Development And R.C.C. Design Of Shrirampur City

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Abstract –

In old times stone , bricks were popular as building material. Now a days cement concrete is conveniently use for construction of multistoried building & construction of R.C.C. structure. If is the composite structure made of construction & steel reinforcement , Use to carry tensile load & also compressive loads . It helps to construct earthquake resisting structures . for the construction of R.C.C. structures we design different members of building such as column, beam, slab, stair case, footings, etc. by considering factor of safety & economy & various consideration are taken in to account.

***Key Words*: Cement concrete, R.C.C. , Reinforcement, Tensile load, Earthquake, compression, Factor of safety, Economy, Structure.**

1.INTRODUCTION

There are many cities constructed in India and Maharashtra like amanora city in pune and magarpatta city in pune also a nanded city. The main purpose for construction of that cites is to improve the poshness of the area also to give entertain able things people and to give optional things for the people who have to take luxurious look by investing their money

And hence by inspiring by that cities and to improve appearance of Shrirampur city area prabhat industry give us a work of surveying,estimating, and rcc designing for that city. This includes 3bhk apartments, 3bhk row houses, school. Collage, hostel, 1bhk apartment, in the 50 acres, and which named as royal city

1.1 Methods :

Steps for design of one way slab :

Step-1: Estimate the thickness of slab (D)

d = Span / 20 X M.F. ……(simply supported slab)

Where, M.F. = modification factor

d = span / 7 X M.F. ………(for cantilever slab)

M.F. = clause 23.2.1 of IS 456 – 2000 page no. 37

D = d+ effective cover

Step-2 : Calculate effective span ($L_{eff.}$)

L_{eff} = clear span + effective depth

OR

L_{eff} =c/c distance between two supports

………. Whichever is less.

L_{eff} = clause 22.2 IS 456-2000 page no. 34

Step-3 : calculation for loading

1)self weight =D(m)x1x25

2)floor finish

3) live load

W(working load)=1+2+3

Factored load=wX1.5

Step-4: calculate factored moment(md) & factored shear force(vd)

$Md = wd \times (l_{eff})^2/8$

$Vd = wd \times l_{eff}/2$

Step-5: determine required depth for bending

$Md = 0.36 \times fck \times b\, xu(d-0.42xu)$

Xu = grade of steel

$D_{req} < d_{ass}$ ……..

Hence Check ok……….

Step- 6: Determine Main Steel

$X_u = 0.87 \times fy \times Ast / 0.36 \times fck \times b$

$Md = 0.87 \times fy \times Ast \times (d - 0.42 \times x_u)$

Spacing = (1000 X A⌀)/Ast

/S = 3d or 300

....Whichever is smaller

Step-7: Determine distribution steel

For distribution steel pt%≮ 0.12%

Ast(D) = 0.15%of total cross-sectional area .....for Fe_{250}

Ast(D) = 0.12%of total cross-sectional area .....for Fe_{415}

Spacing (s) =(1000 X A⌀)/Ast

S<5d or 450

Step-8: check for shear

As shear force in slab is very small no need to check for shear.

Step-9: Summary

1) Depth of slab.
2) Cover.
3) Main steel.
4) Distribution steel.

Step-10: Reinforcement Detailed.

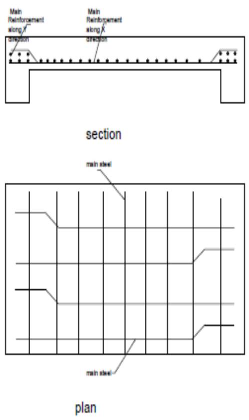

Fig.no. 1

1.2 Example -

Step-1 : Estimate the thickness of slab (D)

d = Span / 20 X M.F. ......(simply supported slab)

=3000/20 X 1.2

=125 mm

Where , M.F. = modification factor

D = d+ effective cover

= 125+15

= 140 mm

Step-2 : Calculate effective span ($L_{eff.}$)

L_{eff} = clear span + effective depth

= 3000+152

= 3125 mm

OR

L_{eff}=c/c distance between two supports

= 3000+230/2+230/2

= 3230 mm

.... Whichever is less.

