

## 3d Modelling Of G+6 Residential Building Using Revit Software

Mr. Guguloth Sai Kumar<sup>\*1</sup>, Dr. Khaja Fareeduddin<sup>\*2</sup>,  
Mr. Abdul Sajeed<sup>\*3</sup>, Mr. Shaik Irfan<sup>\*4</sup>, Mr. Mohammed Tasin Arsalan<sup>\*5</sup>,  
Mr. Abdul Khader Khan<sup>\*6</sup>

<sup>\*1</sup>, Assistant Professor, <sup>\*2</sup> Professor & Hod, Dept. Of Civil, Lords Institute Of Engineering And Technology  
<sup>\*3, 4, 5, 6</sup> B.E Student Dept. Of Civil, Lords Institute Of Engineering And Technology

Accepted 22-04-2026

*Author(s) Retains the Copyrights of This Article*

**Abstract:** The rapid evolution of the construction industry has shifted the focus from traditional 2D drafting to the multi-dimensional environment of Building Information Modelling (BIM). This project, titled "3D Modelling of a G+6 Residential Building using Revit Software," aims to demonstrate the practical application of BIM in the architectural design and visualization of a high-rise residential structure. The primary objective is to develop a high-fidelity 3D digital representation that integrates architectural aesthetics with functional spatial planning. Unlike manual drafting, the use of Revit allows for a parametric design approach, where any modification in the floor plans is automatically reflected in elevations, sections, and 3D views, ensuring design consistency and reducing errors. The methodology begins with the creation of a comprehensive architectural layout for a Ground plus Six (G+6) floors residential building, adhering to standard building by-laws and functional requirements. Each floor is meticulously modelled to include essential structural and architectural elements such as walls, windows, doors, staircases, and floor finishes. The project further explores the advanced visualization capabilities of Revit, including the application of realistic materials, lighting analysis, and high-quality rendering to provide a lifelike walkthrough of the residential units. This visual clarity is crucial for stakeholders to comprehend the spatial arrangement and aesthetic appeal of the building before the commencement of physical construction. Furthermore, the project highlights the advantages of BIM in terms of documentation and coordination. By utilizing Revit's scheduling features, the model facilitates the automatic generation of architectural schedules, enhancing the efficiency of the design process. The outcome of this work is a complete architectural BIM model that serves as a single source of truth for design data, laying a strong foundation for future integration with structural analysis and construction management. This project concludes that Revit is an indispensable tool for modern civil engineers, offering superior accuracy, time efficiency, and a robust platform for complex architectural modelling in urban residential development.

**Keywords:** Revit Architectural, Building Information Modelling, G+6 Residential Building, 3D modelling.

### Introduction

The rapid growth of the urban population in recent decades has created an unprecedented demand for residential infrastructure in cities across the world. Urbanization, industrialization, and improved employment opportunities have attracted a large number of people to urban areas, resulting in increased pressure on land resources. As land availability becomes scarce and expensive, the need for efficient land utilization has become a critical factor in modern construction practices. To address this challenge, vertical development has emerged as a practical and sustainable solution. Multi-story residential buildings, such as G+6 structures (Ground floor plus six upper floors), are widely adopted in urban planning as they allow accommodation of multiple families within limited land while maintaining functionality, comfort, and safety. A G+6 residential building represents an ideal mid-rise structure that balances structural feasibility, economic viability, and residential requirements. Such buildings are commonly constructed in developing and metropolitan cities where land constraints and population density are

high. Proper planning of these buildings involves careful consideration of various factors, including space utilization, structural stability, ventilation, lighting, accessibility, safety measures, and compliance with local building regulations and by-laws.

### Background of Study

The construction industry has experienced significant advancements with the introduction of digital design tools and modern construction techniques. Earlier, building design was carried out using manual drafting methods, which were time-consuming and less accurate. The introduction of computer-aided design (CAD) improved the drafting process, and AutoCAD became a widely used tool for preparing precise 2D drawings such as floor plans and sections. However, 2D drawings have limitations in representing complete building visualization, especially in understanding depth, spatial relationships, and overall appearance. To overcome these limitations, the construction industry has shifted towards advanced 3D modelling techniques and Building Information Modelling (BIM). BIM has become a key technology in

modern construction, as it provides a comprehensive digital representation of a building along with its components and properties. Autodesk Revit is one of the most important BIM-based software tools used in the construction industry.

