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Plan and Design of a Residential Building

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Abstract: ***Generally, building is a structure that provides basic shelter for the humans to conduct general activities. In common prose, the purpose of buildings is to provide humans a comfortable working and living space and protected from the extremes of climate. However, a building usage is depends on the lifespan and the change of rate effected on their impact on efficiency of use. Hence, more attention needs to be emphasized on the performance of buildings as the changes are not static over time. This paper highlights the concept and requirements in evaluating building performance. Exploration on the concept of building performance is also addressed on the purposes of building performance and the link of performance towards the end-users and incorporating their feedback. It concludes that obtaining users' feedback is vital in building performance and the requirements of assessment must outline the performance criteria and mandates in such building.***
Keywords: ***AutoCAD, STAAD. Pro, Sketch Up, Structural Analysis***

I. INTRODUCTION

1) Civil engineering is the application of physical and scientific principles for solving the problems of society. The earliest practice of civil engineering may have commenced when humans started to abandon a nomadic existence, creating a need for the construction of shelter. Every human has a desire to own comfortable home so the person does maximum effort and spends hard earned saving in owning houses. By studying principal of planning a plan is designed for a family in which each members of family can conveniently be accommodated. A flat which contain drawing hall, kitchen cum dining room, bedroom, and bathroom.
2) AutoCAD software is used for 2D drawing of the building.
3) Sketch UP software is used for 3D structure of the building.
4) STAAD Pro software is used for the computations of loads, moments and shear forces. Now a day's most of the high rise buildings are designed by STAAD Pro which makes a compulsion for a civil engineer to know about this software. This software can be used to carry RCC, steel, bridge, truss etc according to various country codes.

II. SOFTWARE USED

A. *AutoCAD*

1) AutoCAD is a software, developed by AUTODESK company used for 2d drawing and 3d modeling.
2) Earlier to the invention of CAD programs, manual hand drafting tools like drafting boards and pencils, parallel rulers, compasses, and triangles were only the options for the designers to create 2D designs. AutoCAD released in the year 1982, and since then, AutoCAD quickly became the most widely used CAD application because of its automated set of tools and features. It was a great advantage in the AutoCAD stream.
3) Professionals across many industries use AutoCAD to do everything from designing and creating different buildings, constructions, and infrastructure. AutoCAD enables companies to design and plan projects virtually. AutoCAD supports a powerful yet easier workflow that works corrects and helps the users to execute the commands effectively and precisely.
4) In this project we use AutoCAD for the 2d drawing of the plan.
5) By this we conclude a 3storeyed building plan.
6) Civil engineering drawings indicate site and project locations, vehicle accessibility, topography, site drainage, and possibly landscape requirements, although this aspect may be performed by a licensed landscape architect rather than the project architect.
7) By the help of AutoCAD the 2d drawing of a plan of a building is easier, time efficient, minimum error chance, and easy to handle.
8) With this tool, an engineer would be ready to design their entire site, including access roads, car entrances, site boundaries, and contour lines.
9) By this software we also do the elevation.

Elevations: These show the configuration of perimeter walls, shear walls, sizes of trusses, or vertical bracing systems, indicating forces in the members together with end moments.

B. STAAD Pro Analysis

1) STAAD Pro was developed and marketed by Research Engineers International in 1997, but Bentley Systems acquired this company in 2005. Bentley Systems is an American software development company that is actively engaged in developing and marketing software products for the design, construction, and operation of infrastructure.

2) STAAD.pro is the abbreviation for Structural Analysis and Design. STAAD pro is one of the popular software that is used for analysis & designing structures like buildings, towers, bridges, industrial, transportation and utility structures.

3) In this project we use the STAAD. Pro for structural analysis and column and beam layout.

4) By the help of STAAD. Pro we can do structural analysis of the building. Manual calculation is tedious and time consuming. STAAD. Pro provides us a quick, efficient and correct platform for analysis and coming up with structures.

5) Types of loads on a hypothetical building are as follows.

a) Vertical Loads
b) Dead (gravity)
c) Live (gravity)
d) Snow (gravity)
e) Wind (uplift on roof)
f) Seismic and wind (overturning)
g) Seismic (vertical ground motion)

'-' sign indicates that floor load is acting downwards.

C. 3D By Sketchup

1) Sketch Up is a 3D modeling computer program for a wide range of drawing applications such as architectural, interior design, landscape architecture, civil and mechanical engineering, film and video game design.

2) Sketch Up is owned by Trimble Inc. a mapping surveying and navigation equipment company .There is an online library of free model assemblies (e.g. windows, doors, automobiles), 3D Warehouse, to which users may contribute models.

3) Sketch Up helps us analyze problems and keep construction moving forward by the help of sketch up we do the 3D design of the project as well as the interior design.

