



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

IJIRSET

International Journal of Innovative Research in
SCIENCE | ENGINEERING | TECHNOLOGY



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 11, Issue 7, July 2022

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 8.118



9940 572 462



6381 907 438



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Comparative Study of Direct Design Method and Etabs-18 with and Without Interior Beam

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ABSTRACT: Chunks are the ground surface systems of most developments including office, business and confidential designs, ranges, sports fields and various workplaces building. The guideline components of sections are all around to convey gravity powers, similar to loads from human weight, items and furniture, vehicles, and so on. In present day structure plan particularly for raised designs and basement structures, areas as floor stomachs assist in contradicting external sidelong exercises with enjoying breeze, seismic quake and equal earth load. The piece directly lays on transmits or the part and weight from the chunk is clearly moved to the points of support and portions and a while later to the foundation. To assist significant weights the thickness of chunk with shutting to the assistance with the portion is extended and these are called drops, or fragments are overall gave intensified heads called section heads or capitals. Nonappearance of shaft gives a plain rooftop, likewise giving favored primary appearance over in typical circumstances where bars are used.

Arranging of pieces depends on whether it is a solitary course or a two way segment, the end conditions and the stacking. The arrangement cooperation of essential orchestrating and setup requires imaginative brain and applied allowance as well as sound data on investigation of fundamental planning other than the data on logical points, for instance, continuous arrangement codes, bye regulations, maintained by sufficient experience, sense and judgment. The inspiration driving standards is to ensure and work on the security, keeping mindful congruity among economy and prosperity.

KEYWORDS:SAFE Programming, Multi-storey Building, Slab

I. INTRODUCTION

Chunk, even more precisely strong Slab is a regular basic part of current design. That is typically level and has more humble thickness comparable of its reach. Pieces are used to furnish a level and significant surface in developed strong turn of events.

Shaft is an essential part that is good for enduring burden fundamentally by restricting curving. The bowing power impelled into the material of the supporting in view of the external weights, own weight, length and outside reactions to these stacks is known as a winding second. Shaft are depicted by their profile (condition of cross-region), their length, and their material. Moving the piles from chunk to the slab a fundamental part evolved. Chunk on Beam can work at all levels. It moves weight to emanate and a while later on to the fragments. This can ensure differential settlement subject to one point. The basic advancement cost is higher than chunk on grade considering the way that formwork at the section underside and the help to join shaft and piece is required.

II. LITERATURE REVIEW

- MohdRizwanBhina, Arnab Banerjee, D.K.Paul 07 October (2014) This paper worry with Different part of level section working over an ordinary structure . in this paper we consider the three story working with level or customary section by performing static examination on the 3 story working by utilizing Indian is 456 and euro code we reason that Indian code recommend greater support and firmness as contrast with euro code. by performing reaction range examination we get that structure with level section is more adaptable as contrast with working with regular chunk.
- B.Anjaneyulu, K Jaya Prakash vol. 04,issue 02 feb(2016) level section enjoys more benefit than the ordinary chunk it give more primary security to the structure and give the tasteful view to the structure. For planning motivation

behind level piece we can utilize post tensioning as well as traditional support concrete. The expense of post tensioning for planning level piece is higher than the supported substantial plan. Plan of ordinary supported concrete level plate/chunk in India, using Indian codes, has numerous weaknesses, which must be tended to and changed soon.

- S. N. Utane, H. B. Dahake Volume 5, Issue 2, March (2016) when we look at a modern design developed by involving waffle framework and level section framework in a square and rectangular format the removal is more on the off chance that level chunk than the waffle framework. As we increment the level of design, uprooting is additionally increments. Story shear of the modern design is additionally more in level piece framework than waffle framework.
- VinodGoud; Vol. 06, Issue 09 (Sep. 2016), This paper worry on the Analysis and Design of Flat Slab with and without Shear Wall of Multi-Storied Building Frames .by this paper we reason that worth of story float doesn't surpass admissible cutoff for example 0.004 times the story level. In the event of level piece with shear wall the thickness of the structure changes with the story level. Also, the surface shear and twisting pressure expansions in 10 to20 story building and diminishes in 20 to30 story building. Also, the von mis stresses at top and base expansions in both the case with and without shear wall.
- Mohit Jain, Dr.Sudhir S. Bhadauria, Danish Khan Volume-5, Issue-10 (2016) In this paper level section framework is contrast and wide shaft framework. In this paper we consider the modular of 4 story building. Also, dissected under gravity and seismic burden we reason that deformity in the structure are less in the event of level chunk framework contrast with wide shaft framework. At the point when we perform direct static investigation under gravity load this is expected to when we utilized level chunk the heaviness of injury is diminished. From the seismic examination it is seen that parallel twisting of similarly bigger size has been seen in the event of level section. This is because of lessening in sidelong firmness.

