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Planning & Design of Library Building for 100 Student Capacity

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ABSTRACT

The systems thing is to PLANNING & DESIGN OF LIBRARY BUILDING FOR 100 STUDENT CAPACITY" Layout of the structure or structure is always the first step in any construction design, followed by design and structural analysis. Using AutoCAD 2017, a layout plan for the proposed structure is created. The structure has a main bottom and two farther storeys. Planning is done in agreement with Indian standard law conditions. STAAD Pro V8i is utilised to assay the structure. The soil condition is used as the medium for the foundation's insulated footing design.

INTRODUCTION

New planning principles are needed to meet the changing requirements of the druggies of the library of the future. The digital revolution has changed the appearance of moment's libraries entirely. The maturity of moment's information coffers are of anon-physical nature and penetrating information is more varied and complex. The traditional part as asset keeper is one of numerous tasks moment. The lately completed exemplifications of Dresden and Göttingen State- and University Library, the Seattle Public Library and the Idea Stores in London, all of them largely popular and visited, show current trends in library design. We can also see how the armature and innards in libraries has changed during the time. New shapes, colors and generalities are employed in newest systems and interior results in different libraries each around the world. Also, for the safety of stoner's Civil masterminds are needed to use structural design to insure the safety and stability of the structure before they add in some creative designs into a structure for visual appeal. Structural designing is grounded on applying the principles of physical laws and mathematics into structure structures. Civil masterminds have to use structural design to dissect the structural design of the structure and the strength of different accoutrements used to determine its safety and provident specifications. And therefore, planning can be done using AutoCAD and analysis of structure.

LITERATURE REVIEW

"NEW ASPECT OF LIBRARY DESIGN" by Tina Hohmann

ACCESS AND ORIENTATION: Access to the library should be easy as possible and media should be straight forward and easily accessible to everyone. Clear patterns of circulation, of architectural and spatial legibility, and the coherent and attractive signage are all means to help the first-time visitor to find whatever he is looking for while less frequented areas such as individual reading and studying are further away from the entrance. Team working can take place in open areas or in study rooms of different sizes. Help desks in strategic places provide orientation points for the visitor. MULTIFARIOUS SPACE: The future library provides zones specific to subject and user working types. The use of wireless networks (LAN) provides access to electronic resources throughout a building, so users can make use of all types of medias in the same place. Public highly frequented areas are close-by the entrance, like the issue desk and the library catalogues. More specialized areas that are less frequented are situated in less accessible areas. Different floor must contain different types of media like journals and catalogues on first floor, history books on second floor likewise And Hall must access to the all the units of building. COMFORT: A comfortable and attractive interior supports concentration and motivation of users and staff. CLIMATE: Climate conditions comprise temperature, humidity, airflow, and thermal radiation. In library climate conditions are a compromise between the ideal conditions for books and people working. Printed material slowly deteriorates when the temperatures vary, humidity is too high and there is too much direct sun. This is why the book stack is ideally situated underground, where temperature conditions are consistent.

Towards a better Design: Physical Interior Environments of Public Libraries in Peninsular Malaysia by Suhaila Sufara, Anuar Talibb & Haris Hambalic

The paper was focused on how to create a better design of physical interior environments in public libraries in Malaysia. The research was consolidated on the interior ambiences caused by selection of lightings, furniture, materials and finishes of public libraries. Suhaila and his mates studied the old library

requirement as well as current library requirements and compared them to give suggestions for the new library buildings. Effects of physical environment to create interior. The researcher also found that there are some aspects that affect emotions, mood and user's experiences. It also influenced human behaviors and perceptions through aspects of ambient, aesthetics and ergonomic factors. Those aspects affect users to come back to the library, to stay longer and find that the library is a fun and exciting place to explore and visits.

