EXAMPLES OF THE USE OF SUN-SHADING DEVICES IN RESIDENTIAL BUILDINGS IN AKURE.

ARC 810: APPLIED CLIMATOLOGY.

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INTRODUCTION

This paper attempts to relate the examples of shading devices in residential buildings in Akure with the various types of shading devices available.

Windows may contain several elements including shading devices. The design of these elements reflects various functions including thermal control. There are three types of shading devices - vertical, horizontal and egg-crate. The design of sunshading devices for thermal comfort involves four steps: determination of when shading is required; determination of the position of the sun at the times when shading is required; determination of the dimensions and proportions of the required shading device and finally the architectural and structural design of the shading device.

Openings, especially windows, greatly influence the thermal conditions within a building. Windows usually contain several elements, some of which are adjustable. These elements perform various functions, including the following: External shading devices are only one of these elements. Others include curtains, glass, solid or louvered shutters, security bars and mosquito screens.

OBJECTIVES OF SHADING DEVICES:

- ventilation
- daylighting
- provision of privacy and security
- prevention of glare
- exclusion of rainfall
- allowing a view out
- exclusion of dust, noises, pollution and insects
- exclusion of direct solar radiation.

External shading devices are only one of these elements. Others include curtains, glass, solid or louvered shutters, security bars and mosquito screens. The functions of external shading devices include:

- allowing a view out
- protection from rain
- protection from direct solar radiation
- protection from sky glare

VARIOUS SHADING DEVICES AND THEIR GEOMETRY:

There are three types of sun-shading devices. They are:

- Vertical devices.
- Horizontal devices.
- Egg-crate devices.

In describing the characteristics of shading devices it should be noted that the window and the shading device are considered as one unit.

VERTICAL SHADING DEVICES:

Vertical Shading Devices consist of pilasters, louvers blades or projecting fins in a vertical position. Their performance is measured by the horizontal shadow angle (delta). They are commonly referred to as fins and are most effective on western and eastern elevations.
Examples of vertical sunshading devices in some residential buildings in Akure

Example of a fin used as a vertical shading device and also coated windows.
HORIZONTAL SHADING DEVICES:

Horizontal Shading Devices are usually in the form of canopies, long verandas, movable horizontal louvre blades or roof overhangs. They are best suited to southern and northern elevations and their performance is measured by the vertical shadow angle (epsilon).

Examples of horizontal sunshading devices in some residential buildings in Akure
EGG-CRATE SHADING DEVICES:

These are combinations of vertical and horizontal devices. They are usually in the form of grill blocks or decorative screens. Their performance is determined by both the horizontal and vertical shadow angles and (delta and epsilon).

Examples of egg-crate sunshading devices in some residential buildings in Akure
Examples of egg-crate sunshading devices in some residential buildings in Akure
KEY IDEAS

- Use exterior shading, either a device attached to the building skin or an extension of the skin itself, to keep out unwanted solar heat. Exterior systems are typically more effective than interior systems in blocking solar heat gain.

- Design the building to shade itself. If shading attachments are not aesthetically acceptable, use the building form itself for exterior shading. Set the window back in a deeper wall section or extend elements of the skin to visually blend with envelope structural features.

- Use a horizontal form for south windows. For example, awnings, overhangs, recessed windows. Also somewhat useful on the east and west. Serves no function on the north.

- Use a vertical form on east and west windows. For example, vertical fins or recessed windows. Also useful on north to block early morning and late afternoon low sun.

- Give west and south windows shading priority. Morning sun is usually not a serious heat gain problem. If your budget is tight, invest in west and south shading only.

- Design shading for glare relief as well. Use exterior shading to reduce glare by partially blocking occupants’ view of the too-bright sky. Exterior surfaces also help smooth out interior daylight distribution.

- The shade’s color modifies light and heat. Exterior shading systems should be light colored if diffuse daylight transmittance is desired and dark colored if maximum reduction in light and heat gain is desired.