This study focuses on the application of AutoCAD and Revit to develop a 3D model of a G+6 residential building using BIM methodology. It highlights the importance of transitioning from traditional drafting methods to modern digital modelling techniques, which significantly improve the efficiency and accuracy of construction projects.

#### Need for the Study

In the present scenario, the construction industry is undergoing a rapid transformation with the adoption of advanced technologies and digital tools. The increasing demand for infrastructure, coupled with the complexity of modern building projects, has made it essential to move beyond traditional methods of planning and design. As a result, designers and stakeholders faced difficulties in understanding the complete design, leading to misinterpretations and errors during execution. Traditional 2D drafting methods also involve a significant amount of manual effort and time. Any modification in the design requires changes to be made in multiple drawings, increasing the chances of inconsistencies and errors. Moreover, these drawings do not provide a realistic view of the building, making it difficult for clients and non-technical individuals to visualize the final outcome.

#### Objectives of the Project

The main objective of this project is to develop a detailed 3D model of a G+6 residential building using modern software tools and techniques. The project focuses on understanding the process of converting 2D drawings into a 3D model using Building Information Modelling (BIM) methodology. The following are the specific objectives of the project:

- To study and understand the architectural layout of a G+6 residential building using available floor plans and sectional drawings.
- To prepare accurate 2D drawings using AutoCAD, which serve as the base for 3D modelling.
- To develop a detailed 3D model of the building using Autodesk Revit based on BIM principles.
- To understand the concept of parametric modelling in Revit and its advantages in building design.
- To visualize the building in a realistic manner, including walls, slabs, doors, windows, and other components.
- To improve coordination between different elements of the building using BIM technology.
- To identify and minimize design errors during the modelling stage.

- To enhance knowledge and practical skills in modern software tools used in the construction industry.
- To understand the workflow involved in integrating AutoCAD and Revit for efficient project development.

#### Scope of the Project

The scope of this project is focused on the planning and development of a 3D model for a G+6 residential building using modern digital tools. The project mainly involves the use of AutoCAD for preparing and understanding 2D drawings and Autodesk Revit for creating a detailed 3D model based on Building Information Modelling (BIM) methodology. This study includes the analysis of architectural drawings such as floor plans and sections, which are used as the base for developing the 3D model. The project covers the modelling of essential building components such as walls, slabs, doors, windows, staircases, and other structural elements required to represent the building accurately. The emphasis is on creating a realistic and well-coordinated model that reflects the actual design. The scope also includes understanding the workflow between AutoCAD and Revit, where 2D drawings are converted into a 3D BIM model. This process helps in improving visualization, coordination, and accuracy in building design. It also enables better representation of the building in different views such as plans, elevations, sections, and 3D perspectives, which are essential for proper understanding of the project. The project further focuses on the application of BIM concepts such as parametric modelling and data integration within the model. In conclusion, the scope of this project is to develop a comprehensive 3D model of a G+6 residential building using AutoCAD and Revit, highlighting the importance of BIM technology in modern construction practices.

