

MEMBER NAME : S01

1. General Information

- (1) Design Code : NSR-10
(2) Code Unit : N, mm

2. Material

- (1) F'_c : 28.00MPa
(2) F_y : 420MPa

3. Design Load

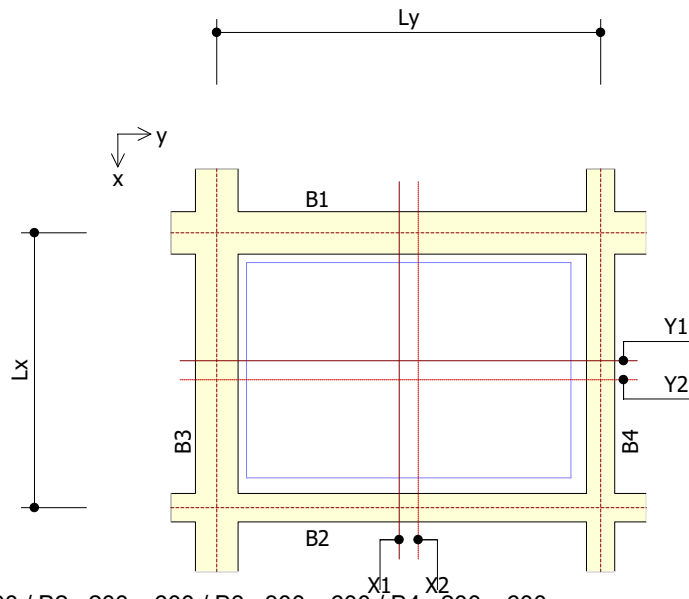
- (1) Dead Load : 1.961KPa
(2) Live Load : 1.961KPa

4. Section Size

- (1) Span(X) : 1.940m
(2) Span(Y) : 2.710m
(3) Thickness : 125mm
(4) Cover : 30.00mm
(5) Use clear span : Yes

5. Slab Type & Support

- (1) Slab Type : 2-Way Slab
(2) Support Type : Case-2
(3) Boundary Beams : B1 : 300 x 600 / B2 : 200 x 600 / B3 : 300 x 600 / B4 : 200 x 600



6. Calculation Summary

(1) Check Thickness of Slab

Category	Value	Criteria	Ratio	Note
Minimum Thickness Required (mm)	125	90.00	0.720	

(2) Calculate Moment & Shear (X Direction)

Category	Value	Criteria	Ratio	Note
Moment Capacity (Top) (kN·m)	1.173	5.296	0.222	
Moment Capacity (Middle) (kN·m)	0.654	5.296	0.124	
Moment Capacity (Bottom) (kN·m)	1.173	5.296	0.222	
Rebar Ratio (Top)	0.00252	0.00180	0.713	
Rebar Ratio (Middle)	0.00252	0.00180	0.713	
Rebar Ratio (Bottom)	0.00252	0.00180	0.713	
Shear Capacity (Top) (kN)	3.809	60.88	0.0626	
Shear Capacity (Middle) (kN)	0.000	60.88	0.000	
Shear Capacity (Bottom) (kN)	3.809	60.88	0.0626	

(3) Calculate Moment & Shear (Y Direction)

Category	Value	Criteria	Ratio	Note
Moment Capacity (Left) (kN·m)	0.538	4.729	0.114	
Moment Capacity (Center) (kN·m)	0.313	4.729	0.0663	
Moment Capacity (Right) (kN·m)	0.538	4.729	0.114	
Rebar Ratio (Left)	0.00252	0.00180	0.713	
Rebar Ratio (Center)	0.00252	0.00180	0.713	
Rebar Ratio (Right)	0.00252	0.00180	0.713	
Shear Capacity (Left) (kN)	1.210	54.45	0.0222	
Shear Capacity (Center) (kN)	0.000	54.45	0.000	
Shear Capacity (Right) (kN)	1.210	54.45	0.0222	

7. Determine the design type of slab

(1) Calculate span ratio [Use clear span]

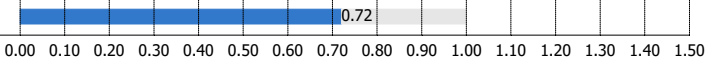
- $L_x = 1.690\text{m}$
- $L_y = 2.460\text{m}$
- Span Ratio(L_x / L_y) = 0.687 $\geq 0.5 \rightarrow$ 2-Way Slab

8. Check Load

(1) Calculate factored load

- LCB01 = 2.746KPa (1.4D)
- LCB02 = 5.492KPa (1.2D+1.6L)
- $\omega_u = 5.492\text{KPa}$

9. Check Thickness of Slab*Calculation Summary (Check Thickness of Slab)*

Category	Value	Criteria	Ratio	Note
Minimum Thickness Required (mm)	125	90.00	0.720	
Minimum Thickness Required				

(1) Calculate factors

- $\beta = I_{ny} / I_{nx} = 1.456$
- $\alpha_m = 22.70$ ($\alpha_1 = 30.37$, $\alpha_2 = 22.55$, $\alpha_3 = 21.74$, $\alpha_4 = 16.15$)

(2) Calculate minimum thickness required

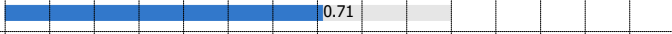
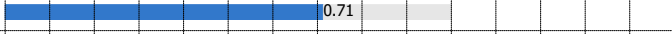
- $h_{req} = \frac{I_n (0.8 + (f_y / 1400))}{36 + 9\beta} = 90.00\text{mm}$
- **$h = 125\text{mm} > h_{req} = 90.00\text{mm} \rightarrow \text{O.K}$**

