Design of India's New Parliament

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Abstract - **Cement Reinforcement Concrete building structures are extremely important in our world. It could be residential, commercial, or institutional in nature. Our world's population is growing by the day. In such cases, countries such as India stretch their arms vertically in order to meet the growing population's needs. In this study, Auto CAD, STAAD pro, and ETABS were used to design a India's new parliament building. STAAD Pro and ETABS are well-equipped and include all analysis engines, including static, dynamic, linear, and nonlinear. These programmers are used to analyze and design buildings. In our project, we designed and analyzed various components of India's New Parliament building using E tabs, which is compressive analysis, design, and detailing software for any building's superstructure (Beams, Columns). STAAD pro software is used to design the substructure (Footing) and slab, which can be directly combined with E tabs for load and reaction transfer. We considered dead load, live load, and earthquake load, as well as their combination on each structural element of the building, when designing a commercial building. Despite the fact that software can perform linear-static, linear-dynamic, nonlinear static, and nonlinear dynamic analysis. We limited our research to linear static analysis. Although software is capable of detailing each structural element in the substructure and superstructure, we attempted to do so with AUTOCAD. We even used STAAD PRO to design the structure. Furthermore, critical structural elements were designed manually and the results were compared to ETABS, STAAD PRO.**

Index Terms - **AUTOCAD, STAD PRO, ETABS, Manual design.**

I.INTRODUCTION

Popular democracy and representative institutions have neither the Indian soil nor the recent origins completely alienated. The Vedic period dates from the history of democratic traditions in India. These assemblies discussed and decided on state affairs in addition to the king's election. The administration had to find room for two houses in legislative chambers. The challenge was the newly established larger 140-strong legislature. Two proposals were made by the administration. One of them was to house the legislature in a shamiana (tent). In 1921, the first central parliamentary assembly was held in this building. At that time Herbert Baker and Edwin Lutyens architects of Delhi argued about plans for the parliamentary permanent building. The Baker suggested a triangular, while Lutyens supported the Parliament building as being circular, colosseum design. Thus the parliamentary procedure was in place and many of the rules were similar to modern parliamentary procedures. They had rules on the arrangement for sitting in an assembly, they followed a very elaborate voting procedure and had rules for counting votes, etc.

Fig-1 Paisa coin

The other was to restructure an existing building to accommodate the legislature. The first proposal was rejected as it was felt the new legislative procedure

would begin to accommodate 'members under canvas under unfavorable conditions. The second proposal was made by the administration and a larger chamber was built on the secretariat building. The current democratic Parliament is celebrating its 100th birthday. Edwin Lutyens and Herbert Baker designed the Old Parliament building during the British period. As we are so proud of our compatriots, the new one will be built. The purpose of the New House in New Delhi is to understand architectural-democratic relations. The cultural diversity of the country will be highlighted. Regional arts and craft would also be involved. There will be a square meter area in the new building.

The new building in the Indian Parliament will be the rhombus that we took out of the Indian currency. Since the currency is of two kinds, the first is coins and the second is notes. There are now circulating coins worth 1 rupee, 2 rupees, 5 rupees and 10-rupee coins. During many years, the Indian rupee was a silver currency.

II. AUTO CAD, STAAD PRO, ETABS in Designing

A. Auto cad

The AutoCAD is a two-word word 'AUTO' and 'CAD' (computer-assisted design). The word "AUTO" It is widely used for 2D and 3D design in industry. We used AutoCAD in this project in 2014. The plan has been divided in four triangles called block A, B, C, D. The Lok Sabha (A-Block) and Rajya Sabha (Block B), are located on the left side of the y-axis and the Block C and D triangles are arranged on the other side. They are equipped with committee, library, and some of the other required rooms. The rooms, stairs, lifts and relaxation rooms are all surrounded by these four blocks. The building's total height is 39 feet The Lok Sabha and Rajya Sabha are 13 feet high each floor from the ground floor, and the central hall will continue to the first floor, which is still on the same level. Each floor has a surface height. (Extension). Our parliament building, which aims at expanding the Member of the Parliament, has higher capacity of Lok Sabha (900) and Rajya Sabha (450). Sitting in Parliament's buildings is arranged as never before and places a separate chair for each MP with effective space between chair as well as chair and bench. Each floor has 56 lounges in 5*9*13 dimensions for 3 to 4 guests with an annexed bathroom. The main hall has an area of 254.34 m2, continuing until the end of the

first floor. There are two conference halls in Block D, with an area of 280, in the ground floor.

