iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 5 **Issue:** I **Month of publication:** January 2017

DOI:

www.ijraset.com

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)

Residential Building Construction

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Abstract: ***When more than half of the floor area is used for dwelling purposes the building is regarded as residential building. Single-Family house, Condominiums, Townhouses, Cooperatives, Multi-family house, land these are six types of residential building. In this paper the construction practices of the most important element in any residential building which comprises roofs, walls, floors and slabs are studied and the method involved in there construction process are explained. The paper also focused in all parameters of various steps of managing and organizing process during construction as construction work, project manager, builder, contractor and all planning aspects during construction.***

Key Words: ***Residential building, building component, Method of construction, plot area, principle of planning***

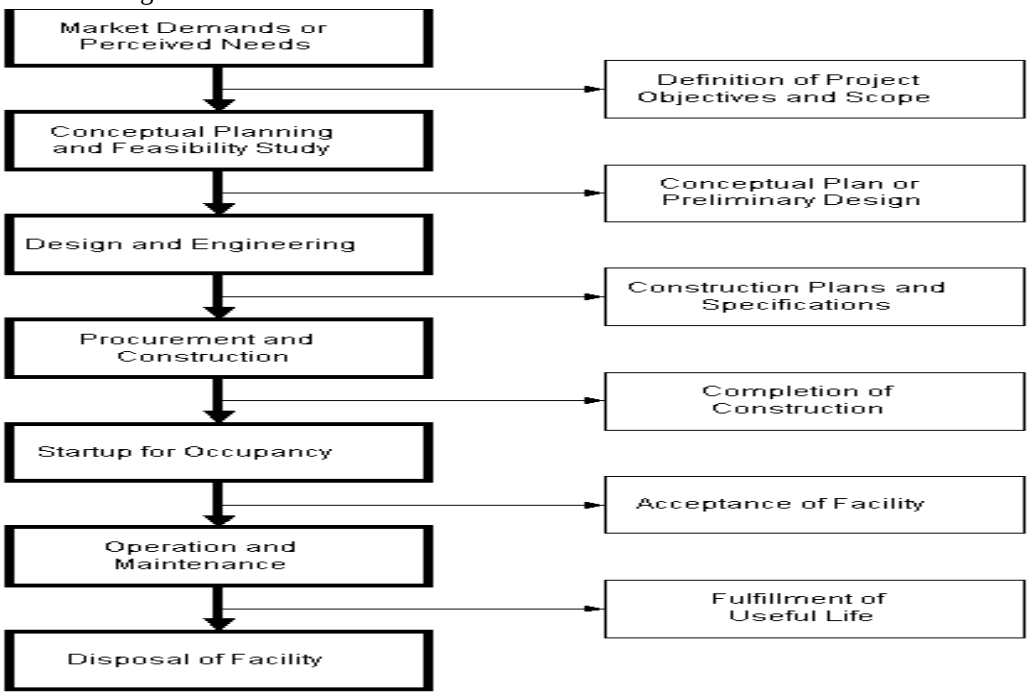
I. INTRODUCTION

A residential building construction comprises of four interconnected foundation walls which are partially sunk below a ground surface and support the floor across their upper end. Two side walls, a front wall and a back wall are supported by and extended upwardly from the foundation walls while a roof extends across and covers the side walls, back wall and front wall. The first interior wall extends between the floor and the roof at a position spaced inwardly but parallel to the front wall while ,the second interior wall extends between the floor and roof at a position spaced inwardly but parallel to the back wall. The interior walls together with the building side walls form a living space of conventional height. In addition, the housing front wall preferably includes two windows having portions extending both above and below the housing floor. These windows provide illumination for lower living level and also provide the building construction the appearance of a conventional home.

OVERVIEW OF SITE: Plot Area: 7200sq.ft Super built up area: 5520sq.ft Built up area: 4460sq.ft Set back line: 15ft

A. Project life cycle

This is the process through which project is implemented from beginning to end. This process is very complex however it can be decomposed into various stagesas shown below:



B. Principle of planning & factors to be considered

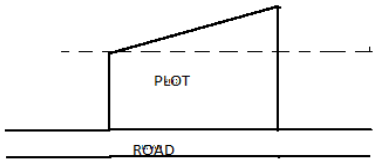
To arrange all units of building on all floors and at level according to their functional requirements making best use of the space available for building. The shape of a plan is governed by several factor such as climatic conditions, site location, accommodation requirements, local by-laws, surrounding environment.

Following factors to be considered In planning :

1Aspect	2 Prospect
3Privacy	4 Grouping
5Roominess	6 Furniture Requirement
7Sanitation	8 Flexibility
9Circulation	10 Elegance
11 Economy	12 Practical Considerations

1) Layout of plot

The plot is not perfectly rectangle in shape.
For placing of columns the plot is divided into grid.
So, plot should be made perfectly rectangular in shape.
It is done by using Pythagoras theorem.



