

DOMESTIC LIGHTING SCHEME & EFFECT OF OVERLOADING AND CAUSE OF FIRE HAZARDS

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Abstract: Illumination or Lighting in houses is regarded as an important aspect of interior decoration. Illumination level in different parts of the building are different and should be selected in accordance with the Indian standard IS 3646 (Part II) 1966. In addition to the lighting houses, lighting for factories, streets and commercial purposes are equally important.

Index Terms – Domestic lighting Scheme, Fire Hazards.

I. INTRODUCTION

Illumination or Lighting in houses is regarded as an important aspect of interior decoration. Illumination level in different parts of the building are different and should be selected in accordance with the Indian standard IS 3646 (Part II) 1966. In addition to the lighting houses, lighting for factories, streets and commercial purposes are equally important.

Lighting or illumination is the deliberate use of light to achieve a practical or aesthetic effect. Lighting includes the use of both artificial light sources like lamps and light fixtures, as well as natural illumination by capturing daylight. Day lighting (using windows, skylights, or light shelves) is sometimes used as the main source of light during daytime in buildings. This can save energy in place of using artificial lighting, which represents a major component of energy consumption in buildings. Proper lighting can enhance task performance, improve the appearance of an area, or have positive psychological effects on occupants.

Indoor lighting is usually accomplished using light fixtures and is a key part of interior design. Lighting can also be an intrinsic component of landscape projects.

After installing the switches needed to control the lighting, you need to mount the light fixture itself. Each lighting installation is designed to produce a specific level of illumination adequate for those working in the area. The amount of illumination initially provided starts to decline almost as soon as it is put in operation. This reduction is caused by dirt on the lamps and luminaries, a decrease in lamp lumen output, and dirt on the room walls and ceilings. Illumination should be enough to eliminate eyestrain, support a high level of production, and promote safety and employee morale.

Lighting fixtures are designed for a lamp size and type. Many fixtures, however, were installed in military buildings long before the manufacturers started producing higher and higher wattage lamps in ever smaller envelopes. Consequently, it is possible to use much higher wattage lamps than the fixture or the circuit can handle adequately. A brief description about these types of lighting is given below: -

1.1 Factory Lighting

Adequate lighting for factories is very important as it provides amenities to the employees. It increases production and has a definite economic value in reducing accidents with their consequent loss of time and compensation payments.

1.2 Domestic Lighting

Domestic lighting is essential to our everyday lives. And it has become so reliable that we rarely even think about it.

1.3 Street lighting

The main objectives of street lighting are,

- To make the traffic and obstruction on road clearly visible in order to promote safety and convenience.
- To make the street more attractive.
- To inverse the community value of streets.

1.4 Flood lighting

This type of lighting used for following purposes.

- Enhancing the beauty of building. Eg. Ancient monuments, religious buildings etc.
- Advertising purpose. Eg. Flood lighting of hoardings and commercial buildings etc.
- Industrial and commercial purposes. Eg. Railway-yards, sports stadium etc.

II MAINTENANCE OF LIGHTING SYSTEMS

Lighting has a great influence on the quality and quantity of work as well as a direct bearing on employee morale. The necessity for periodic attention to the lighting system cannot be overemphasized. To prevent progressive deterioration of the system, personnel must provide regular maintenance and prompt repair of any deficiency. Maintain the required illumination intensity by keeping lamps, fixtures, and reflective areas clean and in good repair, by replacing defective lamps, and by keeping the voltage steady.

It is well known that dirt absorbs and masks light. The progressive decrease of light caused by accumulating dirt renders periodic cleaning of lighting equipment a necessity. The frequency of cleaning depends largely upon local conditions. Fixtures in air- conditioned and air-filtered rooms may require cleaning only once a year. In an atmosphere that is heavy with dust and fumes, cleaning every few weeks may be necessary.

The cleaning schedule for a particular installation should be determined by light meter readings after the initial cleaning. When subsequent foot-candle readings have dropped.

20 to 25 percent clean the fixtures again. Make readings with the light meter at the working surface with the meter reader in the position of the operator or person using the working surface.

Wash lighting equipment; do not just wipe it off with a dry cloth. Washing reclaims 5 to 10 percent more light than dry wiping and reduces the possibility of marring or scratching the reflecting surface of the fixtures.

To clean removable glassware, reflectors, and diffusing louvers, immerse them in a solution of synthetic detergent cleaner and scrub them with a soft brush or sponge. If scrubbing does not remove incrustation, use No. 0 steel wool to remove dirt film.

Rinse in warm, clear water and dry with a clean cloth.

III DIFFERENCE BETWEEN SHORT CIRCUIT & OVERLOAD

One of the major differences between the short circuit and the overload is that the short circuit occurs because of the fault between the lines or line-to earth whereas the overload means the equipment draw the excess of current from the supply. The other differences between them are explained below in the comparison chart.

The term overloaded is referred to the circuit or devices. The circuit is said to have overloaded when more than the desirable load is applied to the circuit. The overload occurs because of the malfunctioning of the equipment or faulty circuits. Whereas the short-circuit condition occurs when the metal wires meet each other or because of insulation failures. The resistance of the devices during the short circuit becomes zero due to which the heavy current flows through the network.