Each unit is 12 square metres. For conference halls, a 10-inch wall thickness is provided. The museum is located in Block C and covers an area of 440.94 square metres. Block D houses the library, important rooms for the Lok Sabha and Rajya Sabha, and a separate room for the Prime Minister and the SPEAKER.
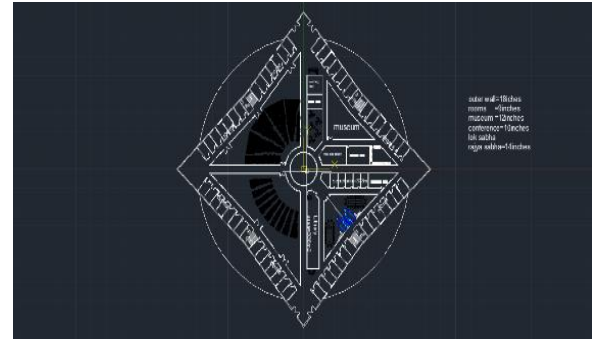

Fig-2 Ground Floor

Fig-3 First floor

Fig-4 Second floor

B. STAAD PRO

STAAD Pro is a software for structural analysis. The user interface, display tools and international design codes are included. It is used for generating, analyzing and designing 3D models. We used Snap grid to plan

the building in STAAD Pro, giving nodes at required points and attaching them as we desired. We planned a circular building in the centre, so we used curved beams. Later, using translational repeat, we raised above three floors with heights of 4.27m, 3.96m, and 3.96m, and below one floor with a height of 1m for plinth beams. Using Y t =1.5 as the partial safety factor for loads in accordance with IS-456-2000 clause 36.4. In accordance with clause 36.4.2, the partial safety factor for material is IS-456-2000, which is 1.5 for concrete and 1.15 for steel. Using partial safety factors in accordance with IS-456-2000 load combination clause 36.4.

We assigned several loads like dead, live, seismic. We mentioned this as an important building which is located in Agra.
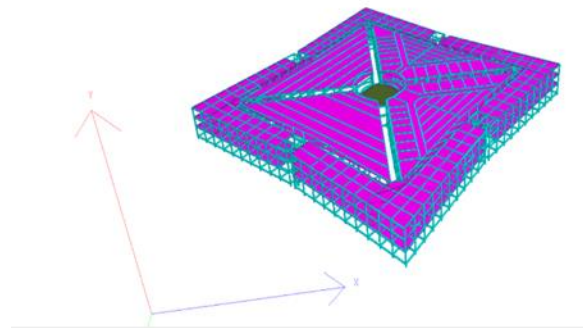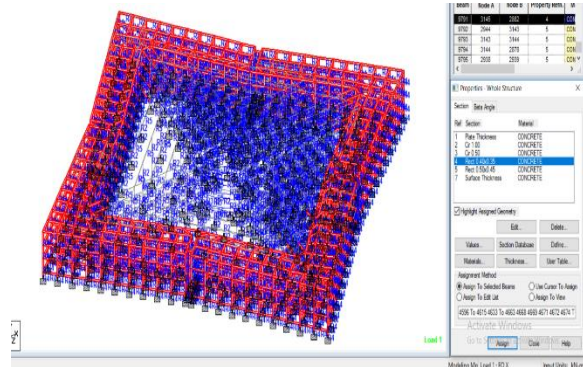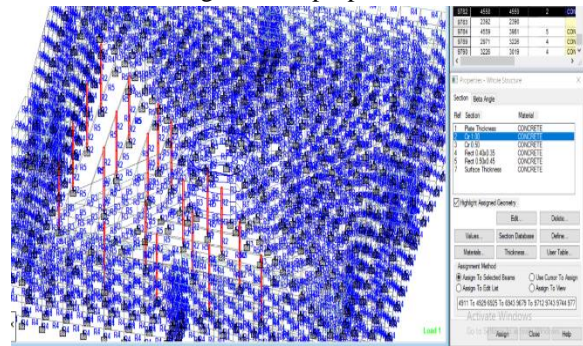

Fig-5 3D Rendering view

Fig-6 Beam properties

Fig-7 Column properties

Fig-8 Footing

C. ETABS

It is a piece of engineering software that specializes in multi-story building analysis and design. Modelling tools and templates, code-based load prescriptions, analysis methods, and solution techniques all work with the grid-like geometry that is unique to this structure type. ETABS can be used to evaluate basic or advanced systems under static or dynamic conditions.