2) Excavation for foundation: All excavation are carried out in conformity with the directions and manner approved by the engineer. While planning or execution, adequate precautions are taken against soil erosion, water pollution etc. The earth is excavated using excavator, soil & underlying rocks are dug out. There are various equipment used for excavation are:

Excavation in rock- Hydraulic excavator with rock breaker
Removal of earth - Hydraulic excavator

Fig: Hydraulic excavator

C. Footing

The lower most part of foundation which is in direct contact with sub soil. These structures are constructed in brick work, masonary or concrete under the base of wall or column for distributing the load over a large area
Ratio of cement concrete and mortar for foundation
The cement concrete 1:8:16 is generally used in the foundation of wall in construction work.
In case of column raft cement concrete 1:4:8 is the best recommended ratio for it in the foundation.
For brick masonry cement mortar 1:4 to 1:6 is used as loading condition

.In case of column and raft footing up to plinth level cement concrete 1:2:4 or 1:1.5:3 are used.

Details of foundation at site
Depth of foundation : 8'
Types of foundation : Shallow foundation
Size of foundation : 2x2.2m (at each column)
Diameter of rebar used
in foundation : 12mm , 18mm
Types of cement used : Portland slag cement (PSC)
Grade of concrete : M20
Type of soil : muroom soil containing much iron.
Bearing capacity of moorum: 430KN/M^2
To increase bearing capacity of soil, the bed of foundation is made firm by ramming ballast into it.
Layers of 40mm, 20mm and 12mm metal are provided.
Bottom of foundation is leveled both longitudinally and transversely.

D. Column & Beam

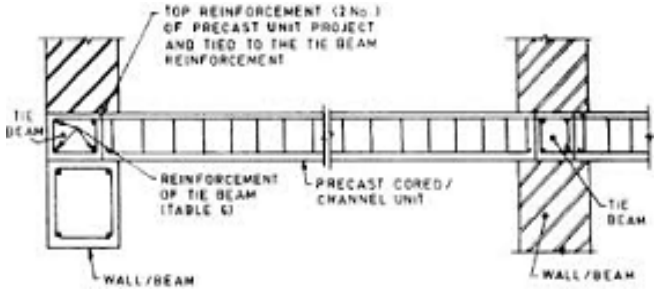
Column (fig:a) or strut is compression member, which is used primarily to support axial compressive loads and with a height of at least three times it's least lateral dimension. A R.C.C. is subjected to axially load. Depending upon the architectural requirements and the loads to be supported, R.C.C. column may be cast in various shapes i.e. square, rectangular, hexagonal, octagonal or circular.
A R.C.C. beam (fig:b) should be able to resist tensile, compressive and shear stresses induced in it. Concrete is fairly strong in compression but very weak in tension. Tensile weakness of concrete is overcome by the provision of reinforced steel in tension zone to make a reinforced concrete beam.


Fig:a


Fig:b

Plinth beam A plinth is the base or platform upon which a column of the structure rests this is part of structure which transfers load to adjacent columns. Plinth beam is provided to support wall above it and acts as tie beam for the column.

In soft and water-logged soil if earth settles downward plinth may also face uneven settlement. In R.C.C frame structure plinth acts as a tie, as beam at ground level. These plinth beams are also recommended for their earthquake-resistant properties.



E. Slab

Slab are plain structures members forming floors and roofs of building whose thickness is quite small compared to their other dimensions. These carry load primarily by flexure and are in various shapes such as square, rectangular, circular and triangular in buildings, tanks etc.

Volume 5 Issue I, January 2017
ISSN: 2321-9653
International Journal for Research in Applied Science & Engineering Technology (IJRASET)

Thickness of reinforced concrete slabs ranges from 75mm to 300mm. In domestic and industrial building a thick concrete slab, supported on foundations or directly on subsoil is used to construct the ground floor of a building.


Fig: slab


fig: bar bending

II. BRICKWORK

Brickwork or brick masonry is done with fly ash bricks. Fly ash bricks contain class C fly ash and water. Raw materials used in manufacturing of Fly ash brick are: fly ash, sand/stone dust lime, gypsum and cement. These bricks are lighter than clay bricks and are described as self-cementing. SIZE OF BRICKS: 20X10X10 cm Advantages

Due to high strength, practically no breakage during transport and use.

Due to uniform size of bricks mortar required for joints and plaster reduces almost by 50%'

Due to lower water penetration seepage of water through bricks is considerably reduced.

Gypsum plaster can be directly applied on these bricks without a backing coat of lime plaster.

These bricks do not require soaking in water for 24hrs. Sprinkling of water before use is enough.

III. WALL

A wall is a continuous, usually vertically structure, thin in proportion to its length and height. Wall is one of the most essential components of building. Primary function of a wall is to enclose or divide space of building to make it more functional and useful .Walls provide support to floor and roof and also provides security, privacy and provides protection against heat, cold, sun and rain.

Type of bond used is ENGLISH BOND. Header and stretcher laid alternately. Header (fig: a) will show its face measuring 10x20cm. Stretcher (fib:b) face measuring 10x20cm.