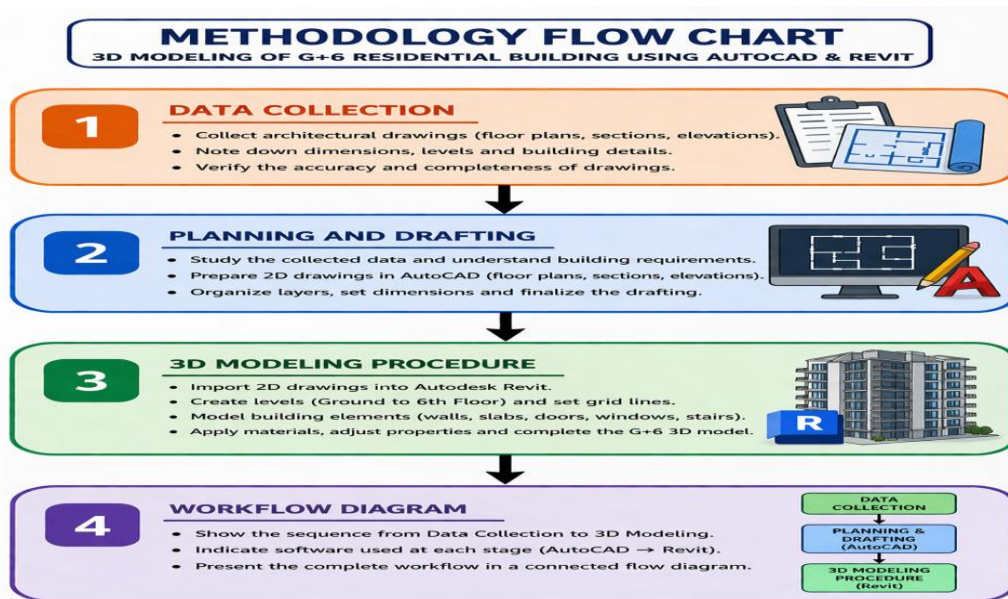
### 1. LITERATURE REVIEW

#### Overview of Previous Studies

The construction industry has undergone significant transformation over the years with the adoption of advanced technologies in planning, design, and execution. Several studies have highlighted the importance of digital tools in improving the efficiency, accuracy, and quality of building projects. Earlier research mainly focused on traditional drafting techniques, where manual drawings were used for planning and designing structures. These methods were time-consuming and often resulted in errors due to a lack of proper visualization. With the introduction of computer-aided design (CAD), many researchers emphasized the benefits of using software such as AutoCAD for preparing accurate 2D drawings. Studies have shown that CAD tools improved drafting speed, precision, and documentation quality. However, these studies also pointed out that 2D drawings have

limitations in representing complex structures, especially in understanding spatial relationships and building geometry. In recent years, a large number of studies have focused on the application of 3D modelling and Building Information Modelling (BIM) in construction projects. Researchers have found that BIM significantly improves project visualization and coordination among different disciplines. It allows the creation of a digital model that includes both geometric and functional information of a building. This helps in detecting design conflicts at an early stage and reduces errors during construction. Autodesk Revit has been widely studied as a powerful BIM tool for developing 3D models of buildings. Previous studies have shown that Revit enables parametric modelling, where changes made in one part of the

This feature improves consistency and reduces the time required for modifications. Researchers have also highlighted that Revit enhances collaboration between architects, engineers, and designers. Studies related to multi-storey residential buildings have emphasized the need for proper planning and visualization due to their complexity. The use of BIM tools in such projects has been found to improve space utilization, design accuracy, and presentation quality. It also helps in better decision-making and project management. Overall, previous studies clearly indicate that the transition from traditional drafting methods to BIM-based 3D modelling has greatly improved the construction process. These studies form the foundation for the present project, which focuses on the application of AutoCAD and Revit for developing a 3D model of



model automatically update in all related views.

a G+6 residential building.