$L_{eff.}$ = 3125 mm

L_{eff} = clause 22.2 IS 456-2000 page no. 34

Step-3 : calculation for loading

1)self weight =D(m)x1x25

= 0.140 X 1 X 25

= 3.5 m

2)floor finish = 0.5 KN/M^2

3) live load = 5 KN/M^2

W(working load)= 9KN/M^2

Factored load (Wd)=9X1.5

Wd = 13.5M

Step-4: calculate factored moment(md) & factored shear force(vd)

$Md = wd \times (l_{eff})^2/8$

$= (13.5 \times 3.125^2)/ 8$

= 16.47 KN/M^2

$Vd = wd \times l_{eff}/2$

= (13.5 X3.125)/2

= 21.09 KN/M^2

Step-5: determine required depth for bending

Md = 0.36X fckX b xu(d-0.42xu)

$(16.47 \times 10^6) = 0.36 \times 15 \times 1000 \times (0.479 \times d) \times (d - 0.42 (0.479d))$

d = 89.28mm

Xu = grade of steel

$D_{req} < d_{ass}$

Hence Check ok..........

Step- 6: Determine Main Steel

$X_u = 0.87 \times fy \times Ast / 0.36 \times fck \times b$

= (0.87 X 415 XAst)/ (0.36 X15 X 1000)

X_u = 0.066Ast mm

Md = 0.87 X fy X Ast X(d- 0.42 X x_u)

(16.47 X10^6)= 0.87 X 415 X Ast(125- 0.42 X (0.066Ast))

Ast = 396.35 mm^2

Spacing (S) = (1000 X A⌀)/Ast

= (1000 X (π/4(10^2)))/396.35

= 198.13

= 190 mm

S = 3d or 300

....Whichever is smaller

S = 190 mm

Step-7: Determine distribution steel

For distribution steel pt% ≮ 0.12%

Ast(D) = 0.15%of total cross-sectional area .....for Fe_{250}

/Ast(D) = 0.12%of total cross-sectional area .....for Fe_{415}

= (0.12 /100) X 1000 X 140

= 168 mm^2

Spacing (s) =(1000 X A⌀)/Ast

= 1000 X (π/4(08^2)))/168

= 299.16

= 290 mm

S<5d or 450

Step-8: check for shear

As shear force in slab is very small no need to check for shear.

Step-9: Summary

1) Depth of slab = 125 mm
2) Cover = 15
3) Main steel = 400 mm^2 c/c @ spacing 190 mm
4) Distribution steel = 168 mm^2 c/c @ spacing 290 mm

Step-10: Reinforcement Detailed.

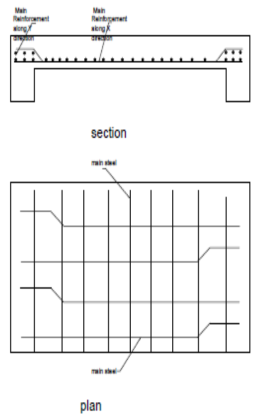

Fig.no. 2

Reinforcement Detailed :

1) Main steel = 400 mm^2 c/c @ spacing 190 mm
2) Distribution steel = 168 mm^2 c/c @ spacing 290 mm

Key Plan :-

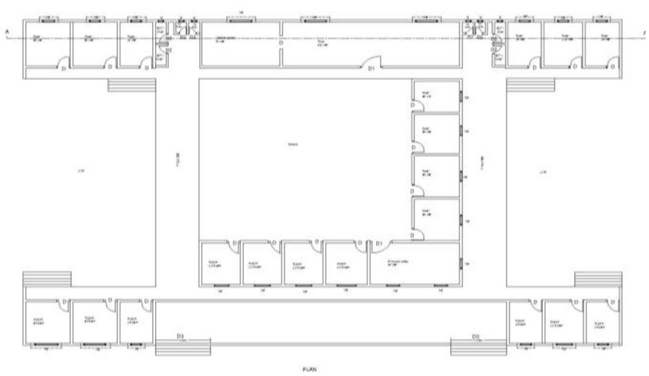

Fig.no.3- Hostel Building

3. CONCLUSIONS

By designing different member of building such as column, beam, slab, stair case, footing . We design the safe city & earthquake resisting city by considering various important aspects such as factor of safety & economy.

By use of reinforced cement concrete (R.C.C.). we construct the safe & earthquake resistanting structure as well as we design the city effectively.

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REFERENCE

1.Murthy C.V.R., Learning Earthquake Design
2.Agrawal , Shrikhande Mansih , Earthquake Resistant Design Of Structure.
3.Is:456-2000, Plain & Reinforced Coad Of Practice .
4. Is:1893 (Part 1) 2002 Criteria For Earthquake Resistant Design Of Structure.
5. Ramamurtham (Theory Of Structure)
6. Macgregor, J. G. (1976) Safety & Limit State Design For Reinforced Concrete.
7.Winter G. (1979). Safety & Serviceability Provision In The Building Code.
8.Nawy E.G (2003) Reinforce Concrete A Fundamental Approatch. Fifth Edition Prentice Hall.

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