

1.5 SHADING DEVICES

The primary objective of shading devices is creating a comfortable internal environment.

Sun shading devices inhibit the solar radiation incident on a building. Sun shading devices are any mechanical equipment or textiles that are used either internally or externally or in between the internal and the external building space. Shading devices can be fixed, manual and automatic movable.

IMPORTANCE OF SUN SHADING DEVICES

- To provide greater comfort for occupants.
- It can improve building energy performance.
- To prevent glare
- To increase useful daylight availability.
- To create a sense of security

SOLAR SHADING

When sunlight hits a pane of glass, it splits into three components, if it is reflected, then there is no effect on heating. If it is absorbed then glass heats up which would transfer heat by conduction and also emits. If it is transmitted, heat up surface behind it.

The proportion between the three components is determined by the angle of incidence and by the type of glazing. From the types of glazing, the transmitted light is very small if the angle of incidence is larger than 45 from the normal to the glazing. If the angle is 60°, most of the radiation is reflected.

TYPES OF SUN SHADING DEVICES

Shading devices is classified into two types

- Internal shading devices
- External shading devices

Internal shading devices

Internal shading devices such as curtains form of vertical or horizontal blinds attached above the window, can reduce heat energy passing through a window. It limits the glare resulting from solar radiation. Usually it is adjustable and occupants to allow & regulate the amount of direct light entering their space. Mostly they are attached above windows either horizontally or vertically. It should be made or designed to be durable.

Curtains

It is the most commonly used shading device, mostly used on residential buildings. It is cheaper and can be found in various varieties colors and texture.

Venetian blind

Venetian blinds are basic slatted blinds made of metal or plastic or wood. Suspended by a strip of cloth called tapes, all slats in unions can be rotated through nearly 180 degrees.



Curtains



Venetian blinds

Fig 1.3.1- Curtains & Venetian blind

Vertical Louvre blinds

It is used in commercial and public buildings, it controls the heat, light and glare. It can be used in larger windows and doors.

Roller blinds

Roller blinds are usually stiffened polyester, mounted on a metal pole and operated with a side chain or spring mechanism. It is used for block outs, sun screens. Translucent with a metal or plastic chain available that operates the blind through an aluminum tube to roll up and down.

Pleated blinds

Pleated blinds are shades made from a pleated fabric (which helps to add texture to a room) that pull up to sit flat at the top of a window to hide from sight when open.

Blackout blinds

It is made up of tight woven fabric to help control the light levels in a room. It is designed to block the external lights to enter the room.

External shading devices

External sun shading devices are considered better than internal shading devices. It is in horizontal, vertical or inclined projections, vegetation in buildings.

Horizontal devices

To shade a window during hot summer months, but to allow sunlight to shine through a window in the winter, to help warm a building.

Vertical devices

Primarily useful for east and west exposures to improve the insulation value of glass in winter months by acting as a windbreak.

The egg-crate

A combination of vertical and horizontal shading elements used in hot climate regions because of their high shading efficiencies. The horizontal elements control ground glare from reflected solar rays.

Designing Shading Systems

It is difficult to make sweeping generalizations about the design of shading devices.

However, the following design recommendations generally hold true:

- Use fixed overhangs on south-facing glass to control direct beam solar radiation
- Limit the amount of east and west glass since it is harder to shade than south glass.
- A light shelf bounces natural light deeply into a room through high windows while shading lower windows.
- Solar gain has already been admitted into the work space
- These interior devices do offer glare control and can contribute to visual activity and visual comfort in the work place.
- Carefully consider the durability of shading device
- Shading devices can require a considerable amount of maintenance and repair.
- Be careful when applying shading ideas from one project to another.