

TO STUDY DIFFERENT LOSSES OF ELECTRICITY**K. D. More,****Dept. of physics, Yeshwant Jr. College,
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Maharashtra (India).****And****P. G. Gawali,****Head of Department of Physics, B.S. College,
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Maharashtra (India).****Abstract :**

In the process of supplying electricity to consumer, energy losses occur due to technical losses. These losses are due to equipment used for transmission, transformation and distribution of power. These technical losses can not completely eliminate but they can be reduced to minimum level. The losses can be sub grouped depend upon the stage of power transformation and transmission system. The disturbances in power based on wave shape such as sag, swell, waveform distortion, voltage fluctuations, frequency variation.

Keywords : Transmission, distribution, UPS, standby.**Introduction**

Transmission and distribution losses in India gradually increase from 15 % to 25 % by survey. The losses in any system would depend upon the pattern of energy use, amount of load demand, load density, capacity to distribute. Other losses of electricity due to home appliances,

equipments are operating on standby mode. Standby power consumption is a global phenomenon. Stand by losses are not limited to electrical appliances rather than in other commonly used household appliances like air conditioners, freezers, refrigerators, microwave oven, T.V., washing machine.

The low voltage distribution transformers have been more efficient parts of electrical infrastructure. The transformer losses are increasingly driven by electronics receiver, TV, DVD players, Computers etc.

Electronic equipment requires power that is free of interruption or disturbance. Many power problems originate in the power grid, which is at thousands of kilometers of transmission lines. It also depends upon whether condition lighting storms, snow, ice and flooding along with equipment failure, traffic accidents

Technical losses – The following are the major reasons for technical losses.

1. In distribution there are many stages of transformation
2. The large scale rural electricity distribution through long 11kV and low tension.
3. The poor quality of equipment used in agricultural pumping in rural areas.
4. The industrial load in urban areas.
5. Improper load management.

Reducing technical losses –

1. Reduce the length of L.T. lines by relocation of distribution substations.
2. Install the transformer of lower capacity for distribution at each consumer premises.
3. Instillation of shunt capacitor for improvement of power factors.
4. The planning of complete primary and secondary distribution system with the various parameters such as conductor's size, line length etc.
5. Estimate the distribution system, considering the expected load development during next 8-10 years.

The losses due to power quality disturbances –

1. **Wave from distortion** – There are many primary types of waveform distortion such as DC offset, harmonics, inter harmonics, notching, noise.
 - (a) DC offset – It can be included into an AC distribution system, due to failure of rectifiers. DC

cans transverse the AC power system, shown in fig. (1)



Fig. (1)

- (b) Harmonics - Harmonics distortion is the large difference in fundamental sine wave at frequencies that are multiples of the fundamental, shown in fig. (2). For example, the second harmonics of 50 Hz fundamental frequency $50 \times 2 = 100$ Hz. The symptoms of harmonics problems include over heated transforms.

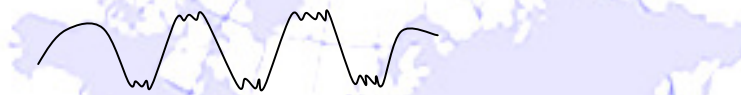


Fig. (2)

- (c) Inter harmonics – Inter harmonics are signal imposed on the supply voltage by electrical equipment, shown in fig. (3). The solution to inter harmonics includes filters, UPS systems and line conditioners.

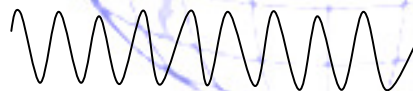


Fig. (3)

- (d) Notching – It is periodic voltage disturbance caused by electronic devices shown in fig. (4). Solution for notching is to move the load away from the equipment causing the problem. UPS and filter equipment are solution for notching.

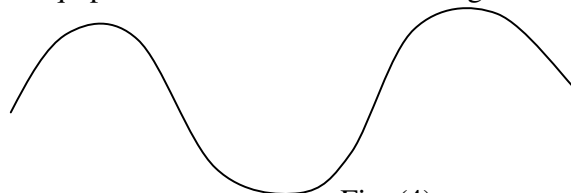


Fig. (4)

- (e) Noise – It is unwanted voltage or current superimposed on the power system voltage or current waveform, shown in fig. (5). It can be generated by power electronics device, control circuits, switching power supplies and so on. The noise create due to the devices, circuits are poorly ground.

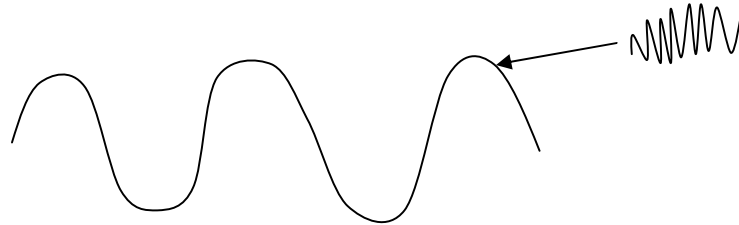


Fig. (5)

2. **Under voltage (sag)** – Sag is a reduction of AC voltage at a given frequency for duration of 0.5 cycles to 1 minute's time, shown in fig. (6). Sags are caused due to system faults.



Fig. (6)

Sags due to starting large loads. The starting of large motors inside an industry can drop voltage. A motor can draw six times its normal running current, while starting. The solution for sags overcomes by using UPS with the ability to adjust voltage using an inverter.

3. **Over voltage (swell)** – It is a reverse form of sag, having an increase in AC voltage for duration of 0.5 cycles to 1 minute's time, shown in fig. (7)

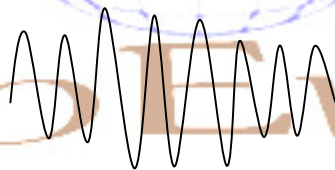


Fig. (7)

The high impedance neutral connections are sudden load reduction. It results can be data errors, flickering of lights, semiconductors damage in electronics, it control by UPS.

4. **Voltage fluctuations** – These are different from other wave form, shown in fig. (8). To solve this problem remove load or install UPS devices.

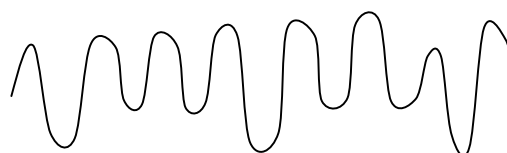


Fig. (8)

5. **Frequency variation** – It is extremely rare in stable utility power systems, especially systems interconnected via a power grid, shown in fig. (9). The frequency variation is more if generator is heavily loaded.

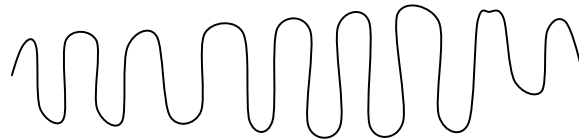


Fig. (9)

To solve or correct this problem, all generated power sources and other power sources causing frequency variation should be assessed.

The stand by energy consumed by various household appliances is estimated.

Standby power household appliances -

Name of Appliances	Measured energy (kWh)
Television (21')	0.649
DVD player	0.43
TV digital satellite receiver	0.56
PC (monitor)	0.41
Laptop	0.22
Printer	0.18
Microwave oven	0.90

To avoid the loss of electricity of household appliances.

1. Unplug the appliances which are rarely used like T.V., washing machine, DVD player, satellite receivers etc.
2. Replace the old and insufficient household appliances by the energy efficient product.

Conclusion –

Every where the loss of electricity is present, to minimize it by avoiding standby mode. Using UPS, proper distribution and transmission of electricity saving of energy means production of energy.

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