Fig:a


fig:b

A. Partition wall

A partition wall is a wall for purpose of separating rooms, or dividing a room. Partition walls are usually not load-bearing. This constructed using bricks, timber, glass. Wall partitioning does not require the use of a floor guide, which allows an easy operation and an uninterrupted threshold. Partition walls may be constructed of steel panels, bricks or blocks from clay, terracotta or concrete, reinforced, or hollow and glass blocks may also be used.

Metal framed partition wall these consist of track(primarily at base and head of partition) and stud(vertical sections fixed at 600mm center)


Fig: metal frame


fig: timber frame

B. Lintel

A lintel beam is a horizontal structure used in construction as a finishing piece over a door or window header beam. Lintel is generally provided over the opening of doors and windows.

Most commonly type of lintel used is Reinforce concrete lintel.

IV. ACKNOWLEDGMENT

The pleasure the achievement, glory, satisfaction and construction of my project cannot be thought of without the few, who apart from their regular schedule spared their valuable time. The gratitude, I owe a lot from my guide MR.VEDPRAKASH DEWANGAN, Assistant Professor, Department of Civil Engineering.my sincere conclusion at this stage is that without their guidance and help, smooth sailing in this journey of project execution would have been extremely difficult.

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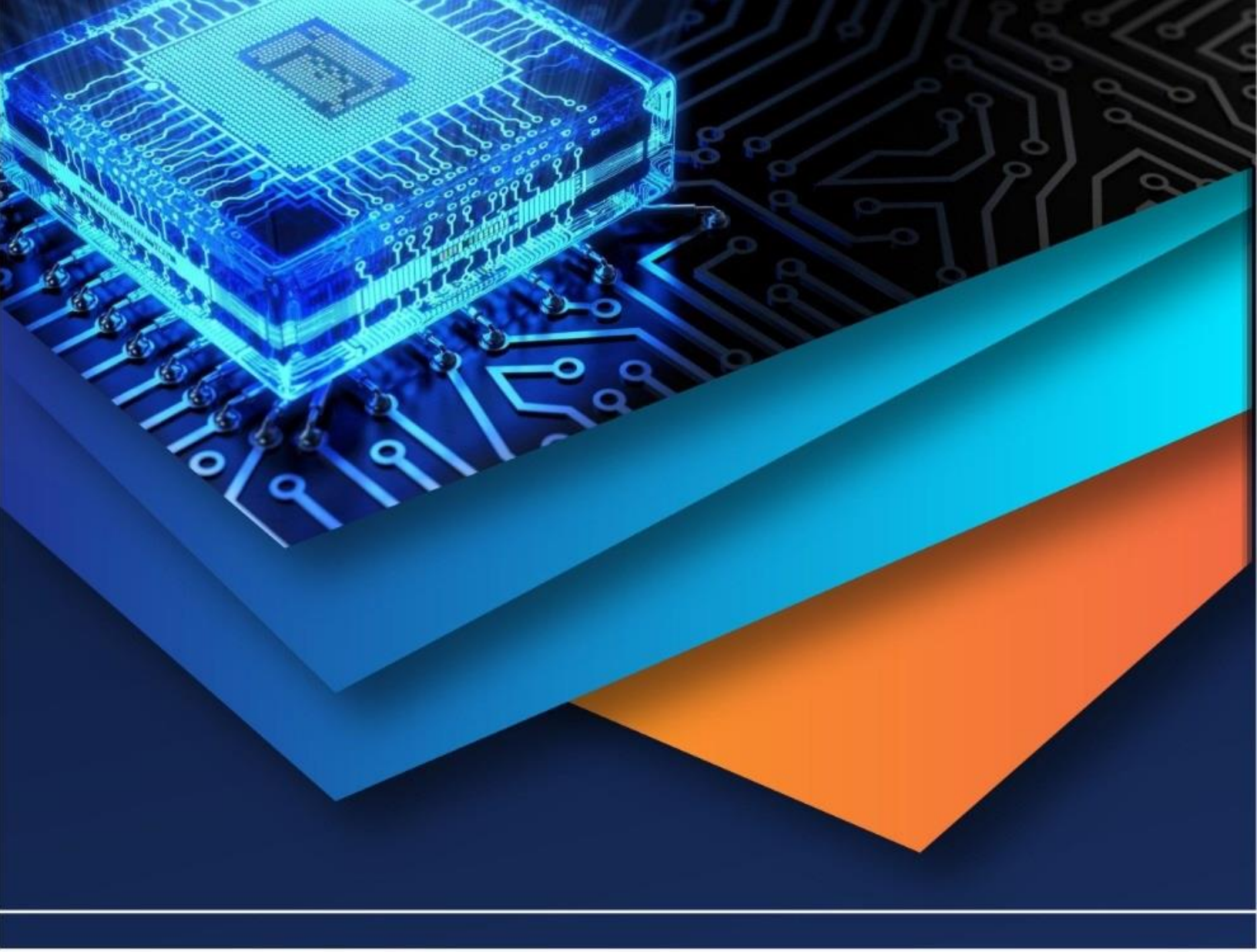

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