10. Check Capacity of Slab

(1) Calculate Moment & Shear [Direction X]

Calculation Summary (Calculate Moment & Shear (X Direction))

Category	Value	Criteria	Ratio	Note
Moment Capacity (Top) (kN·m)	1.173	5.296	0.222	
Moment Capacity (Middle) (kN·m)	0.654	5.296	0.124	
Moment Capacity (Bottom) (kN·m)	1.173	5.296	0.222	
Rebar Ratio (Top)	0.00252	0.00180	0.713	
Rebar Ratio (Middle)	0.00252	0.00180	0.713	
Rebar Ratio (Bottom)	0.00252	0.00180	0.713	
Shear Capacity (Top) (kN)	3.809	60.88	0.0626	
Shear Capacity (Middle) (kN)	0.000	60.88	0.000	
Shear Capacity (Bottom) (kN)	3.809	60.88	0.0626	

Moment Capacity (Top)	
Moment Capacity (Middle)	
Moment Capacity (Bottom)	
Rebar Ratio (Top)	
Rebar Ratio (Middle)	
Rebar Ratio (Bottom)	
Shear Capacity (Top)	
Shear Capacity (Middle)	
Shear Capacity (Bottom)	

Check Items	TOP	MIDDLE	BOTTOM
Bar-1	#3@450	#3@450	#3@450

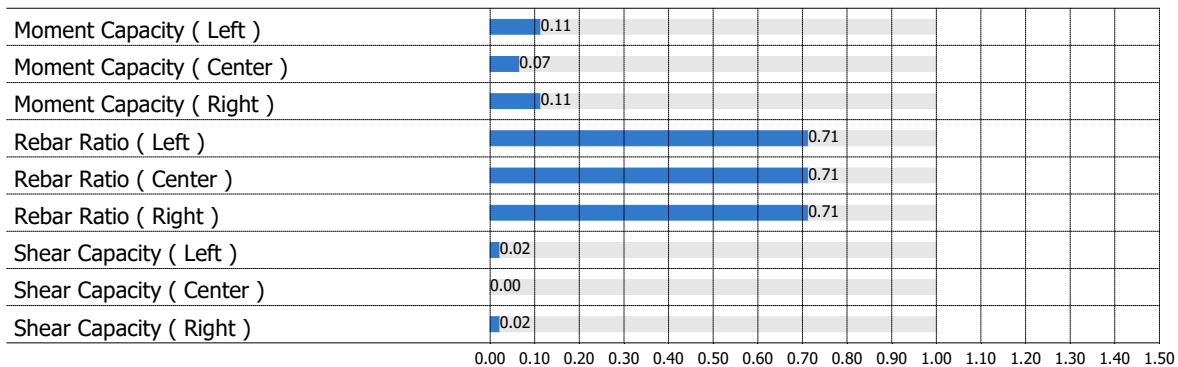
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Bar-2	#3@450	#3@450	#3@450
Bar-3	-	-	-
Moment Coefficient (DL)	0.000	0.0305	0.000
Moment Coefficient (LL)	0.000	0.0501	0.000
Moment Coefficient (FL)	0.0748	0.000	0.0748
Shear Coefficient	0.821	0.000	0.821
M_u (kN·m/m)	1.173	0.654	1.173
V_u (kN/m)	3.809	0.000	3.809
ϕM_n (kN·m/m)	5.296	5.296	5.296
ϕV_n (kN/m)	60.88	60.88	60.88
$M_u / \phi M_n$	0.222	0.124	0.222
$V_u / \phi V_n$	0.0626	0.000	0.0626
ρ_{min} / ρ	0.713	0.713	0.713

(2) Calculate Moment & Shear [Direction Y]

Calculation Summary (Calculate Moment & Shear (Y Direction))

Category	Value	Criteria	Ratio	Note
Moment Capacity (Left) (kN·m)	0.538	4.729	0.114	
Moment Capacity (Center) (kN·m)	0.313	4.729	0.0663	
Moment Capacity (Right) (kN·m)	0.538	4.729	0.114	
Rebar Ratio (Left)	0.00252	0.00180	0.713	
Rebar Ratio (Center)	0.00252	0.00180	0.713	
Rebar Ratio (Right)	0.00252	0.00180	0.713	
Shear Capacity (Left) (kN)	1.210	54.45	0.0222	
Shear Capacity (Center) (kN)	0.000	54.45	0.000	
Shear Capacity (Right) (kN)	1.210	54.45	0.0222	



Check Items	LEFT	CENTER	RIGHT
Bar-1	#3@450	#3@450	#3@450
Bar-2	#3@450	#3@450	#3@450
Bar-3	-	-	-
Moment Coefficient (DL)	0.000	0.00673	0.000
Moment Coefficient (LL)	0.000	0.0115	0.000
Moment Coefficient (FL)	0.0162	0.000	0.0162
Shear Coefficient	0.179	0.000	0.179
M_u (kN·m/m)	0.538	0.313	0.538
V_u (kN/m)	1.210	0.000	1.210
ϕM_n (kN·m/m)	4.729	4.729	4.729
ϕV_n (kN/m)	54.45	54.45	54.45
$M_u / \phi M_n$	0.114	0.0663	0.114

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$V_u / \phi V_n$	0.0222	0.000	0.0222
ρ_{min} / ρ	0.713	0.713	0.713