Once the modelling is done, ETABS generates and allocates code-based loading conditions for gravity, seismic, wind and thermal forces automatically. Unlimited load cases and combinations can be specified by users. Analysis capabilities offer advanced nonlinear approaches for static pushover
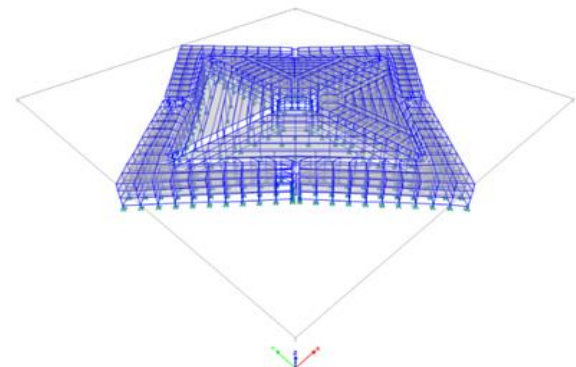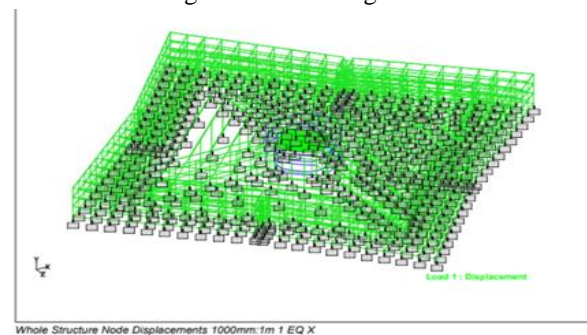

Fig-9 3D Rendering view
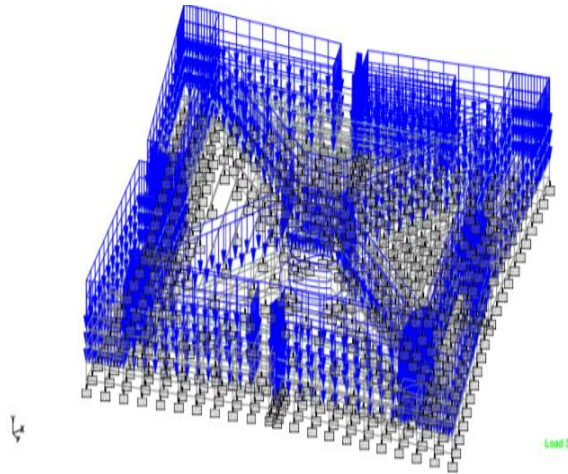

Fig-10 Whole structure.

Fig-11 Slab

and dynamic response characterization. This chapter provides model geometry information, including items such as story levels, points coordinates, and element connectivity.

III. COMPARISION BETWEEN THE FORMER AND THE CURRENT ONE

Former Parliament: The building of the House of Parliament began in 1921 and ended in 1937. It's nearly centenary. Over the years, there have been increased numbers of parliamentary activities have increased manifold. When the existing building of parliament had been conceptualized and constructed, it was not kept in accordance with bicameral legislature of independent India. , Parliament had 703 members- 499 in the Lok Sabha and 204 in the Rajya Sabha. The number of Lok Sabha members increased to 525 in 1973 and 530 in 1987, even though the limit was 500 and was fixed in 1956 via the Law on Constitutional Affairs. The Lok Sabha now has a total of 550 members on a business day (the current strength is 545).

Maximum legislator seating strength in Parliament	1927	1952	1966	1973	1987	2020
Central Legislative Assembly	341	.	.	.	.	.
Lok Sabha	.	501	.	547	552	550
Rajya Sabha	.	216	240	.	245	245

New Parliament: It is designed to be resistant to earthquakes and incorporates architectural styles from various parts of India. As the numbers of parliamentarians grow with the rising population in India and consequent delimitation of the future, it will provide for large chambers for Lok Sabha and Rajya Sabha that will accommodate more people than are currently present. By 2030, the Lok Sabha could need 900 members. The Lok Sabha Chamber will hold 900 seats and the Rajya Sabha Chamber 450 seats. According to the Lok Sabha document, incorporating cutting-edge technology with upgradeability, facilities for members to move seamlessly between houses, modern communication facilities, up-to-date safety norms, and adequate safeguards for natural disasters (New Delhi and surrounding areas follow earthquake Zone V regulations) will be high on the agenda.