**Methodology**

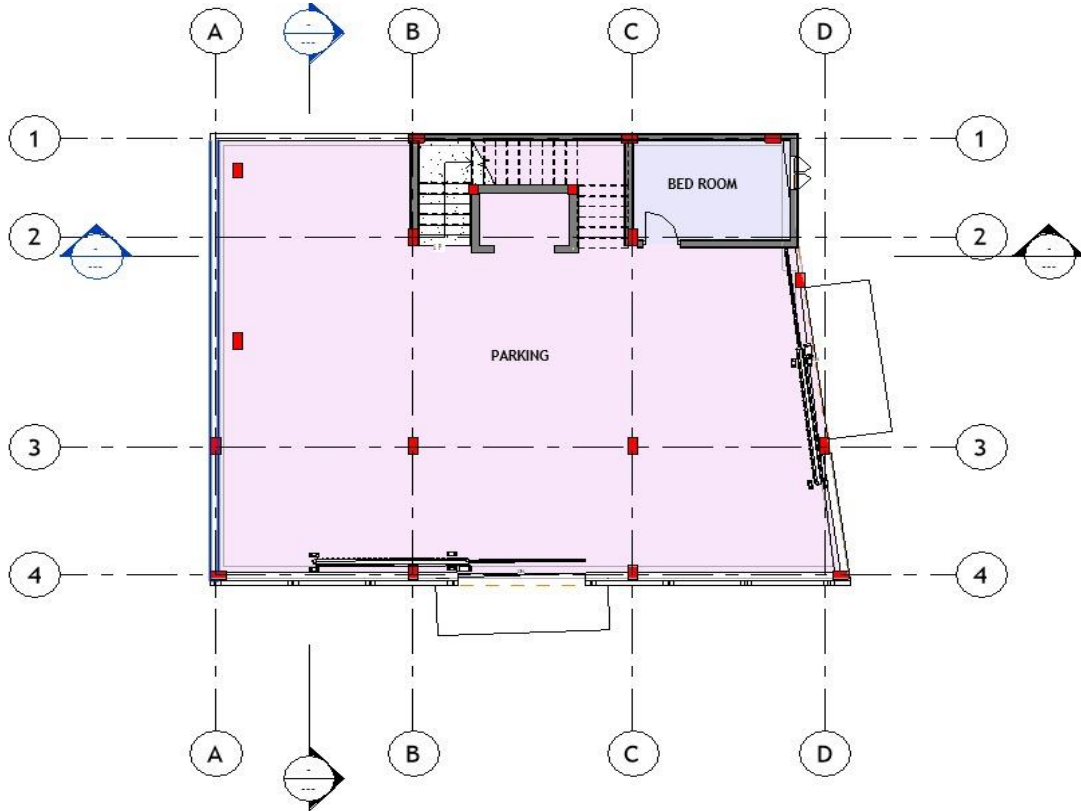
**2. PLANNING AND MODELLING OF G+6 RESIDENTIAL BUILDING**

**Building Configuration**

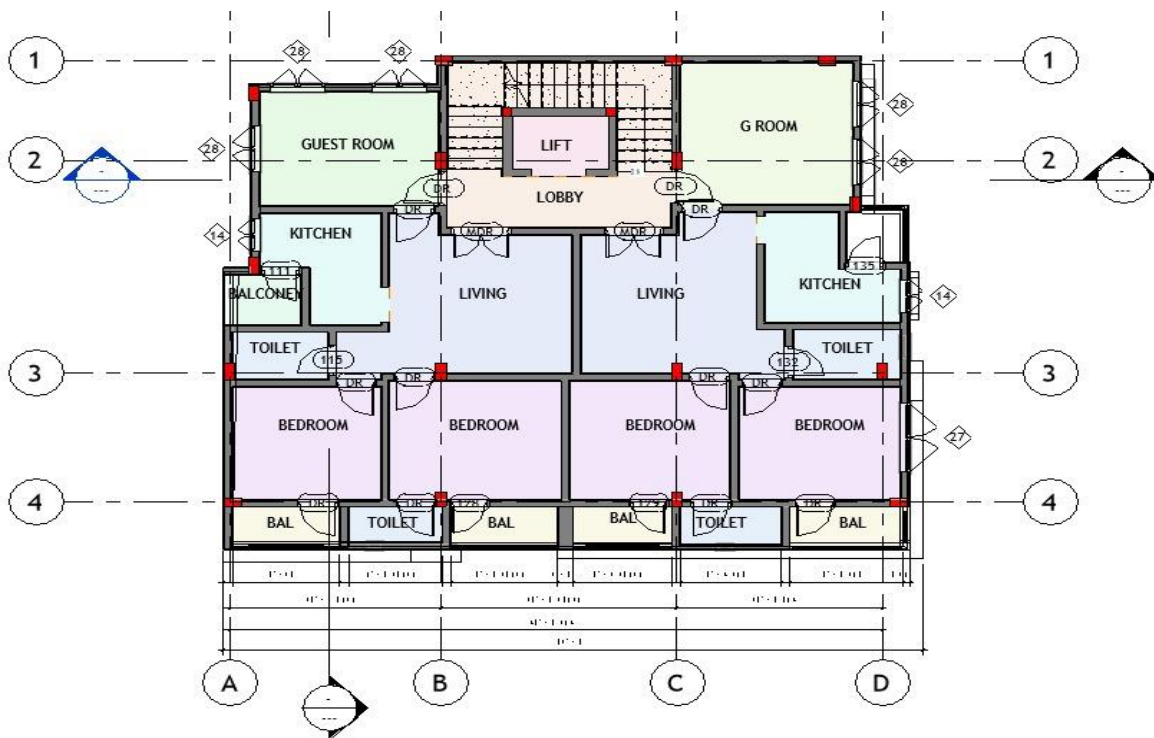
The building configuration of the proposed residential structure is designed as a multi-storey building consisting of a ground floor, five upper floors, and an additional penthouse level, making it a G+5+Penthouse structure. This type of configuration is commonly adopted in modern urban areas where land availability is limited, and vertical development becomes essential to accommodate a larger number of occupants. The design emphasizes efficient utilization of available space while maintaining proper functionality, structural feasibility, and aesthetic appeal suitable for contemporary residential living standards. The total floor area of each level is approximately 1820