"Interior Design Of National Library With Environmentally Sustainability Materials" Hartini L, B Wibawa, R Situmorang, Raissa F

The study was conducted with a design process with methods focused on functions and positive design. Environmentally friendly interior materials are developed on interior elements, especially on partition walls, ceilings and room decorations. Used wood container developed for interior elements after finishing will give a beautiful natural impression, library visitors can enjoy the created natural atmosphere. Utilization of used wood containers in the national library can introduce and make people aware of the nature preservation, not wasteful, minimizing tree felling. The meaning to be conveyed has a meaning that is closely related to environmental care and greening the earth. Applying Eco-friendly Materials such as: wood, bamboo, straw, rattan, Materials from Hempcrete, Materials from Mycelium, Ashcrete Building Materials. Straw Bar material, a natural material used as an environmentally friendly material, especially for walls. Straw stalks that are used to replace brick, wood, or gypsum walls turn out to be able to produce excellent insulation when arranged properly. Straw is also relatively inexpensive and sustainable because it can grow quickly in nature. Straw also has benefits as a good heat insulator and serves as a silencer, will not feel hot easily. Bamboo material, a wood substitute material that has been used in several countries for thousands of years. Bamboo material is also increasingly popular to be used as building material because of its strength that is able to deal with heavy loads besides being environmentally friendly. Although known for its strength, bamboo still has light weight and is very fast growing in nature. Bamboo can also be an earthquake resistant building material.

Design of a Six Storey Building by Dr. H. J. Shah and Dr. Sudhir K Jain

Dr. H.J. Shah and Dr. Sudhir K. Jain has manually designed and analyzed the six-storey building considering IS codes. The building was located in seismic zone III on a site with medium soil. Design the building for seismic loads as per IS 1893 (Part 1): 2002.They introduced each load including seismic loads acting on structure. They have been enrolled different loading combinations for various types of loads like LL, DL, WL etc. They explained the way of calculating Shear and bending are done separately which are main causes of failure of buildings hence they encountered every check required for safety of building. They have been also described design of flexural reinforcement for columns, Beams, and floor slabs. From this study of design of multistorey building we can conclude the manual calculations and analysis of building.

Structural Analysis and Design of Commercial Building for Earthquake Resistance by Binod khadaka

It is one of the dominant constraints while designing the frame building in the earthquake prone zone like Nepal. Earthquake is a natural phenomenon as old as the history of the earth itself and is considered to be most unpredictable one among all other natural disasters. Now a days, designers and engineers are giving more emphasis towards the earthquake resistance while analyzing and designing any structure to minimize the seismic impact.They have been worked on structural analysis of the building. The research has been prepared in complete conformity with various provisions in Indian Standards as Code of practice for plain & reinforced concrete IS 456-2000; Code of practice for Design loads IS 875 (Part 2)-1987: Design Aids for Reinforcement Concrete (SP 16) IS 456-1978; Handbook on Concrete Reinforcement and Detailing SP 34 (1987) are thoroughly referred for proper analysis, design and detailing of structural elements viz. beam, slab, column, staircase, foundation, basement wall, lift and shear wall with respect to safety, strength, stability, ductility & economy in addition to adequate serviceability requirements of cracking and deflection in concrete structures. All the codes are based on the principles of limit state of design. This contain analysis results, load calculations, architectural drawings, structural drawings and sample calculations of various structural elements and their detailing as well.

To Study Analysis and Design of Multi-Storey building using STAAD-pro. and Comparing with Manual Calculations by Khushal yadav, Rashmi Agashe, Marshal Baghele, Vaishanvi Deshmukh, Sharad Khomane, Gaurav Patle

