DESIGN AND ANALYSIS OF MULTI-STOREY PARKING

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ABSTRACT

The population of the world is continuously on the increase and town and cities have grown up around their public transport system. The increasing population and expanding urban centers have been accomplished by increasing car ownership and increasing demand for movement for various purposes. Multistorey parking has come with a number of reliefs since they come with a no. of advantages such as optical utilization of spaces, for comfort for driver since the stress of struggling for parking space is taken of, more security and environmental harmony. This research present the design of a multi-storey car park for the mitigation of traffic challenges in public areas using various case studies. Various design aspect which are considered are arrangements of deck and ramp, planning the dimensions, the bay width, aisle width, ramp dimensions, planning grid, alignment paths to exit barriers, means of escape distances, travel distances from the car to the destination, security, visibility, space allowances and lift provision

Keywords: Multi-Storey Car parking, STAAD Pro, Manual calculation, Design, structural parking.

I.   INTRODUCTION

The number of vehicles on the campus ground has been increasing at an alarming speed. This has created a high demand for a parking space on the campus ground. Notably, the campus requires spacious parking for the even-increasing number of automobiles on the compound. In addition, the existing parking yard should be well marked to ensure that car owners park their cars neatly without overlapping. This has been a great problem where some cars owners park their automobiles in two parking spots. An improvement in the parking on the campus. They include staff and students at the campus. A parking improvement will enhance parking efficiency at the campus.

II.   METHODOLOGY

The study initiates with the measurement and calculation of the area or the site that is to be used for the construction of multi-storey parking. The site selection was done depending upon the vehicular traffic that may exist over a day in peak. Over a peak day/time, it was observe that the maximum number of vehicle that may be present together in the campus may vary from 100-150. For the above observation, depending upon the area of the site required, the site that was finalized for the construction of the parking system was the empty slot behind the CSE block of our institute. The area considered for parking structure measures 1225 m^2 i.e. 35mx35m. Structure constructed for (G+3) with a capacity of 45 vehicle per floor.

III.   MODELING AND ANALYSIS

Model and Material which are used is presented in this section. Table and model should be in prescribed format.
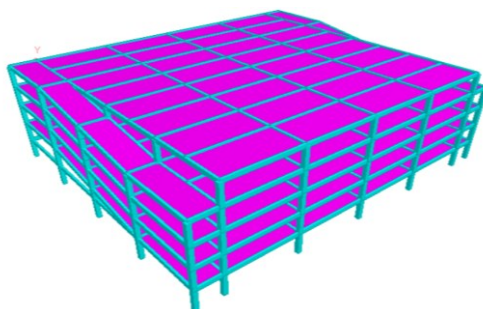
Figure 1: 3D view of building.

IV. RESULTS AND DISCUSSION

- The Multi Storied Car parking Building was designed as G+3.
- All the standards values were taken from the reference Codes to facilitate maximum utility.
- Column size as compare to large span of structure as Column (0.45 m x 0.45m) also Beam (0.23 m x 0.55 m) & Slab thickness 0.175m.

Table 1. Max Values of forces

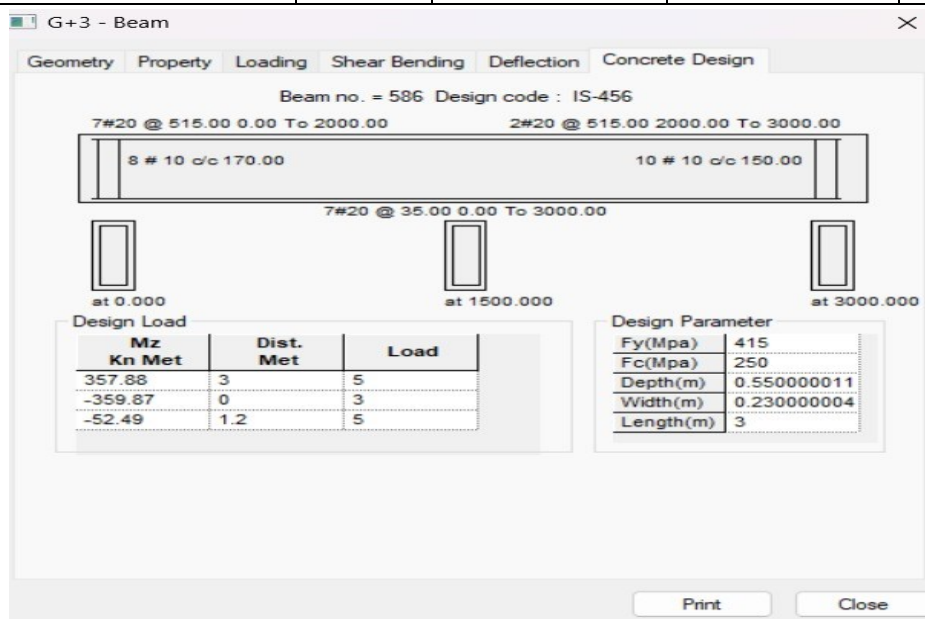| S.No.	Analytical Properties		Beam No.	Node No.	Max Value
1.	Axial Force (Fx)		200	121	9112.272 KN
2.	Shear Force (Fy)		586	271	248.230 KN
3.	Shear Force (Fz)		46	24	73.647 KN
4.	Bending Moment (My)		46	29	134.145 KN
5.	Bending Moment(Mz)		586	271	359.869 KN
6.	Displacement		-	272	0.667 mm

Figure 2: Concrete Design of beam no. 586

V. CONCLUSION

As the Designed Structural Components are Safe. There is No Error in Analysis in STAAD.PRO.

VI. REFERENCES

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[3] Complete G+1 building design by STAAD Pro software with IS 456 2000 code by Shravan Civilbasics123.com.

[4] National Building Code

[5] IS 456:2000

[6] IS 875 Part 1 Dead Load Part 2 Live Load

[7] SP:16 Design aid for Reinforced concrete to IS 456