



# PLANNING OF BUILDING WITH RESPECT TO ORIENTATION

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**ABSTRACT:-** Nowadays many countries suffer from sever shortage of energy resource and inability of saving it. It is necessary to develop an integrated strategy, to make buildings consume less energy and to integrate active and passive design techniques.

Since the building orientation is one of the most important factors affecting the energy consumption. Orientation is the position of a building in relation to seasonal variations in the sun's path as well as prevailing wind patterns, making it more comfortable to live in and cheaper to run.

Generally building orientation has been decided by the influence of views, prevailing winds, housing layouts, site topography, nearby buildings , etc.

The orientation of building is done for giving correct direction to the building according to the surroundings, provide natural light and air to the inhabitants, to save inhabitants from dust, smoke and noise. Also orientation provide privacy to the inhabitants, save buildings from damages due to rain and add beauty to the building.

The word ' building orientation ' is basically the positioning of a building with respect to the sun, usually done to minimize solar gain at the approximate time of the year when required in cold climate and to minimize solar gain in a hot climate. Best house orientation can increase the energy efficiency of your home by making it more comfortable to live in and cheaper to run from energy consumption point of view, The fact is that the sun is lower in the sky in winter than in summer allows us to plan and constant buildings that capture free heat in winter and reject the heat in summer. The building orientation of the whole building plays an important part in designing a good home.

**Keywords:-** Building Automation, Building Orientation, Climate Considerations, Natural Ventilation, Cross-Ventilation, Occupant Comfort, Renewable Energy, Green Roofs, Thermal Mass, Energy Harvesting, Digital Twin, Bioclimatic Design, Regulatory Compliance, Urban Planning, Etc.

## **INTRODUCTION**

Planning of Residential Building is the arrangement of various components or units of a building in a systematic manner so as to form a meaningful and homogeneous structure to meet its functional purpose. Building planning is a graphical representation of what a building will look like after construction. It is used by builders and contractors to construct buildings of all kinds. Building planning is also useful when it is essential to estimate how much a project will cost and for preparing project budgets building planning is also useful. The basic objective of planning of the building is to arrange all the units of the building on all floors at a given level according to their functional requirements. By doing this, one can make the best use of space available for building. In building planning, privacy can be obtained by judicious planning of the building with respect to grouping, the position of doors and windows, mode of the hanging of doors, location of entrance and pathways, drives, etc. sometimes, provision of lobbies, corridors, screens, etc.

Orientate your home to make best use of sunlight and winds. When deciding the best orientation for your home, bear in mind that the climate is warming, and hotter summers with more extreme heat waves will become the norm during its life span. While passive solar heating is still very desirable in climates that require heating, the priority will gradually shift from heating to cooling. Additional attention to shading of windows and walls (particularly west facing) and exposure to cool breezes and other forms of natural cooling is required in all climate zones.

## **METHODS:-**

In this building planning, we have taken residential building for planning by orientation. We selected two floor of residential building having on ground floor four room and on first floor two rooms. This building we have been plane door designed and properly setup rooms of the building by orientation and also by vastu-shashtra.

In this building, we plane door designed all the rooms and by all sides so that gain as more as natural light, air, privacy, save changes due to rain, correct direction into the building according to surrounding and save from just, smokiness noise and also add beauty to the building.

Therefore, in this project we selected all the eight sides plan so building such as east, west, north, south, north-west, north-east, south-east and south-west for planning by orientation and vastu-shashtra. We have taken separate plan of residential building for planning of all eight sides.

### **Following are the steps we followed in planning :-**

- A. For planning of building, we have taken 15m × 10m plote size and 1m margin side by side and 3m front surrounding the built up area.
- B. We have taken one drawing room, one kitchen, one master bed room with attached bathroom and second bed room with separate bathroom.
- C. According to building orientation laws, we oriented most frequently used rooms during the day are placed in the East and the north because during day South and West, which are hotter directions.
- D. We placed as more as windows & doors in the East so that to allow the Sun's UV rays to penetrate into the house in the mornings and also placed ventilators in rooms for getting maximum natural benefits.
- E. We placed drawing room in the direction between South East and South West as the drawing should be

in the extreme of South East direction so that much light is available there.

F. kitchen oriented towards the east that to allow the UV rays to destroy the germs that tend to multiply in the presence of moisture & food.

G. We oriented two rooms, one master bed room with attached bathroom and second bed room with separate bathroom and the bed rooms are placed in the direction between South East and North West as there is normal sun heat available during day light.

## **RESULTS**

Reduce reliance on artificial heating, cooling, and lighting by leveraging natural resources effectively.

Create spaces that are naturally comfortable throughout the year, minimizing temperature fluctuations and drafts. Incorporate green building practices that minimize environmental impact and contribute to long-term resource conservation.

Optimize natural ventilation, daylighting, and views to create healthier and more productive indoor environments.

Anticipate and mitigate the effects of climate change by designing for resilience and adaptability.

Design spaces that are inviting, functional, and conducive to the well-being and satisfaction of occupants.

Ensure compliance with building codes and standards related to energy performance, environmental impact, and safety.

Generate cost savings over time through reduced energy expenses, maintenance costs, and potential incentives for sustainable design.

## **CONCLUSION:**

The orientation of the buildings and the sites planning show that the designers and the project teams are concerned about the aspects of reduction of energy usage in buildings. These buildings were built with the main objective: to deliver and achieve the target for minimising energy consumption in the buildings. Site planning and orientation were taken into account were they are not just to minimising direct sunlight heat the building but also to optimize the use of land topography.

These study can help to reduce the energy usage because air- conditioning load. Building orientation and site planning can help the designers to determine which area will be affected by receiving direct sunlight to the building façade or atrium design. Detail study and analysis on site planning and orientation have been made to determine a location of building shading device. Shading devices will contribute to the facade designs of the buildings. Planning and building orientation are very important in order to allocate which side of the building façades or building atriums.

Good orientation can increase the energy efficiency of your home, making it more comfortable to live in and cheaper to run. The main benefit of building orientation is the energy efficiency of your home or building. It save the heating, lightning and cooling cost of your home. Avail natural lightning, wind and sun in winter, cool breezes during summer.

## **FUTURE SCOPE**

Advanced climate modelling and data analytics will enable architects and designers to create building orientations tailored to specific local climates and microclimates.

Parametric design software and computational analysis tools will facilitate rapid exploration of various building orientations and configurations based on performance criteria such as daylighting, solar gain, and natural ventilation..

Advancements in smart materials, responsive facades, and adaptive shading systems will enable buildings to dynamically adjust their orientation and thermal properties based on changing environmental conditions.

Building-integrated renewable energy systems, such as solar photovoltaics (PV), wind turbines, and solar thermal collectors, will be seamlessly integrated into building facades and roofs, influencing optimal orientation considerations.

Biophilic design principles will be integrated into building orientation strategies to enhance connections with nature, improve indoor air quality, and promote human well-being.

Implementation of digital twin technologies will enable real-time monitoring and performance optimization of building orientation strategies throughout the building lifecycle.

Increasing emphasis on energy performance standards, carbon neutrality goals, and green building certifications (e.g., LEED, BREEAM, Passive House) will drive the adoption of advanced building orientation strategies.

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