IV. MATERIALS AND PARAMETERS

Bamboo-jute composite:
Bamboo fiber is cellulose fiber derived from natural bamboo. A mature bamboo plant expands, bamboo can grow to a height of 40m in six to eight months reach its full-size Bamboo fibers have recently gained popularity. more focus on the global market There are approximately, there are over 1000 species of bamboo recognized worldwide. This material is a good substitute for wood because it has a lot of potential for being processed into

Table-1 Mechanical and physical properties

Table 1A: Mechanical properties of bamboo and jute

Type of fiber	Physical properties		Mechanical properties						
	Density (g/m^3)	Diameter (μm)	Tensile strength (MPa)		Young's Modulus (GPa)		Specific Strngth (MPa/gm^{-3}) Ave.	Specific Modulus (GPa/gm^{-3}) Ave.	Failure strain(%)
			Ave.	M.I.[d]	Ave.	M.I.[1]			
Jute	1290[c]	29 – 52	380	152	25.2	7.1	293.2	18.1	1.38
Bundle of bamboo	809[b]	85 - 122	438	221	35.9	13.4	556.2	41.9	1.30

composites. Bamboo laminates can be used to replace wood in a variety of applications, including doors, windows, and their frames. Jute-coir is another excellent alternative to wood that can be effectively used in the production of doors. Water-resistant, corrosion-resistant, termite-resistant, eco-friendly, bio-degradable, and cost-effective, bamboo-jute composite doors take the lead water resistance, corrosion resistance, termite resistance, eco-friendliness, biodegradability, and cost effectiveness.

Fig-12 Bamboo-jute composite

Solar panels:
The photovoltaic effect, which explains how electricity can be produced from sunlight, was discovered in 1839 by Alexandre Edmond Becquerel. He said "shining light would generate electric currents on an electrode submerged in a conductivity solution." Light (photons) causes the surface of the material to emit electrons by striking certain compounds, in particular metals. When light strikes another compound, the material accepts electrons. Electrons will flow through a conductor due to the combination of these two compounds. The potential to directly supply our electricity with sun is enormous. Photovoltaic solar panels can produce power without waste or pollution once produced. This means that the natural resources of the earth are not dependent. They do not have moving parts, therefore modules are highly reliable and long-life. In addition, solar panels are quite simple to instal and maintenance is very low. Compare it with conventional forms of generation and maintenance of large-scale plants.

Since electricity is important in our daily lives. There is nothing without electricity. In order to reduce pollution we install solar panels, power consumption can even pollute the environment. as sustainable solar panels are used.
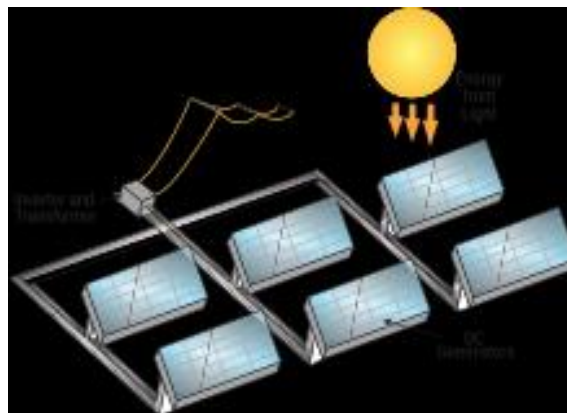

Fig-13 Solar panels

Digital library:
The on-line database of digitally composed objects, including text, images, audio, video, digital documents or other digital media formats, can also be called an on-line library, an Internet library, a digital repository or digital collection. Objects may include digital content such as printed or photographed material, as well as digital content originally produced such as word processor files or social media posts. Digital libraries provide, besides the storage of content, methods of organisation, research and retrieval of the contents in the collections. Traditional libraries are limited to storage areas. Digital libraries have much more potential to store information simply because there is little physical space required to store digital information. . Digital libraries might be ready to take on technological innovations that will provide users with improvements in the technology of electronic and audio-book books as well as the presentation and presentation of new forms of communication, including wikis and blogs. The increased user availability is an important advantage to digital conversion. It also makes it more accessible for persons who are not traditional bosses because of geographical conditions.