square feet, which provides adequate space for planning well-organized residential units. Each floor is designed to accommodate essential spaces such as living rooms, bedrooms, kitchens, dining areas, and circulation spaces like corridors and passages. The layout is carefully planned to ensure that each space serves its intended purpose effectively without any wastage of area. Special attention is given to the arrangement of rooms to provide privacy, comfort, and convenience for the occupants.

successfully balances space utilization, comfort, and modern architectural practices. The incorporation of consistent design parameters, proper planning of spaces, and effective use of digital tools ensures a high-quality outcome. The use of Autodesk Revit and BIM technology further enhances the accuracy, coordination, and efficiency of the modelling process, making it a reliable approach for modern residential building design.



*Figure 1: Parking*



*Figure 2 First Floor Plan*



Figure 3 Front Elevation

### 3. Introduction to 3D Modelling

3D modelling is an essential process in modern construction and architectural design, which involves creating a three-dimensional digital representation of a building or structure using specialized software tools. It plays a vital role in transforming conceptual ideas into realistic visual forms that can be easily understood and analysed. Unlike traditional 2D drawings, which only provide limited information in the form of plans and sections, 3D modelling allows designers to visualize the structure in a more comprehensive and realistic manner, including its shape, size, proportions, and spatial relationships. This makes it easier to interpret complex designs and ensures better communication

among all stakeholders involved in the project. In earlier construction practices, designers relied heavily on 2D drawings, which often led to difficulties in understanding the complete structure, especially in multi-storey buildings. The lack of depth and perspective in 2D drawings made it challenging to identify design errors and spatial conflicts. BIM enables the creation of intelligent models where all building components such as walls, slabs, doors, windows, and staircases are interconnected and contain both geometric and functional information. This means that each element in the model is not just a graphical representation but also includes data related to its properties, dimensions, and materials.



