

Design of Auditorium for College Campus

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Abstract— This project deals with the analysis and design of the Auditorium of "Dilkap Research Institute of Engineering And Management and studies" with special emphasis on Slabs, Beams, Columns, Footing and Staircase. Concrete mix used for the RCC members is M20 and steel used is high yield strength deformed bars of grade Fe415. Limit State Method is adopted for the design of all structural members in the building. Safe bearing capacity of soil is taken as 200kN/m². Footing is designed as Isolated type. Plan and detailing of reinforcement are enclosed in this report.

Key words: Auditorium, College Campus

I. INTRODUCTION

A. General Introduction

"An Auditorium is a room built to enable an audience to hear and watch performances at venues. Auditorium hall can be found in amusement scenes, group corridors, and theaters, and might be utilized for practice, introduction, performing expressions, preparations or as a learning space.

"An Auditorium can also be defined as an enclosure; covered or open, where people can assemble for watching a performance given on stage."

An Auditorium structure can be used for commercial as well as educational purpose. Auditoriums have a wide classification based on the requirements of shape, height, space, seating, acoustics, lightings, safety, design criteria, etc.

B. Objectives

- Seating is done by considering acoustic.
- The design of an auditorium with a large span with considering safety.
- To analyze the frames in auditorium building.
- To design the structure component of building.
- To prepare detailed design of the work carried out.

II. PLANNING OF PROPOSED AUDITORIUM

A. Location Study:

The location of proposed site for the auditorium in campus of "Dilkap research Institute of engineering And Management Studies"

Site Area :- 1050 m²

Longitude: 19.0143° N

Latitude: 73.0384° E

B. Population Survey:

According to the population survey carried out in the college campus revealed us an approximate population of about 1000 including students, teaching staff and non-teaching staff.

C. Geodetic survey:

According to the collection of soil samples by core cutter method:-

The safe bearing capacity of soil sample was found out to be 200 KN/M².

D. Soil Type:

According to the collection of soil sample the soil type is 'clayey soil'.

III. METHODOLOGY

A. Limit State Method (LSM):-

The acceptable limit for safety and serviceability requirement before failure occur is called limit state. The point of configuration is to accomplish satisfactory probabilities that the structure won't end up unfit for utilize. All relevant limit state shall be considered in the design to ensure adequate degree of safety and serviceability.

Types of limit states methods:-

- Ultimate Limit State: It manages weariness, quality, toppling, sliding and so on.
- Serviceability Limit State: It considers crack width, vibration, deflection, etc.

It utilizes progressively numerous Wellbeing Variables for the required security and serviceability at a definitive load and working burden separately by considering all point of confinement states. This is called "Partial Safety Factor".

There are 2 types of Partial Safety Factors in Limit State Method of Design as follows:

