



# Planning and Designing of Residential Building

**Prof. Natish Sayyed<sup>1</sup>, Prof. Mrunali Dongre<sup>2</sup>, Rakesh Kumbhare<sup>3</sup>, Rohit Darwai<sup>4</sup>, Umesh Dharammali<sup>5</sup>, Devashish Wanjari<sup>6</sup>, Gaurav Wanjari<sup>7</sup>, Rohit Raut<sup>8</sup>**

Head of Department, Department of Civil Engineering, NIT Polytechnic College, Nagpur, India<sup>(1)</sup>

Assistant Professor, Department of Civil Engineering, NIT polytechnic College, Nagpur, India<sup>(2)</sup>

Diploma Students, Department of Civil Engineering, NIT polytechnic College, Nagpur, India<sup>(3),(4),(5),(6),(7),(8)</sup>

**ABSTRACT:** In this project planning of residential building (G+1) is done manually and by build master. In planning, as per standard norm's and NIT rules and By laws. Residential buildings are called houses or homes, though buildings containing large numbers of separate dwelling units are often called apartment buildings or apartment blocks to differentiate them from 'Individual' houses. Houses may also be built in pairs (semi-conducted), in terrace where all but two of the houses have others either side; apartments may be built round courtyards or as rectangular blocks surrounded by a piece of ground of varying sizes. Houses which were built as a single dwelling may later be divided into apartments or bedsitters; they may also be converted to another use e.g. an office or a shop. From early years, the structures are constructed with basic requirements but, now a day's lifestyle has been changed as every person needs a luxurious life. So, by considering such various components the detailed planning has become necessary. Any structures cannot be constructed without a proper planning.

## I. INTRODUCTION

As a Civil Engineer, Planning must be there so that the structure should be effectively & economically planned. From early years, the structures are constructed with basic requirements but, now a day's lifestyle has been changed as every person needs a luxurious life so, by considering such various components the detailed planning has become necessary. Any structure cannot be constructed without a proper planning.

All activities to be carried out in the building should be Planned for providing good environment which will help in building up a happy, healthy and beautiful lives and to improve the working conditions of the masses so that work is more a pleasure than a task, efficiency is induced and discomfort is eliminated in planning of building the architectural deal with length, width and height is short he details with spacing.

## II. LITERATURE SURVEY

**Y.N. Raja Rao** states that building and planning is the arrangement of various components or unit of a building in a systematic manner so as to from a meaningful and homogeneous structure to meet its functional purpose.

According to **S.S. Bhaukatti** all major countries like India, USA, UK, Australia are having own standards, design procedures and for finished products. Before Independence, India followed British standards, but after independence it was felt there is need to prepare the standards to meet the Indian Environment.

**Jack H. Willenbrack** says that To planning, analyze & design framed structure of a residential building. The structural members are like slabs, beams, column are designed within limit state method using national building code.

## III. METHODOLOGY

### 1) PLANNING

Planning is the process in which an engineer plans properly each and everything about the structure before execution of work by concluding rules and regulations as per standard norms and administrative authority.

By planning we mean pre-thinking things, before an event take place, in order to get best results in comfort, convenience, health, happiness and efficiency. The object for planning of buildings is to arrange and set out all the different units so as to satisfy their functional requirements to be maximum extent by making use of available space economically. Thus, building planning can be defined as an art of designing functionally sound, convenient yet economic structures. Without proper planning the structures may results in fail as it is the basic thing in Civil Engineering. The structure cannot be effectively and economically erected.

## PRINCIPLE OF PLANNING

To arrange all the units of a building on all floors and at level according to their functional requirements making best use of the space available for a building.

The shape of such a plan is governed by several factors such as climatic conditions, site location, accommodation requirements, local bylaws, surrounding environment.

Factors affecting on planning are:

### 2) ASPECT

It is the proper placement of different rooms of the Building so that the occupants can enjoy the gift of nature such as sunshine, breeze, view of the landscape at different hours of the day, if these are cheerful. People living in their midst are contented and happy. Hence building must be designed to sit with all its varying aspect. Aspect not only provides comfort but it is important from hygienic point of view. By careful disposition of doors and window in external walls, it is possible to admit sun's rays and air into any desired room.

The general appearance of the building largely depends upon the disposition largely depends upon the disposition of doors and windows in the external wall, however aspect does not mean appearance. Aspect depends upon the direction of the sun light, air, rain, A room receiving light and air from particular direction is said to have aspect of the direction. The kitchen should have eastern aspect so that morning sun refreshes and purifies the air and kitchen would remain cool and clean in later part of the day. From point of view of sun-light, living room used for group discussion should have southern or south-east aspect. Hence in winter since the sun is toward south, sun-rays enter the room, while in summer direct rays from north are prevented to enter. Similarly, bed room should have west or south-west aspect since cool breeze is available in summer whereas wind from north in winter cannot enter the rooms. North aspect is very good for study-room, reading room, workshops. Class-rooms, stores and stairs because there will not be direct sun-light from north but only diffused and evenly distributed light will be available.