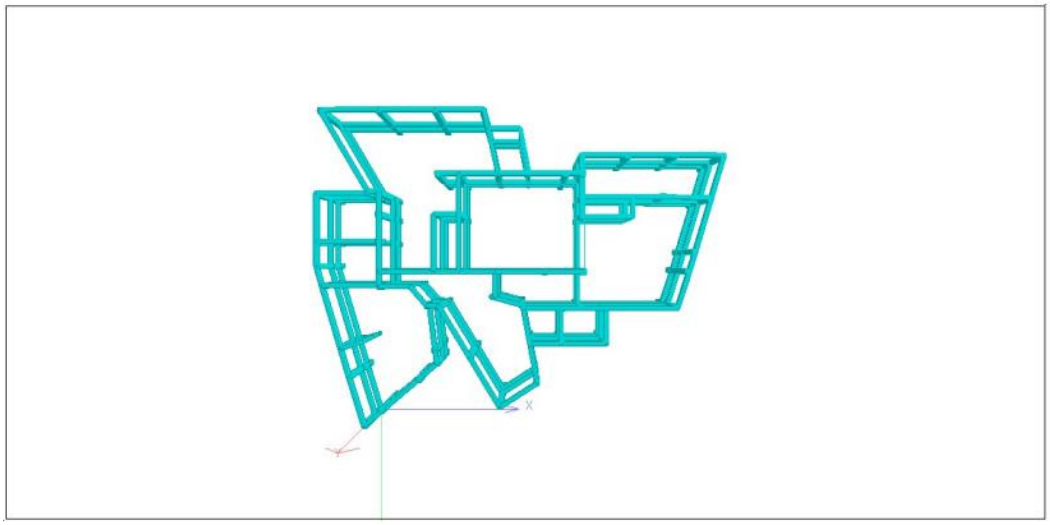
Frame analysis was by STAAD-Pro. Slab, Beams, Footing and stair-case were design as per the IS Code 456-2000 by LSM. The properties such as share deflection torsion, development length is with the IS code provisions. Design of column and footing were done as per the IS 456-2000 along with the SP-16 design charts. The check like one way shear or two-way shear within IS Code provision. Design of slab, beam, column, rectangular footing and staircase are done with limit state method. On comparison with drawing, manual design and the geometrical model using STADD Pro. Also manual design has been done by them and later comparison between them is concluded in which they found that the design using manual calculations and with stadd pro, differs from each other. But designing using stadd pro was easy and quick.

OBJECTIVE AND SCOPE

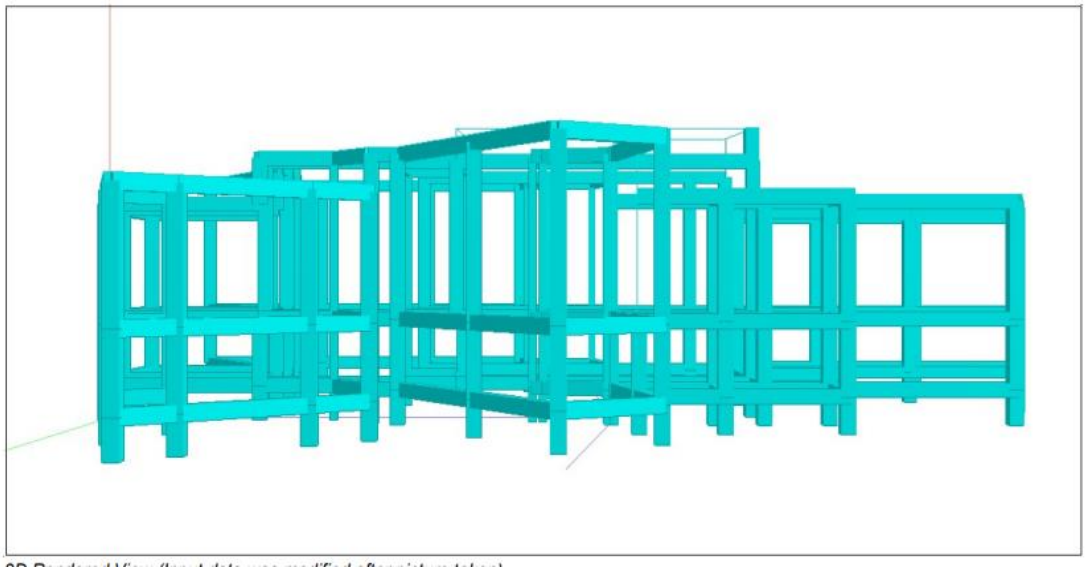
The study will give precious perceptivity into the design process and help masterminds to make informed opinions when designing structures. This study will give difference between homemade designing and stand pro design. To compare the results attained from the software's and homemade computations.

METHODOLOGY

Comparison between Manual & software affect Preparation of erecting layout using AUTO- CAD Analysis & design of library structure using Staad. Pro Analysis & design of library structure by manual computation.