III. METHODOLOGY

The endeavor works is stressed over the assessment and plan of different chunks with emanates between inside supports and sections with edge shaft. Examination of chunk using programming for example ETAB-18. A hand assessment used (method II and direct arrangement system for assessment of piece and difference it and PC program) to show that the safeguarded program is faster and less difficult for game plan than the others procedure. A PC program for the arrangement of developed strong two-way pieces made by rule worksheet used for plan the section by method II and direct arrangement technique.

1. To use Autocad to draw the floor plan and the nuances.
2. To use Microsoft EXCEL to work with the estimations.
3. To use Safe group for the assessment of Multi story building.
4. To familiarize with ACI Code and various codes.
5. To use Reinforced strong arrangement Suite for the arrangement of sections, transmits, portion.

ETABS is a specific explanation PC program developed unequivocally for building structures. It outfits the essential expert with all the devices vital to make, change, analyze, plan and advance construction models. These component are totally planned in a singular. Windows based graphical UI that is unrivaled to the extent that convenience, productivity and limit.

The innovative and moderate new ETABS is a conclusive facilitated programming pack for the essential examination and construction of designs. Uniting 40 years of interminable imaginative work, this latest ETABS offers unmatched 3D item based exhibiting and discernment instruments, blazingly speedy straight and nonlinear precise power, present day and broad design capacities with respect to a wide extent of materials and insightful sensible grandstands, reports and schematic drawings that license client to quickly and successfully decipher and get assessment and setup results.

From this start of design beginning through the making of schematic drawings, ETABS organizes each piece of the structure arrangement process. Arrangement of models has never been easier instinctual drawing orders think about the fast time of floor and level surrounding. PC supported plan drawing can be changed over honestly into ETABS models or used as a configurations onto which ETABS articles may be overlaid.

IV. RESULTS AND DISCUSSION

Slab (work 9) CSI SAFE Analysis and Design of Slab:

Plan of two path chunk with no edge bar with inside section of 400*400 mm and outside segment of 300*300 mm and live heap of 3 kN/m², very forced dead burden =3 kN/m² use f'c=28 MPa and fy 420 MPa.

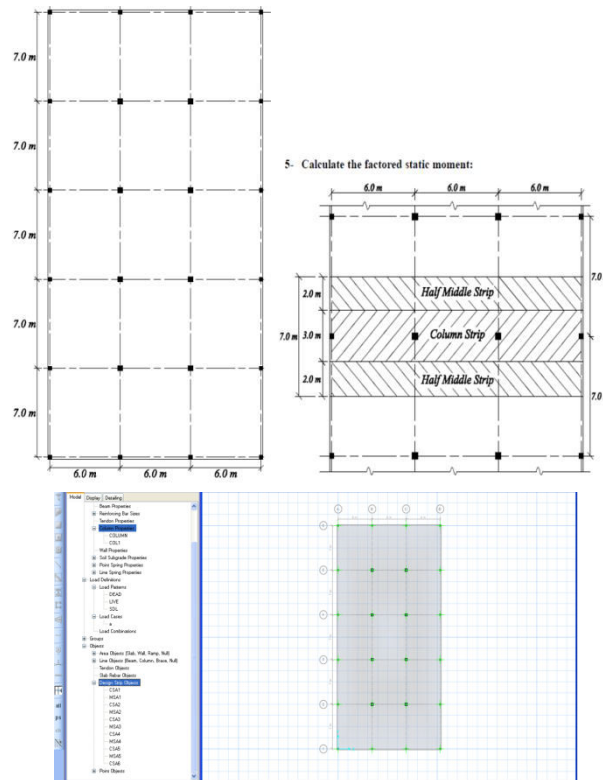


Figure 1:- slab span and dimensions.

- Calculate the slab thickness:

$$l_{n1} = 700 - 20 - 15 = 665 \text{ cm}$$

$$l_{n2} = 700 - 20 - 20 = 660 \text{ cm}$$

$$l_{n3} = 700 - 15 - 15 = 670 \text{ cm}$$

For flat plate with no edge beams, minimum slab thickness

$$h_{min} = \frac{670}{30} = 22.33 \text{ cm, taken as } 22 \text{ cm.}$$

- Calculate the factored moment on the slab:

$$W_u = 1.2(5.28 + 3) + 1.6 * 3 = 14.75 \text{ kN/m}^2$$

- Calculate the strip moment in short direction:

Width of intermediate strip = 7000 mm and width of column strip is the smaller (11/2) and (12/2) taken as (6000/2) mm

- Total factored moment:

Clear span for exterior panels = 600 - 15 - 20 = 565 cm.