### 3) PROSPECT

Prospect refers to the view as seen of the outside from the windows in general and doors in external walls. It is determined by the view as desired from certain rooms of the building such as view of the garden, beautiful scene, a nearby hill etc. prospect includes taking full advantage of the beauties of nature in the landscape by revealing to the occupant certain pleasant features and at the same time Concealing some undesirable views in a given outlook. Prospect depends upon the surroundings of the building.

Aspect and prospect are both primary considerations of building planning and both demand disposition of doors and windows. It will be seen that sometimes aspect and prospect consideration's may be at variance with each other as such they should be skillfully disposed. Prospect can also be accomplished by providing window since such window not only provide pleasant features but also help in concealing undesirable views.

### 4) PRIVACY

Privacy is the one of the most important considerations in the planning of buildings of all types in general and residential building in particular.

**Privacy is of two types:-**

1) Privacy of all parts of a building with reference to the surroundings buildings, streets and by-ways this can be achieved by grooving plants, trees and also by keeping window high enough with respect to roads or ground nearby.



2) Privacy of one room another i.e, bedroom etc. this can be attained by carefully positioning of doors and openings of shutter. The shutters should open in such a way that person entering the room should get the minimum view.

### 5) ROOMINESS

It refers to the effect achieved by making the best of small portions of room by deriving maximum benefit from minimum directions. It appears to be simple at first but really difficult to achieve. It is less, more or adequate, depends upon the shape or proportions of length, width and height. A rectangular room is relatively felt bigger than square room of the same area it is also found more convenient point of view.

### 6) GROUPING

Grouping means arrangement of various rooms in the layout in such a fashion that all the rooms are placed with reference to their functions and in due proximity with each other. The building consists of units, or rooms in general. Each room or units has to perform certain function or functions and there is also some sort of sequence in between them. Proper grouping should facilitate that the functions of each room is carried out with least interference. Grouping should have smooth change over, rather than abrupt one. Bad grouping lacks in privacy also.

Generally people like to sit in the verandah as such living room should naturally be next to it. Dining room must be close to the kitchen. At the same time the kitchen should be away from the drawing or living room. Otherwise the bad smell and smoke will cause nuisance for the occupants. Sanitary arrangements should be adjacent to the bed-rooms but away from the kitchen dinning room. There, should be an independent access to sanitary units. The kitchen should be so located that the housewife who is busy for the major part of the day. Can keep a watch through the window 'w'1 on the children playing in front yard and also entry of any intruder.

### 7) CIRCULATION

Circulation is the access or the internal movement or through fare provided. Circulation is two types. One is the horizontal circulation and the other is vertical circulation. If the movement is for the same floor and may be from one room to another or within the room itself, then it is called horizontal circulation. The horizontal circulation can be achieved by providing passages, corridors, lobbies, verandah and halls. It should be straight, short sufficiency and safety desirable horizontal circulation has short, straight and independent passages. It helps to provide privacy of the room vertical circulation is the movement from one floor to another floor. It can be achieved by means of stairs lifts and escalators. These should also be properly lighted and ventilated stairs should be sufficiency wide with strong balusters or parapets and handrails on the both sides.

All the sanitary services and staircases must have an independent access from every room through a lobby, it should be airy and well it.

### 8) FURNITURE REQUIREMENTS

The requirement of furniture depends on the type of buildings. The number of person using the room and functions of room. Therefore, the requirements of furniture, their size etc. is an important consideration because the furniture will decide the size of room. To make best use of the available space in the room, minimum furniture should be provided. The room does not look does not look pleasing, attractive if it is overloaded in spite of good selected furniture. So that the time of planning, the proper position of furniture such as sofas, chairs, tables, televisions, wall, units in living room, beds easy chairs cupboards, almirah, dressing table in bedroom; dining table with chairs in dining room, racks, fridge in kitchen etc. is to be decided with proper circulation and roominess. The placement of furniture will finalize the location of doors, windows, closet, electrical switches in the rooms. Lastly the entire set up of furniture arrangement must be pleasant, beautiful and comfortable with necessary freedom for movement from one room to another. There should be any difficulty in opening windows, doors cupboards and also to operate electric switches, and power points etc. There is no any such kind of `perfect` arrangement of furniture. Here are some important hints to be borne in mind, while arranging the furniture.

- 1) Furniture should satisfy the functional purpose as well as decorative purpose.
- 2) Furniture should be proportional should be will balanced.
- 3) Traffic lanes should be clear of obstacles.