3.1 Definition of Short-Circuit

The circuit that allows the electric current to pass through the random path which has low resistance is known as the short circuit. The short circuit causes the heavy current which damages the insulation of the electrical equipment. It mainly occurs when the two wires touch each other or when the insulation between the conductors breaks down.

The magnitude of the short-circuit current becomes thousands time larger than the normal current. During the short circuit, the voltage at the fault point diminishes to zero and high magnitude current flow through the network. The short circuit has various harmful effects on the power system. They are

- The short circuit causes a heavy current in the power system which produces excessive heat and hence results in fire or explosion.
- The short circuit produces the arc that causes the major damage to the element of the power system.
- The short circuit affects the stability of the network which disturbs the continuity of the supply.

3.2 Definition of Overloaded

The overload means more than the desires load imposed on the power system network. The voltages at the overloads become diminished to a very low value, but it cannot be zero. The current in the overloaded condition is high but considerably lower than the short circuit current. The overloaded increase the temperature regarding joules, which causes burns and hence damage the electrical equipment.

The overloaded condition damages the equipment of the power system. For example – Consider the inverter has a rating of 400 watts, and if the load of 800 watts is connected across it, then this will cause an overload.

IV KEY DIFFERENCES BETWEEN SHORT CIRCUIT AND OVERLOAD

- The short circuit means the voltage at the fault points reduces to zero and the large current starts flowing through the circuit whereas in the overloaded condition the load greater than the suitable value are applied to the system.
- The voltage at the short circuit decreases to zero, whereas in the overloaded condition the voltages reduce, but it cannot be zero.
- During the short circuit, the resistance of the path of current becomes low due to which the heavy current flow through the circuit whereas in overload condition the magnitude of the current is high but appreciably low as compared to short circuit current.
- The short circuit occurs in the system when the neutral and the live wire come in contact with each other, whereas overload occurs when the number of electrical equipment connects to the same socket.

V MOST COMMON CAUSES OF ELECTRICAL FIRES

Some electrical fires happen because of problems in house wiring or appliance failure, but many occur due to mistakes that homeowners make like overloading electrical outlets or extension cords.

5.1 Faulty Outlets, Appliances

Most electrical fires are caused by faulty electrical outlets and old, outdated appliances. Other fires are started by faults in appliance cords, receptacles and switches. Never use an appliance with a worn or frayed cord which can send heat onto combustible surfaces like floors, curtains, and rugs that can start a fire.

Running cords under rugs is another cause of electrical fires. Removing the grounding plug from a cord so it can be used in a two-prong electrical outlet can also cause a fire. The reason appliances have the extra prong is so they can be only used in outlets that can handle the extra amount of electricity that these appliances draw.

5.2 Light Fixtures

Light fixtures, lamps and light bulbs are another common reason for electrical fires. Installing a bulb with a wattage that is too high for the lamps and light fixtures is a leading cause of electrical fires. Always check the maximum recommended bulb wattage on any lighting fixture or lamp and never go over the recommended amount.

Another cause of fire is placing materials like cloth or paper over a lampshade. The material heats up and ignites, causing a fire. Faulty lamps and light fixtures also frequently result in fires.

5.3 Extension Cords

Misuse of extension cords is another electrical fire cause. Appliances should be plugged directly into outlet and not plugged into an extension cord for any length of time. Only use extension cords as a temporary measure. If you do not have the appropriate type of outlets for your appliances, hire an electrician to install new ones.

5.4 Space Heaters

Because these types of heaters are portable, many times people put them too close to combustible surfaces such as curtains, beds, clothing, chairs, couches and rugs. Coil space heaters are especially dangerous in this regard because the coils become so hot they will almost instantaneously ignite any nearby flammable surface.

If you do use space heaters, use the radiator-type that diffuse heat over the entire surface of the appliance. These are less likely to ignite flammable items but should still be kept away from them.

5.5 Wiring

Outdated wiring often causes electrical fires. If a home is over 20 years old, it may not have the wiring capacity to handle the increased amounts of electrical appliances in today's average home, such as computers, widescreen televisions, video and gaming players, microwaves and air conditioners.

Breakers should be triggered when circuits get overloaded by too much electricity, but outdated breaker boxes often have worn connectors that do not work, causing the system to overload and start an electrical fire.

VI RESULTS AND DISCUSSIONS

As a crew leader, you must be familiar with required safety equipment and the conditions under which your crew must use it to perform assigned tasks safely. The following is a list of common clothing and protective equipment requirements for working around electricity. • Wear thick-soled work shoes for protection against sharp objects, such as nails. Wear work shoes with safety toes if the job requires. • Wear electrically insulated gloves when there is the slightest chance that you might come in contact with energized parts. • Wear rubber boots in damp locations. • Wear safety goggles for protection against airborne particles, electrical sparks, and acid splashes. • Wear a hard hat. Wear an approved safety helmet when on a project site. Be careful to avoid placing your head too near rotating machinery. • Wear Gloves when handling sharp objects.

VII CONCLUSIONS

Natural and artificial lights both are important for daily life. There are different types of artificial light and basic lighting types. Lighting properties can vary the use of light in different areas. Achieving light varies with the need of the light. In the end lights are useful in any purpose. JAI HIND

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