III. RESULT AND DISCUSSION

A. By using AutoCAD we can easily plan the design of the building according to the client.
B. By the help of STAAD. Pro we can do structural analysis of the building.
C. Manual calculation is tedious and time consuming
D. STAAD. Pro provides us a quick, efficient and correct platform for analysis and coming up with structures.
E. By the help of Sketch Up, we do the 3D design of the plan.
F. Software based planning is easier and time consuming as well as low chance of error.

IV. CONCLUSION

A. We conclude that, there is a much need of concentration on building design through software, and practically doing a residential building is the toughest part. A residential building should be placed in a peaceful environment as well as economical for the people.
B. By the help of such software like AutoCAD, STAAD. Pro, Sketch Up is much easier, quick, time efficient.
C. By the help of AutoCAD the 2d plan and elevation is easy to do.
D. Structural analysis by the help of STAAD. Pro is time consuming and easier than manual.

V. FUTURE WORK

A. This project gives us the experience and knowledge about the designing and construction. This project is very much helpful to all of us for planning , designing , structural analysis and construction of a proper residential building in future.
B. By the time software like AutoCAD , STAAD.pro and SKETCHUP is surely take a part in planning , design and structural analysis of building.
C. It is a clear vision that software based work is really necessary for the construction in day to day life.

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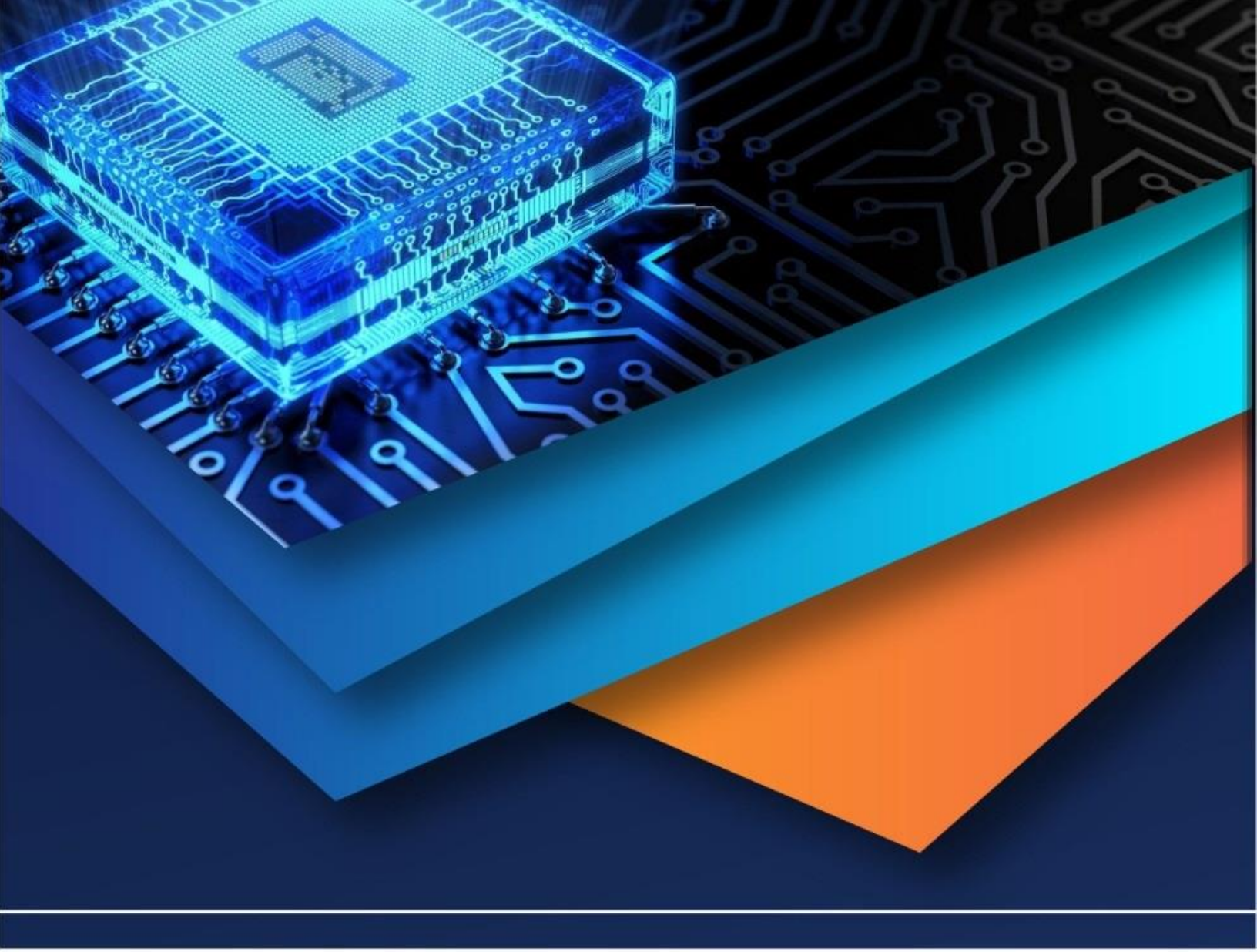

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