### 9) FLEXIBILITY

Flexibility means planning a room in such a way that even through a room originally planned to satisfy a particular purpose. It should also serve other desired purposes when required in future, space has maximum value now a days. So economy of space is an important factor. Space or lack of space is a problem for all the answer is not in finding more space but to make maximum use of available space. This is particularly important for designing the houses where economy is major consideration. So we should be careful to see that even the smallest room should serve a big role.



One should be flexible over the use of rooms. The requirements go on changing as the family expand in future. Hence planning is to be done in a manner that the rooms like living room can be easily converted into a guest room. Dining can be provided in the kitchen, in the case it may be useful as kitchen-cum dining room. If there is a separate dining room. It may be used as a study room. With this arrangement many compactable living functions can be combined advantageously in a moderately big room. Three or four roomed flats can be planned with special regard to this flexibility.

#### **10) SANITATION**

Sanitation includes provision of sufficient light, ventilation, cleanliness and sanitary convenience in the following way.

#### **11) LIGHTING**

The object of lighting is to promote the work or any activity to be carried in the building under safety condition. And pleasant environment which are helpful to create interest, efficiency and a sense of well being. Lighting is of two types one is natural and other is artificial.

#### **12) VENTILATION**

It may be defined as a system of supplying of fresh air from outside by natural or mechanical devices and removing of air vitiated by respiration, bacteria, and unpleasant odours from the rooms in order to maintain comfortable conditions. Lack of movements of air produces a feeling of discomfort, increases temperature, humidity and leads to perspiration. The want to fresh air always produces nausea, headache, sleepiness, inability to fix attention. Good ventilation is therefore, an important factor to provide comfort in the buildings it is the change of air in the room by infiltration. Ventilation may be natural or artificial.

#### **13) ELEGANCE**

Elegance means beauty and grace. This effect is produced by greater purity and delicacy or ornamental enrichment of construction. Elegance is related to the appearance of the building. i.e. elevation, which can be made attractive, impressive and pleasing. This elegance in a building can be achieved by the treatments of walls, the proportions of openings in the form of doors and windows, relation of one storey to another etc. Secondly, it can be achieved by the treatment of exterior of a building which is aesthetically significant as a whole, such as the effect of a pitched or flat roof of a dome, the rhythm of projections and recessions etc. Thirdly, it can be achieved by the treatment of the interior, the arrangement of rooms, a graceful stair-case etc. The first of the above three ways is two.

#### **14) ECONOMY**

Economy is not the principle of planning but rather a factor on which the planning can be based. No general rules can be made achieve economy since the ways and means by attain it are different in different situation. Economy can be achieved by keeping the minimum dimension of the rooms. Doors, windows simple design for windows, plain tiles as well as fixtures and fastening. The height of the building can be kept to a minimum of 4m. for a residential buildings. Porches lobbies can be avoided if the land cost is high, multistoried buildings can be constructed to save the cost for foundation and roof. A building designed for a good strength, utility and safely will certainly prove to be costly in the beginning but may prove to be cheaper in the long run as it saves the cost of maintenance in future. It should be remembered that a building or house is immovable property and built with one's life saving to last for many years to come. One should not therefore adopt false economy by erecting a weak building.

#### **15) ORIENTATION**

Proper orientation means setting or fixing the direction of the plan of the building which allows the inmates of the house or buildings to enjoy to the utmost whatever is good and avoid whatever is bad in respect of comfort in the elements of the nature. Orientation implies not only the direction of the front of the house or building but also the back and two side facing good orientation means proper placement of rooms in relation to sun, wind, rain topography and general outlook and at the same time providing a convenient access both to the streets and backyard because, of the surroundings of the site, nearness of streets, and other factors like privacy, protection against nuisance of noise and dust the building has to be properly oriented in a particular direction.

Without good orientation, the principles of aspect, prospect and grouping cannot serve. Therefore, once the site for building is fixed, the engineer should first decide proper orientation prior to planning and designing of the building.



#### IV. CONCLUSION

As our project is based on the planning of residential building ``G+1``. We have studied about the basic requirements of planning for our residential building in which we have concluded principles of planning, norms according to DCR for Nagpur City 2000 as well as we have given importance to Vastu Shastra in planning.

In the process of implementing this project, we learned how to apply the theoretical aspects of evaluation in actual projects. We checked the process of evaluating and calculating costs and found that this is an important aspect of providing financial resources in the project. Necessary to complete the work. Our calculations are based on precise measurements, which can provide us with approximate and accurate values. The structural evaluation has been developed in detail so that these values can be used in actual projects in progress. When compiling the cost estimate summary, it is necessary to take into account the current unit unfinished rate of each work item, so that the cost estimate also meets the structural requirements of the project. Therefore, this project is not a draft, but rather an accurate one of the estimated quantity and estimated cost, and is very useful for the current project that is executing the project.

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