு முடிவுகள் கூறுகின்றன. இதுபோன்ற கொடுமையான உயிரிழப்புகளைத் தவிர்க்க நாம் என்ன செய்ய வேண்டும் என்று பார்ப்போம்.

இருமல்: மாரடைப்பு ஏற்படும் முன் உங்களுடைய இதயம் தாறுமாறாகத் துடிக்கிறது. நீங்கள் சுய நினைவை இழப்பதற்கு வெறும் 10 நொடிகள் தான் இருக்கிறது என்ற நிலை இருந்தால். அந்த நொடியின் தீவிரத்தை உங்களால் உணர முடியும். அந்த சமயங்களில் என்ன செய்ய வேண்டும் என்றால், நீங்கள் தொடர்ச்சியாக மிகவும் ஆக்ரோஷமாக இரும வேண்டும். ஒவ்வொரு முறை இருமுவதற்கு முன்பும் மூச்சை மிக வேகமாக இழுத்து விட வேண்டும். அந்த இருமல் மிகவும் ஆழமானதாக இருக்க வேண்டும். அப்படி இருமுகின்ற பொழுது, இதயம் இயல்பு நிலைக்குத் திரும்பும்வரையில், அல்லது அடுத்தவருடைய உதவி கிடைக்கும் வரையில், ஒவ்வொரு இரண்டு நொடிக்கும் ஒருமுறை மூச்சை நன்கு இழுத்து விட வேண்டும். அதேசமயம் ஆழமாக இருமிக் கொண்டே இருக்க வேண்டும்.

இதயத் துடிப்பு: மூச்சை நன்கு இழுத்து விடுவதனால் நுரையீரலுக்கு ஆக்சிஜன் சீராக எடுத்துச் செல்வதற்கு உதவுகிறது. அதேபோல் வேகமாக இருமுவதால், இதயத் துடிப்பு நின்றுவிடாமல் தொடர்ந்து துடித்துக் கொண்டே இருப்பதற்குத் துணை புரிகிறது. ரத்த ஓட்டமும் சீரடையும். வேகமாக இருமுவதால் ஏற்படும் அதிர்வினால் இதயத் துடிப்பு சீராக இருக்கும். பின்னர் இதயத் துடிப்பு சீரடைய ஆரம்பித்ததும் மருத்துவமனைக்குச் செல்லலாம்.

வெங்காயச் சாறு: வெங்காயச் சாறும் சிறந்த பலனைத் தரும். வீட்டில் தனியாக இருக்கும் பொழுது மாரடைப்பு ஏற்பட்டால், உடனடியாக வேகமாக இருமுவதன் அருமையைப் பற்றி பார்த்தோம். அப்படி இருமிக் கொண்டே வெங்காயத்தை நசுக்கி, அதனுடைய சாறினை சிறிதளவு காதுக்குள் விட வேண்டும். இப்படி சின்ன சின்ன விஷயங்களை மனதுக்குள் கவனமாக வைத்துக் கொண்டால் போதும். தனிமையில் இருக்கின்ற பொழுது, மாரடைப்பு வந்தால் என்ன செய்ய வேண்டும் என்று மனதுக்குள் வைத்துக் கொண்டாலே போதும். மருத்துவமனைக்குச் செல்லும் வரை இதயத் துடிப்பை சீரடைய வைத்து மருத்துவமனைக்குச் செல்லலாம்.

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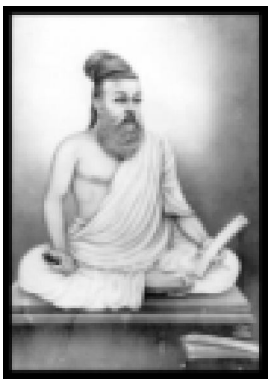
A SIMPLE ADVICE FROM TIRUKKURAL FOR "CORONA"



We can always scan through Tirukkural for answer for any kind of situation. At the present pandemic situation of Corona, we can get a piece of advice from Tiruvalluvar as to how one can challenge Corona or any such pandemic and avoid serious affliction, even leading to death, as it is happening with Corona. (*Nonbu) Notral* in Tamil refers to serious and disciplined following of certain actions or rituals, the power of which can help the performer challenge any affliction and can even challenge death. To avoid getting afflicted by Corona too, certain very simple but really needed practices are prescribed like *wearing mask, keeping distancing from others and washing the hands with soap after any outing or after touching anything, before removing your mask.* These, if followed as a ritual – *(Nonbu) Notral* – Corona can't enter the system and affect, as discovered by all specialists from all over the world. So, let us strictly follow the laid down simple practices and challenge Corona.