3D Rendered View (Input data was modified after picture taken



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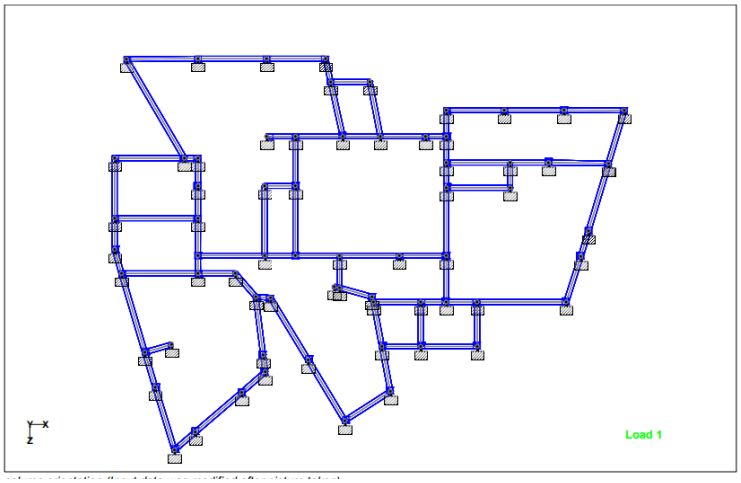

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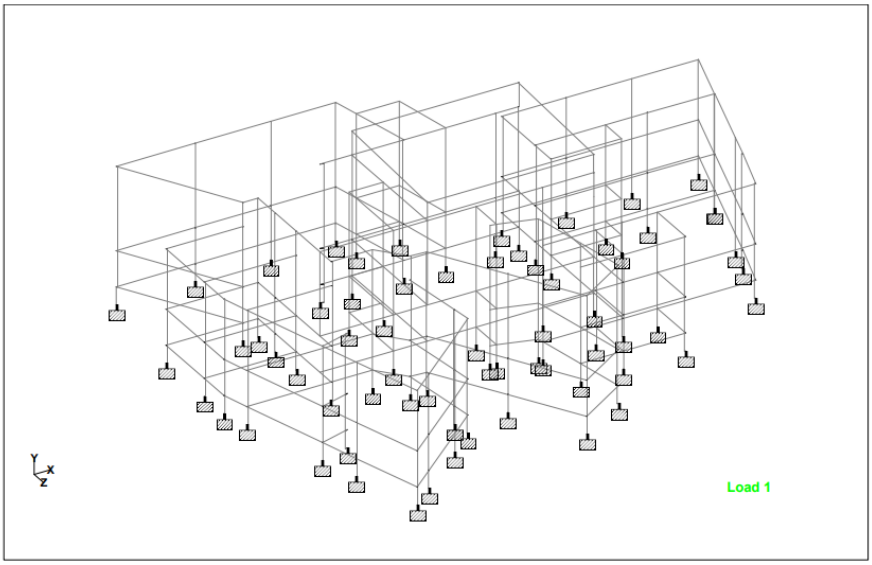
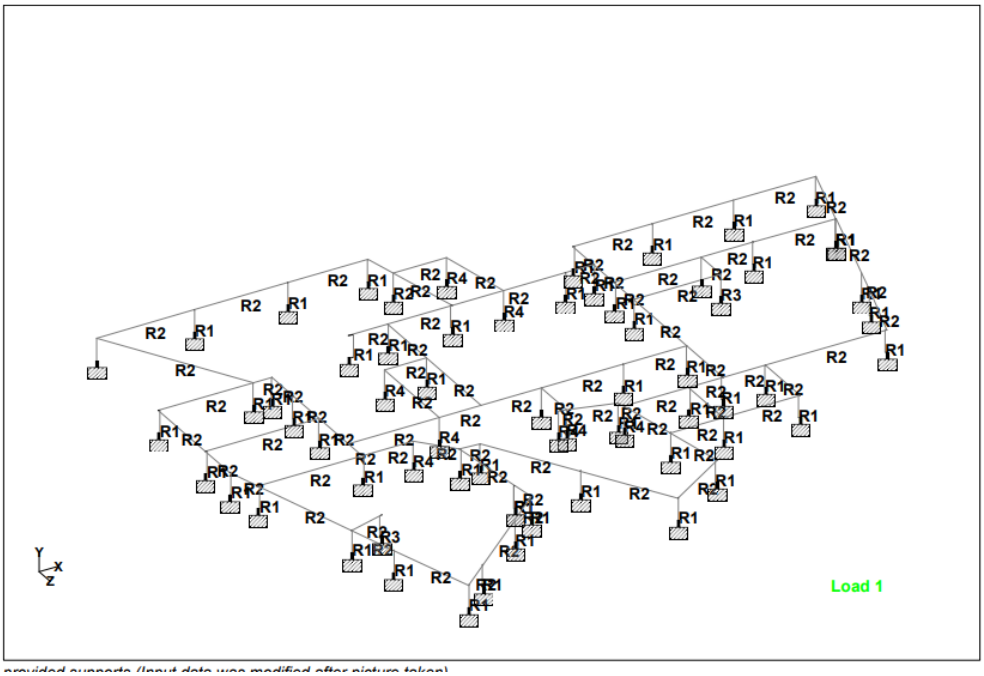


