Analysis & Design of Multi-storeyed Residential Apartments

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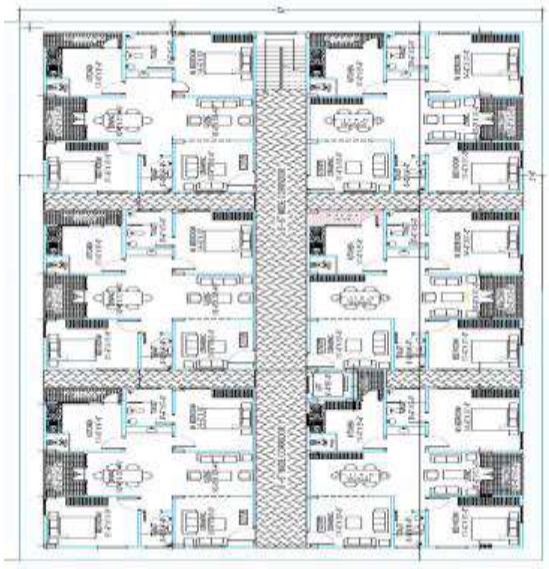
Abstract: **The basic need of person is to provide with proper food, clothing and shelter. The first two aspects are very essential to each and every person and people who are sufficient with the food and clothing, they will have thought of a shelterOn emplacing requirements of modernization this project has been chose to *ANALYSIS & DESIGN OF MULTISTORIED RESIDENTIAL APARTMENTS*, which provides shelter to 30 families in ground and five floors.**
The proposed project having 5 blocks and each block consists of 6 flats i.e. G+5 floors. Each flat consists of one master bed room, bed room, living room, dining, kitchen, two balconies and toilet.All external walls are of 230mm thick, internal walls are of 115mm thick. Height of each floor is 3m. The designs have been done by using *LIMIT STATE METHOD* and the frame analysis done by using *KANI'S METHOD*.

I INTRODUTION

The present project deals with the analysis and design of a multi storied residential building of (ung-2+g+10) by using most economical column method. The dead load &live loads are applied and the design for beams, columns, footing is obtained etabs with its new features surpassed its predecessors, and compotators with its data sharing. Our main aim is to complete a multi-storey building is to ensure that the structure is safe and economical against all possible loading conditions and to fulfil the function for which they have built. Safety requirements must be so that the structure is able to serve it purpose with the maintain cost. Detailed planning of the structure usually comes from several studies made by town planners, investors, users, architects and other engineers .on that, and a structural engineer has the main influence on the overall structural design and an architect is involved in aesthetic details. For the design of the structure, the dead load, live load, seismic and wind load are considered. The analysis and design for the structure done by using a software package etabs.in this project multi-storeyed construction, we have adopted limit state method of analysis and design the structure. The design is in confirmation with is 456-2000.the analysis of frame is worked out by using etabs

Statement of The Project:

Salient Features: The design data shall be as follows. 1. Utility of Buildings: Residential Building 2. No of Storey: (UNG-2 +G+10) 3. Shape of the Building: Rectangular 4. No. Of Staircases: ONE 5. No. Of Lifts: One 6. Types of Walls: Brick Wall 7. Geometric Details a) Ground Floor (G-2, G-1): 3.2 M b) Floor-To-Floor Height: 3.0 M c) Height of Plinth: 0.6 M above G.L d) Depth of Foundation: 2 M below G.L 8. Material Details a) Concrete Grade: M30, M25 (COLUMNS AND BEAMS) b) All Steel Grades: HYSDREINFORCEMENT of Grade Fe415 c) Bearing Capacity of Soil: 200 KN/M2 9. Type Of Construction: R.C.C FRAMED structure.



General

Major advances in both design and new material assisted roman architecture. Design was enhanced architectural developments in the construction of arches and roof domes. Arches improved the efficiency and capability of bridges and aqueducts (fewer supports columns were needed to support the structure), while domed roofs not only permitted the building of larger open areas undercover, but also lent the exterior an impressive. . he social unit that lives in a house is known as a household. Most commonly, a household is family unit of a same kind, though households can be other social groups, such as single person, or groups of unrelated individuals. Settled agrarian and industrial societies are composed of household units living permanently in housing of various types, according to a variety of farms of lands tenure. English-speaking people generally call any building there routinely occupy "home". Many people leave their houses during the day for work and recreation, and return to them to sleep or for other activities.

Architecture is the art and science of designing buildings and structures. A wider definition would include within its scope also the design of the total built environment, from the macro level of creating furniture. In the field of building architecture, the skill demanded of an architect range from the more complex, such as for a hospital or stadium, to the apparently simpler, such as planning residential houses. Many architectural works may be seen also as cultural and political symbols, and /or work of art. The role of architect though changing, has been central to the successful design and implementation of pleasing built environments in which people live. SCOPE: Architectural is an interdisciplinary field, drawing upon mathematics, science, art technology, social sciences, politics, history and philosophy. Vitrifies states: "architecture is a science, arising out of many other sciences, and adorned with much and varied learning: by the help of which is judgment is formed of those works which are result of other arts". Most modern-day definition of "good buildings" recognize that because architecture does not exist in a vacuum, architectural form cannot be merely a completion of historical precedent, fictional necessities ; and socially aware concerns, but most also be a trance dents synthesis of all of the former and a creation of worth in and of itself As Nunziarodanini stated, "through its aesthetic dimension architecture goes beyond the functional aspects that it has in common with other human sciences…through its own particular way of expressing values, architecture can stimulate and influence social life without presuming that, in and of itself, it will promote social

III ARCHITECTURE LAYOUT DRAWING:

GENERAL PRINCIPLES OF SITE SELECTION:

Site selection has an important bearing on planning and designing of buildings. Generally, therefore an architect has either to make a choice of suitable site or to plan his building structure to suit the available site. Natural defects of a site will involve considerable expenditure on construction and maintenance of the building.