Clear Span for interior panels = 600 - 20 - 20 = 560 cm

The larger of the two values will be used in moment calculations.

$$M_0 = \frac{1.475(7)(5.65)^2}{8} = 41.20 \text{ t.m}$$

- Distribute the complete considered second into positive and negative second.
- Distribute the positive and negative second to section and center strip:

Example for calculations:

$$\phi = 0.9 \quad d_{short} = t - cover - db/2 \quad (cover=20mm, db=12mm) \\ = 220 - 20 - 12/2 = 194 \text{ mm} \quad \dots \dots D \text{ long} = d_{short} - db = 194 - 12 = 182 \text{ mm}$$

Short Direction

$$R = \frac{m}{\phi * b * d^2 * f_c} = 85.7 * \frac{1000000}{0.9 * 400 * 194 * 194 * 28} = 0.2259$$

$$\omega = \frac{1 - \sqrt{1 - 2.36 * R}}{1.18} = 0.2684045 \quad \rho = \omega * f'_c / f_y = 0.0644073 * \frac{28}{400} = 0.01789363$$

$$\text{As } \rho * b * d = 0.00402546 * 1000 * 175 = 1388.546 \text{ mm}^2$$

$$A_{smin} = 0.0018 * b * t_{As} > A_{smin} = 0.0018 * 1000 * 220 = 369 \text{ mm}^2$$

$$\text{Number of bars} = A_{sreq} / A_{sbar} = 1388.546 / 113.4 = 12$$

$$A_{spro} = n * A_{sbar} = 12 * 113.04 = 1356.48 \text{ mm}^2$$

$$S_{req} = A_{sbar} * 1000 / A_{spro} = 113.04 * 1000 / 1388.546 = 81.4089$$

$$S_{min} = 40 \text{ mm and } S_{max} = \text{minimum of } [3 * t], (600 \text{ mm}) \text{ or } 500 \text{ mm; use } 500 \text{ mm}$$

The program shows that the activity of estimation of minutes and support exceptionally simple and basic and quicker than the hand computation which utilize numerous equations and outlines and table to figure and need a projects to drawings the guides which program safe give full guides for minutes, stresses, shear, hub powers, support maps, deformity shapes and gives drawings in (xy plan) and 3D).

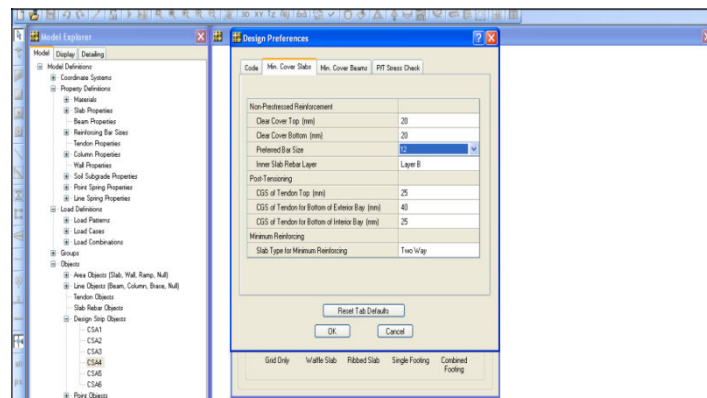


Figure 4:- program design preferences.

V. CONCLUSION

1. The projects very speedy and dreary with the objective that the results show concurring a second while the hand figuring consume an enormous lump of the day.
2. In this endeavor we plan and assessment of areas depending upon conditions chart and tables to plan and examination and settling which bring time.
3. The degree of plan of the results is OK and precision of the results depends on the wellsprings of data accuracy.
4. It's very straightforward for client while the hand figure should be have more information for lump plan and be more assemble in process.
5. Method II gives enormous worth which isn't precise and takes only two course pieces with emanates and direct arrangement methodology is difficult to figure.

REFERENCES

- [1] Amway Center, "Production Guide Version 2,"
- [2] Association Française de Génie Civil, "Ultra High Performance Fibre-Reinforced Con-cretes - Interim Recommendations," 2002.
- [3] C. of Standardization, "Eurocode 1: Actions on structures part 1-1: General actions-densities, self-weight, imposed loads for buildings," 2002.
- [4] C. of Standardization, "Eurocode 1: Actions on structures part 1-3: General actions-snow loads," 2002.



- [5] C. of Standardization, "Eurocode 1: Actions on structures part 1-4: General actions-wind actions," 2002.
- [6] E. C. of Standardization, "Eurocode-basis of structural design," April 2002.
- [7] E. Chao, "Pier Luigi Nervi 1891-1979," pp. 32–38, 2005.
- [8] E. D. Hartog, "Prefabrication of concrete shells," 2009.
- [9] E. Ramm and G. Mehlhorn, "On shape finding methods and ultimate load analyses of reinforced concrete shells," *Engineering Structures*, vol. 13, no. 2, pp. 178–198, 1991.
- [10] E. Ramm, *Ultimate Load and Stability Analysis of Reinforced Concrete Shells*.



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Impact Factor: 8.118



ISSN INTERNATIONAL
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