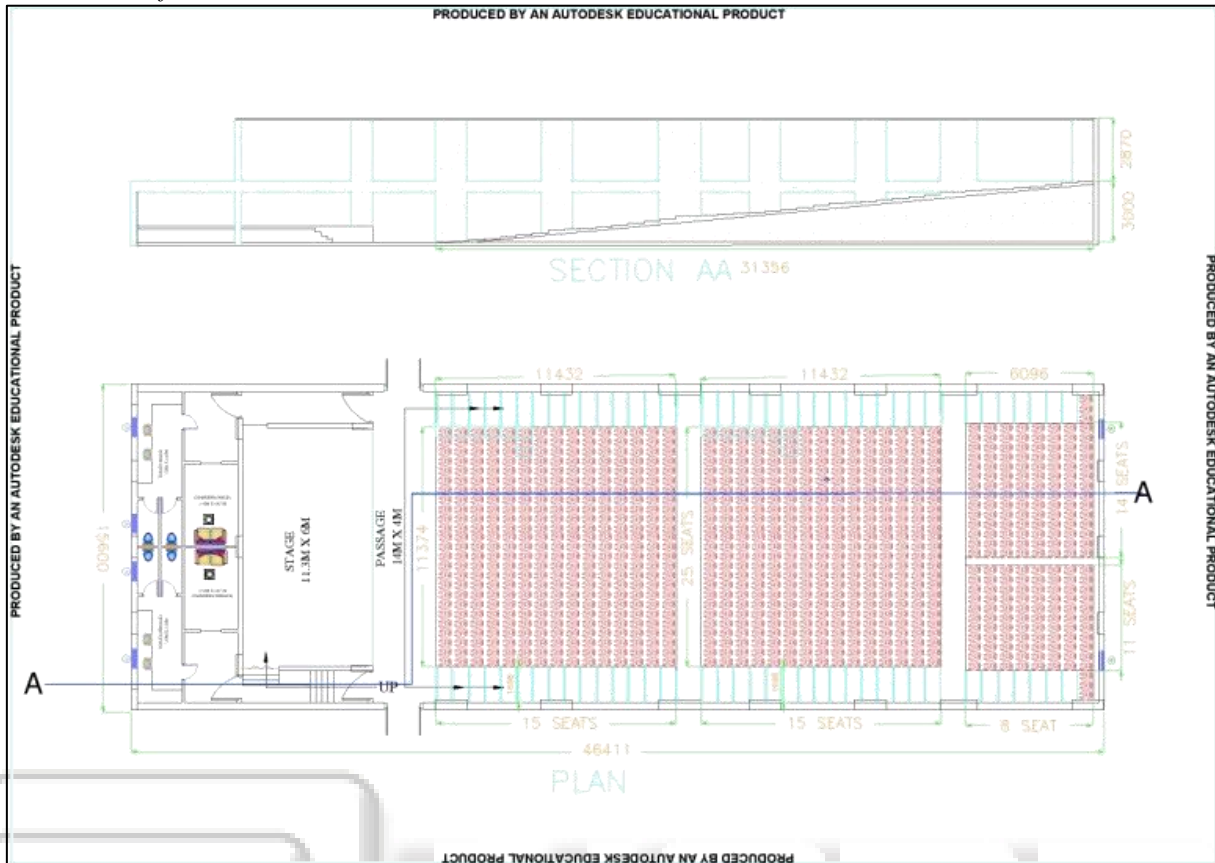
- 1) Partial Safety Factor for *Materials*.
- 2) Partial Safety Factor for *Loads*.

IV. DESIGN

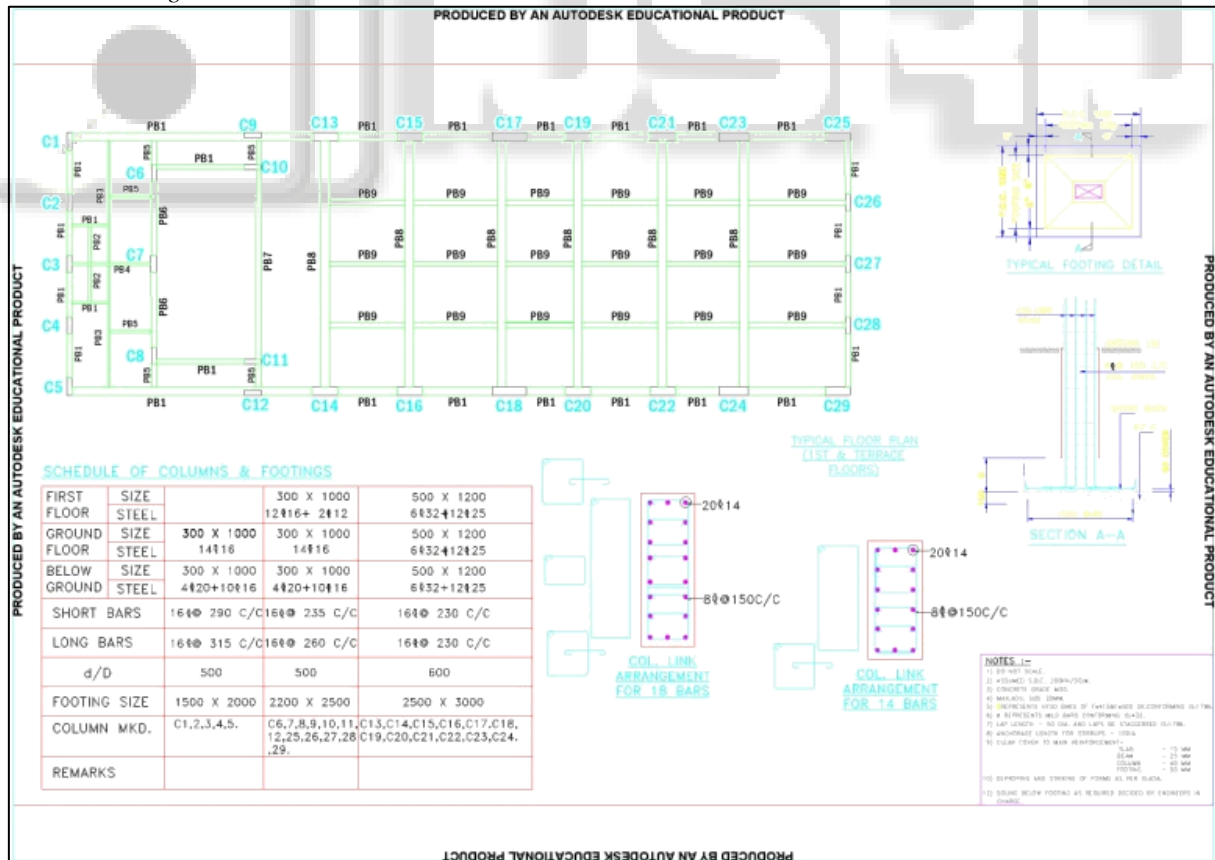
A. The Auditorium was Designed using AutoCAD Software and Loadings were applied using eTabs.