1. A site which comes within the limits of an area where the by-laws of the local authority enforce restrictions regarding proportions of plots to built up, vacant spaces to be left in front and sides, heights of buildings etc. should be preferred.
2. The site should be situated on an elevated place and also leveled on with uniform slopes from one end to the other so as to provide good and quick drainage of rain water.
3. The soil surface of the site should be good enough to provide economical foundations for the intended building without causing any problem. Generally for most satisfactory instructions, the site should have rock, sand or firm soil below 60 to 120cm. layer of light or even black cotton soil.
4. The situation of the site should be such as to ensure unobstructed natural light and air.
5. The site should have a good land scope but away from quarries, kilns, factories etc.

IV TYPES OF LOADS:

Loads are primary consideration in any buildings design because they define the nature and magnitude of hazards or external forces that a building must resist to provide reasonable performance (i.e.; safety and serviceability) throughout the structure's useful life.The anticipated loads are influenced by a building's intended use (occupancy and function), configuration (shape and size) and location (climate and site conditions). Ultimately, the type and magnitude of the design loads affect critical decisions such has the Material selection, construction details, and architectural configuration. Thus to optimize the value (i.e. performance versus economy) of the finished product, it is essential to apply design loads realistically. While the building consider in this guide are primary single-family detached and attached dwellings, the principles and concepts related to building loads also apply to other similar types of construction, such as low-rise apartment's buildings. In general, the design loads recommended in this guide are based on:

1. Dead load
2. Live load
3. Imposed loads
4. Wind loads
5. Earth Quake load.

DEAD LOADS:

This is the permanent of the stationary load like self-weight of the structural elements. This includes the following a) Self-weight b) Weight of the finished structure part. c) Weight of partition walls etc. Dead loads are based upon the unit weights of elements, which are established taking in account materials specified for construction, given IS 1911-1967 Dead loads consists of the permanent construction material loads compressing the roof, floor, wall, and foundation system, including claddings finishes and fixed equipment. Dead load is the total load of all of the components of the building that generally do not change over time, such as the steel columns, concrete floors, bricks, roofing material etc.

LIVE LOADS:

These loads are not permanent or moving loads. The following loads includes in this type of loading: imposed loads(fixed) weight of the fixed seating in auditoriums, fixed machinery, partition walls these loads through fixed in positions cannot be relieved upon to act permanently throughout the life of the structure. Imposed loads (not fixed) these loads change either in magnitude or position very often such as the traffic loads, weight of the furniture etc. Live loads are produced by the use

occupancy of the building. Loads include those from human occupants, furnishings, no fixed equipment, storage, and constriction and maintenance activities. As required to adequately define the loading condition, loads are presented in terms of uniform are loads, concentrated loads, and uniform line loads

3. Zone IV.

4. Zone V.

V STRUCTURAL ANALYSIS:

The procedure of structural analysis is simple in concept but complex. In detail. It involves the analysis of a proposed structure to show that its resistance or strength will meet or exceed a reasonable expectation. This expectation is usually expressed by a specified load or the demand and an acceptable margined of safety that constitutes a performance goal for a structure. The performance goals structural design is multifaceted. Foremost, a structure must perform its intended function safely over its useful life. The concept of useful life implies consideration of durability and established the basis for considering the cumulative exposure to time varying risks (i.e. corrosive environments, that performance is inextricably linked to cost, owners, builders, and designer must considers economic limit to the primary goal of safety and durability. In the view of the above discussion, structural designer may appear to have little control over the fundamental goals of structural design except to comply with or exceed the minimum limits established by law. While this is generally true, a designer can still do much to optimize the design through alternative means and methods that can for more efficient analysis techniques, creative design detailing, and the use of innovative construction materials and methods. In summary the goal of structural design are defined by law and reflect the collective interpretation of general public welfare by those involved in the development and local adoption of building could.

VI CONCLUSION:

CASE-1

As our project deals with the most economical column method in this project we have design the structure in an economical way by reducing the sizes in the sections. As the load is more at the bottom when compared to the top floors, there is no need of providing large sizes at the top.

CASE-2

Economizing the column by means of area of steel as per code, the min percentage of steel is 0.8%gross cross sectional area and max: 6% as per code.

CASE-3

Economizing the column by means of column orientation is longer span longer direction will reduce the amount of bending as a result the area of steel is also reduced

CASE -4

(SCOPE FOR FUTHER STUDY) If the height of the structure is increased, the stiffness phenomenon (slenderness effect) i.e. long column effect will come in to the picture. As a result the amount of deflections are far greater than the codal provisions (Is - 456).

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