Analysis (Input data was modified after picture taken



provided supports (Input data was modified after picture taken)

EQUIPMENT AND MATERIAL

Civil Engineering software's:-

AutoCAD: - For drafting and detailing of planned structure.

STADD PRO / E-tabs :- For analysis of designed structure.

Cost-X/ Excel: - For estimating project cost.

3DX-MAX:- For Different perspective views of Designed building.

IS CODES: -

IS 456- 2000 – code for RCC

IS 875 (Part 1 to 5) : 1987 – code of practice for design loads

IS 2751 : code for Steel Structure

BOOKS:-

Reinforced concrete structure B.C.Punmia

RESULTS

Comparison between Manual & software

Table 1 : difference between reinforcement details between stadd pro and manual calculation

Sr. no.	Reinforcement details	
	By stadd pro.	By manual calculatios
1. Slab	At MIdspan – 10mmØ @ 130mm c/c At Supports – 10mmØ @ 110mm c/c Distribution reinforcement – 8mmØ @ 210 c/c	At MIdspan – 10mmØ @ 120mm c/c At Supports – 10mmØ @ 150mm c/c Distribution reinforcement – 8mmØ @ 300 c/c
2. Beam	Top - 3 Nos of 12mm@ 214 mm c/c Shear rein. – 10 mmØ @ 150mm c/c Bottom – 6 Nos. of 20mm @ bar 40mm	Top – 4 Nos of 12mmØ bar @ 230mm c/c Shear rein. – 8mmØ @ 125mm c/c Bottom – 6 Nos of 20mmØ @ 214 mm c/c
3.Column	Top - 3 Nos of 12mmØ bar Bottom – 3 Nos. of 12mmØ bar Distribution steel – 2 legged 8mmØ bar @ 190 mm c/c	Top - 3 Nos of 12mmØ bar Mid – 2 Nos of 12mmØ bar Bottom – 3 Nos. of 12mmØ bar Distribution steel – 2 legged 8mmØ bar @ 175mm c/c

Table 2 : difference between Area of steel calculation between stadd pro and manual calculation

AST calculations →	Stadd pro Ast calculations (mm2)	Manual Ast Calculations (mm2)
1.slab	Ast Required =748.64 Ast Provided =760.34	Ast Required = 751.01 Ast Provided = 806.24
2. beam	Ast Required =403.75 Ast Provided =452.38	Ast Required =403.76 Ast Provided =450.20
3.column	Ast Required = 900 Ast Provided =904.78	Ast Required = 900 Ast Provided =904.78

CONCLUSION & DISCUSSION

In the present study structure of two story is designed and analysis with its(Crossbeams, shafts, Columns and Footings and staircase) using software like(Auto CAD, MD solid, Excel, and Stand Pro). The loads are calculated videlicet the dead loads which depend on the unit weight of the mate ls used(concrete, slipup) and the live loads using the law. The safety of corroborated concrete structure will depend upon the original architectural and structural configuration of the total structure the quality of the structural analysis, design and underpinning detailing of the structure frame to achieve stability of rudiments and their ductile performance. Proper quality of construction and stability of the infill walls and partitions are fresh safety conditions of the structure.

The advantages of using computer program is briskly to analysis the structural element and time consuming

In this design we design and analysis of Multi story structure using the equations to design and analysis and solving. So that this design takes a long time for working the equation of design. But to save time by using a computer software program, which takes the inputs of design and carried out the computations fluently and snappily so that we saved time and insure that the design was correct.

From compare the results between hands calculate and the program we find that:

The programs veritably presto so that the results show according a nanosecond while the hand calculating take a long time.

The degree of agreement of the results with the program is good.

delicacy of the results depends upon the inputs delicacy It's veritably easy for stoner while the hand calculate should be have further information for arbor design and be more accrue in calculate

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