Following are the details of design:-

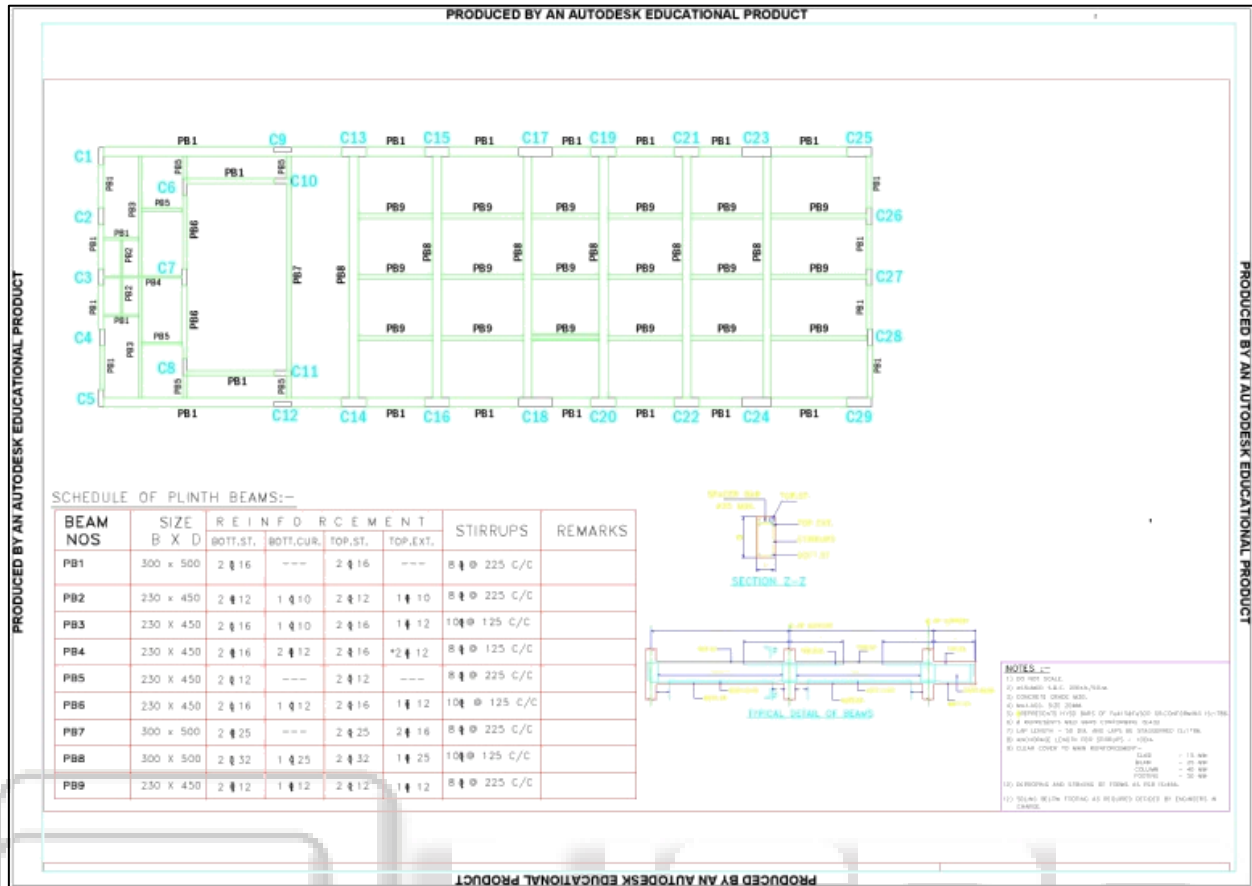
1) Plan & Section of Auditorium:



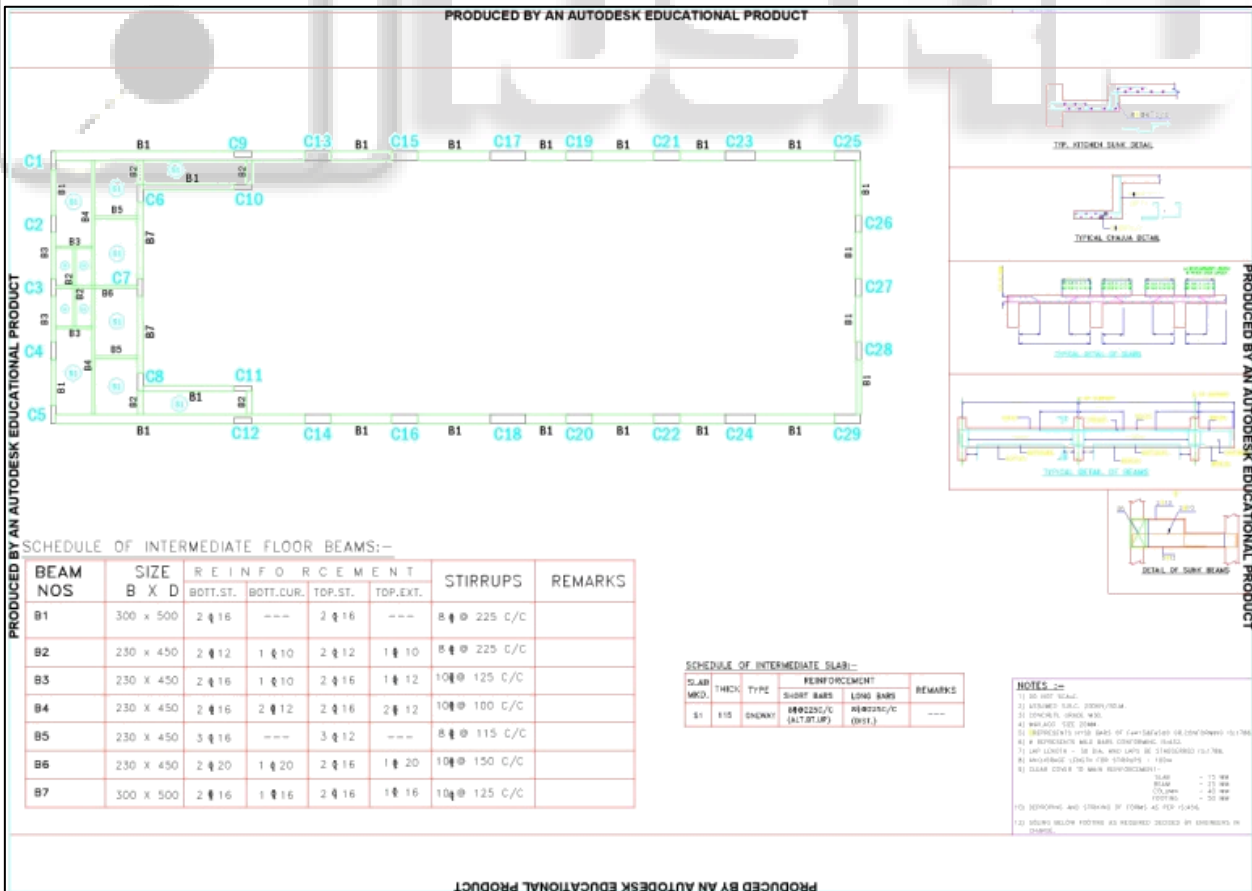
2) Column & Footing:



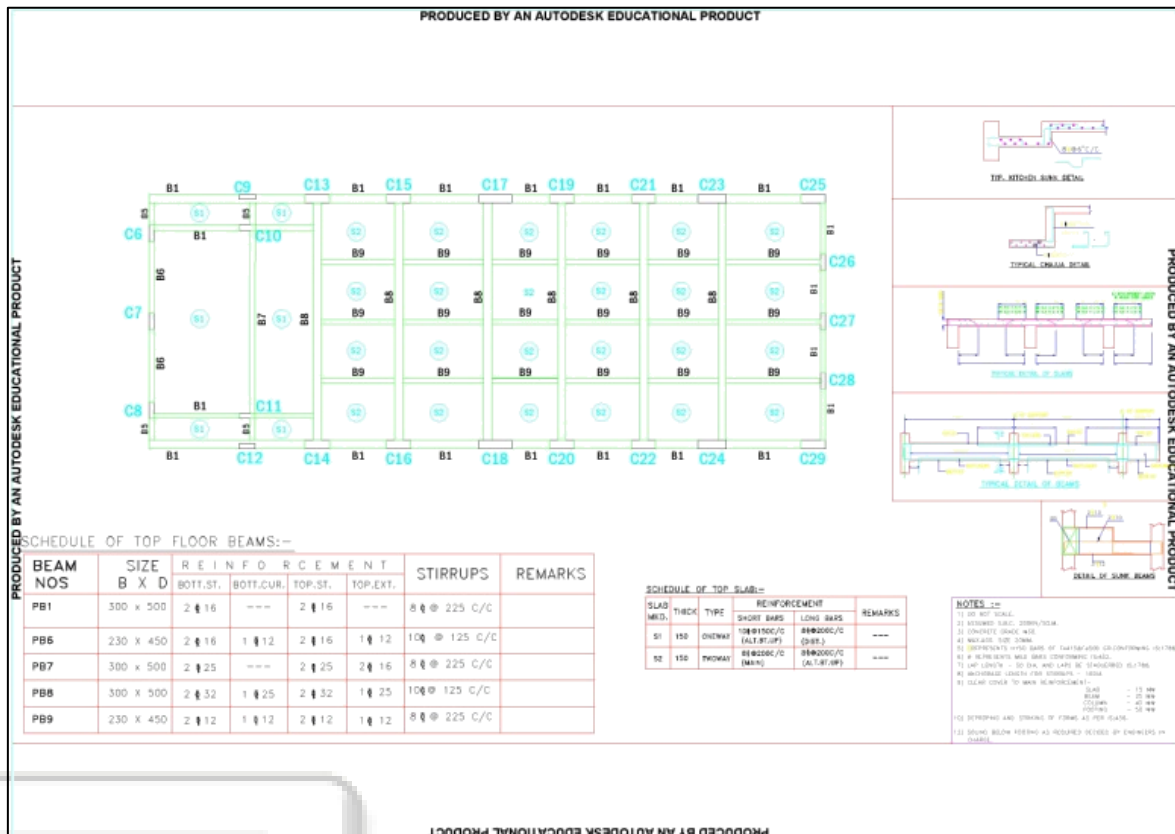
3) Plinth Beam:



4) Intermediate Floor Beam:



5) Top Floor Beam:



V. CONCLUSION

The analysis and design of the structural components of the college auditorium envisaged planning for each floor of the building with detailed analyses of Beams, Columns, Slabs and Stairs. Isolated footings for Columns were considered. This work tosses an understanding into the basic segments of the proposed Auditorium which will be built soon.

REFERENCES

- [1] “Advanced Reinforced Concrete Design”, by N.Krishna Raju.
- [2] IS:875 part , “Code of Practice for design loads for buildings and structures – Dead Loads”.
- [3] IS:875 part , “Code of Practice for design loads for buildings and structures – Live Loads”.
- [4] IS:875 part , “Code of Practice for design loads for buildings and structures – Wind Loads”.
- [5] IS:456-2000, Plain and Reinforced Concrete - Code of Practice”.
- [6] “Design of Concrete Structures”, by Shah.