Technology:
The new information and communication technologies have created several new opportunities for forging instant connections between the electorate and their representatives, which can improve the effectiveness of representative democracy. Networking communication via e-mail, computer-assisted audio and video conferencing, online consultations, and so on, which is part of the larger concept of e-governance,

is gradually being adopted by Parliaments in their day-to-day operations. So, in both the Lok Sabha and the Rajya Sabha, we are making advances, including modern audio visual communication and data network facilities. As we all know, India is a country with over 720 dialects and 22 major languages written in 13 different scripts. The official languages of India are Hindi (which has approximately 420 million
spoken and accepted as an associate language.

Fine aggregate:
Sand is a naturally occurring loose, fragmented material composed of very small particles of decomposed rocks, corals, or shells. Sand is used in construction materials such as asphalt and concrete to add bulk, strength, and other properties. Sand grains are finer than gravel grains and coarser than silt grains. Sand can also refer to a textural class of soil or a type of soil, i.e., a soil that contains more than 85 percent sand-sized particles by mass.

Coarse aggregate:
There are many building materials which are used in the construction industry. Coarse Aggregate is one of the most important and massively used building material in the Construction Industry. Aggregate is one of the most important component parts of the concrete. Coarse Aggregates gives volume to the Concrete.

Steel structures:
In buildings and infrastructure, the possibilities to use steel are unlimited. The following are the most frequent applications. For construction. Structural sections: these provide a strong and steep structure for the construction and represent 25 per cent of the construction's steel consumption. Reinforcing bars: These add tensile strength and stiffness to concrete and account for 44 percent of steel used in construction. Steel is used because it adheres well to concrete, has a similar thermal expansion coefficient, is strong, and is relatively inexpensive. Reinforced concrete, which is currently the world's primary building material, is also used to provide deep foundations and basements.

Wood:
Wood, one of the most abundant and versatile natural materials, is the primary strengthening and nutrient-conducting tissue of trees and other plants. Wood

retains a place in the majority of its traditional roles, and its utility is expanding through new applications. Aside from well-known products like lumber, furniture, and plywood, wood is the raw material for wood-based panels, pulp and paper, and a variety of chemical products. Finally, wood remains an important fuel source in much of the world. Wood is an economically significant material. It is found worldwide and can be managed as a renewable resource sustainably. Regardless of which kind of wood you want, go to the seasoned wood. Seasoning is the drying process through which a piece of wood needs to be robust and furnished.

Jute:
The fibres are extracted from the stem's ribbon. The plants are harvested by cutting them near the ground with a sickle-shaped knife. The small fibres, 5 mm in diameter, are produced by retting in water, beating, stripping the fibre from the core, and drying. After millions of years of evolution, these fibres were designed to perform in a wet environment in nature. Nature is programmed to recycle jute back to its basic building blocks of carbon dioxide and water in a timely manner via biological, thermal, aqueous, photochemical, chemical, and mechanical degradations. It is important to interfere with nature's recycling chemistry at the centre and drying stages to maximise the use of jute fibre-based composites in harsh environments.
The above mentioned some of the parameters used.

V. CONCLUSION

The detailed study yielded the following conclusions:
PLANNING, DESIGNING, AND ANALYSIS OF A INDIA'S NEW PARLIAMENT BUILDING is the topic of this project. Our team members have learned how to design a building using the National Building Code of India. This construction project has required us to learn how to draw and drafting building plans using AutoCAD software, STAAD Pro, ETABS.
Many factors are important in the design and implementation of a proper and efficient building protection system. The architecture, quality of construction, and state of the building to be protected; the components to be included in the device (such as sensors and video monitoring); and the financial resources allocated for its design, implementation, and

maintenance are all factors to consider. To make it even more complicated, each building is unique due to differences in its architecture and design, the materials used in its construction, and the people who built it, as well as wear and tear. Until funds are allocated to implementing building security schemes, all of these considerations should be carefully considered. In this building project, we learned to use analysis to construct models by assigning nodes and properties to structural elements, as well as to simulate the same structure with corresponding loads as specified in IS 875 part 1&2.

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