*Figure 4 Final 3D Model of Building*  
Rendered model



*Figure 5: Final 3D Render Model*

#### 4. CONCLUSION

The present project on the 3D modelling of a G+5+Penthouse residential building demonstrates the effective application of modern software tools and Building Information Modelling (BIM) technology in the field of civil engineering and construction. The study began with the collection and analysis of architectural drawings, followed by accurate 2D drafting using AutoCAD, which provided a strong foundation for further development. The use of Autodesk Revit enabled the transformation of these 2D drawings into a detailed and realistic 3D model, where all building components such as walls, slabs, doors, windows, and staircases were created systematically using parametric modelling techniques. The adoption of BIM methodology ensured that all elements were interconnected, allowing automatic updates and improved coordination throughout the design process. The project also incorporated standard construction materials such as M25 (DM25) grade concrete and Fe415 steel, ensuring structural strength, durability, and suitability for residential error reduction, and better communication among stakeholders. The workflow followed in this project ensured a systematic and organized approach from data collection to final model development. In addition, the project improved practical knowledge in handling industry-standard software tools and understanding real-time building modelling processes. It also demonstrated how digital models can be used for better planning and design coordination. The ability to visualize the complete structure before construction helps in minimizing design errors and improving project outcomes. Furthermore, the project highlights the importance of adopting modern technologies in construction to meet current industry demands. Overall, the project successfully achieved its objective of developing a complete 3D model of a residential building while demonstrating the importance of modern digital tools in construction. This study not only improves technical knowledge but also provides practical exposure to industry-relevant software, making it highly useful for future professional applications. In conclusion, the integration of AutoCAD and Revit with BIM methodology significantly enhances the design process, improves visualization, and ensures better project outcomes, making it an essential approach in modern construction practices.

#### REFERENCES

- 1) Rehman, M. A., Raut, O. D., Mudassir, M. A., Shah, M. M., Tidke, A. M., Meshram, H. H., Noman, M. F., Balapure, M. S., & Ingle, A. S. (2024). Design of G+1 Building by BIM. *International Research Journal of*
- 2) Thakkar, H. S., Pandya, B. V., Rabadiya, M. B., Prajapati, R. C., & Thakkar, D. S. (2021). Application of BIM in a Residential Project in India: Benefit-Cost Analysis. *International Journal of Engineering Technologies and Management Research*, 8(3), 45–52.
- 3) Sharma, P., & Gupta, S. (2016). Applicability of BIM in Indian Built Environment Sector. *American Journal of Engineering and Technology Management*, 1(4), 21–30.
- 4) Isac, I. A., & Anoop, C. K. (2019). Analysis of Building Information Modelling and Scope of BIM in India. *International Journal of Engineering Research & Technology*, 8(9), 117–123.
- 5) Jagadeesh, G. M., & Jagadisan, S. (2019). Investigation of BIM Adoption in India. *International Journal of Engineering Research & Technology*, 8(6), 87–93.
- 6) Sharma, N., Kaur, B., & Goel, A. (2018). Green Building Based on BIM. *Indian Journal of Science and Technology*, 11(22), 1–7.
- 7) Ghadge, S., Samal, M. G., Madas, B. M., Chintakindi, S. B., & Ankam, R. A. (2020). A Case Study on BIM for Residential Building. *International Journal of Creative Thoughts*, 8(1), 33–42.
- 8) Bhendkar, S. A., & Pajgade, P. S. (2022). Importance of BIM in Construction Industry – A Review. *Journal of Emerging Technologies and Innovative Research*, 9(5), 12–18.
- 9) Narayankar, S., Raut, S., Bhavsar, A., Chaudhari, D., & Patil, S. (2022). Clash Detection Using BIM for Efficient Construction Timeline. *International Journal of Innovative Research in Technology*, 8(4), 44–51.
- 10) Aarthipriya, V., & Chitra, G. (2020). Clash Detection in Appropriate Technology Building Using BIM. *International Journal of Construction Engineering and Planning*, 5(3), 101–108.
- 11) Raol, P. H., Deshmukh, S., & Pitroda, J. R. (2020). Integration of BIM with Lean Principles in Indian Construction. *International Journal of Science and Research*, 9(6), 77–85.
- 12) Amarnath, C. B. (2020). BIM Implementation in India: Industry Perspective. *International Journal of Civil Engineering Research*, 11(2), 23–30.
- 13) Dixit, S., Mandal, S. N., Thanikal, J. V., & Saurabh, K. (2021). Factors Affecting Construction Productivity Using RII in Indian Construction Industry. *Journal of Construction Engineering*, 12(1), 55–63.