Kootram Kuthiththalum Kaikoodum Notralin Aatral Thalaippat Tavarkkul. Kural 269

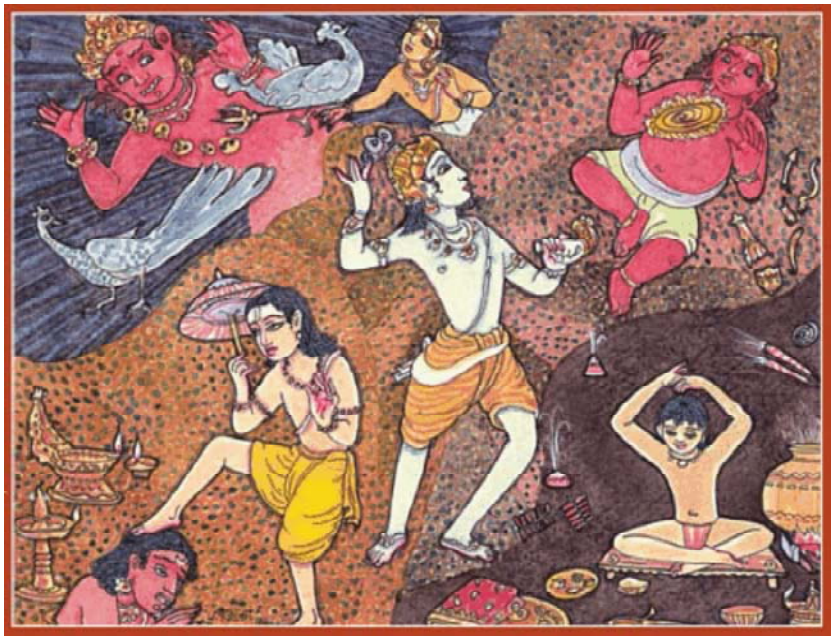
கூற்றம் குதித்தலும் கைகூடும் நோற்றலின்
ஆற்றல் தலைப்பட் டவர்க்குல். குறள் ***269***

"Behold the persons that have acquired power by austerities; they can succeed even in challenging and conquering death"

(To be continued)

HOME FESTIVALS - 10

ஐப்பசி – Aippasi (October/November)



Skanda shasti is the first festival of this month(right), commemorating the victory of Lord Murugan over the demon Sura, of the higher, spiritual self over the lower nature. **Dipavali is the major event of Aippasi**, celebrated everywhere Hindus live and by Buddhists and Jains, too. In one story of its origins, Vamana, the dwarf avatar of Lord Vishnu, requests the amount of land from King Bali that he can cover in three steps. Granted the request, Vamana covers with his first step all of the Earth, with the second all of the sky, and then asks the king where to take the third step. The king offers his own head (lower left), and in commemoration of the king's humility, the day was established. In another story, Lord Vishnu (center) kills the demon Nagagasvaran with His discus. The various observances (lower right) of Dipavali include an oil bath, gifts of new clothes, fireworks (sufficiently indulged in Chennai to rattle dishes off the kitchen shelves), oil lamps for display and abundant pots of delicious food. The early morning bath is always considered to be in the Ganga itself, so one greeting of the day is, "Did you have the Ganga bath?"

(To be continued)

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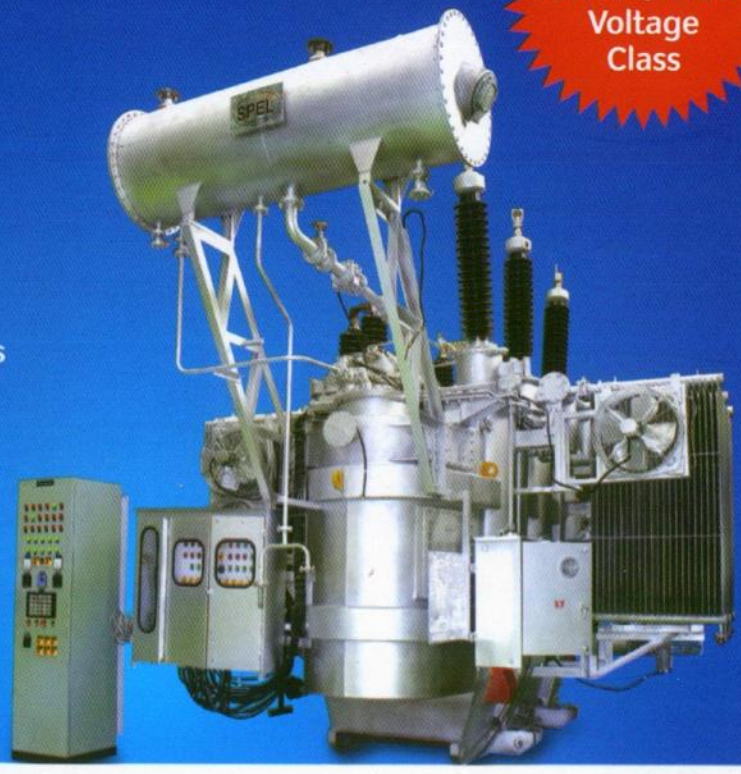

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