

MEMBER NAME : S06

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

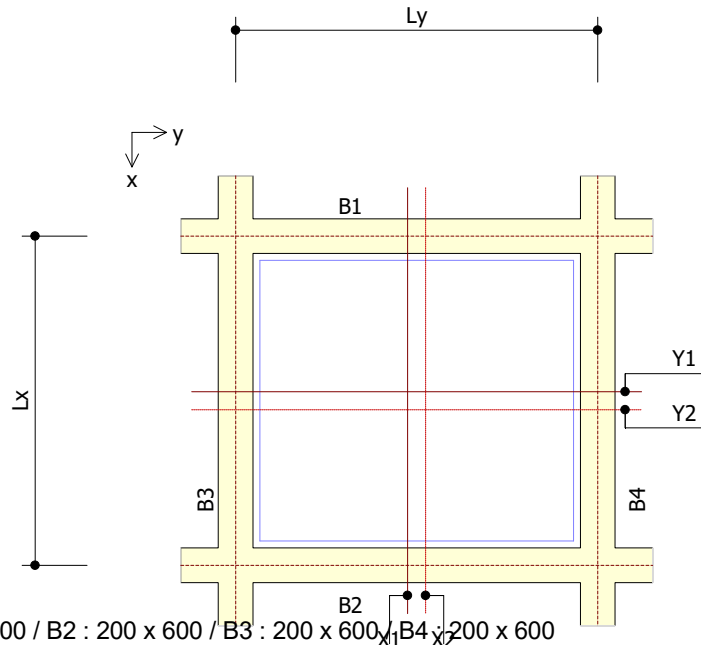
- (1) Dead Load : 1.961KPa
(2) Live Load : 1.961KPa

4. Section Size

- (1) Span(X) : 1.900m
(2) Span(Y) : 2.090m
(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 : 200 x 600 / B2 : 200 x 600 / B3 : 200 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)	0.874	5.296	0.165	
Moment Capacity (Middle) (kN·m)	0.459	5.296	0.0866	
Moment Capacity (Bottom) (kN·m)	0.874	5.296	0.165	
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)	2.806	60.88	0.0461	
Shear Capacity (Middle) (kN)	0.000	60.88	0.000	
Shear Capacity (Bottom) (kN)	2.806	60.88	0.0461	

(3) Calculate Moment & Shear (Y Direction)

Category	Value	Criteria	Ratio	Note
Moment Capacity (Left) (kN·m)	0.723	4.729	0.153	
Moment Capacity (Center) (kN·m)	0.363	4.729	0.0768	
Moment Capacity (Right) (kN·m)	0.723	4.729	0.153	
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)	2.070	54.45	0.0380	
Shear Capacity (Center) (kN)	0.000	54.45	0.000	
Shear Capacity (Right) (kN)	2.070	54.45	0.0380	

7. Determine the design type of slab

(1) Calculate span ratio [Use clear span]

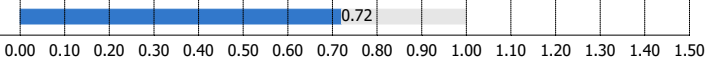
- $L_x = 1.700\text{m}$
- $L_y = 1.890\text{m}$
- Span Ratio (L_x / L_y) = 0.899 $\geq 0.5 \rightarrow$ 2-Way Slab

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

- $\beta = I_{ny} / I_{nx} = 1.112$
- $\alpha_m = 21.98$ ($\alpha_1 = 23.03$, $\alpha_2 = 23.03$, $\alpha_3 = 20.93$, $\alpha_4 = 20.93$)

(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)	0.874	5.296	0.165	
Moment Capacity (Middle) (kN·m)	0.459	5.296	0.0866	
Moment Capacity (Bottom) (kN·m)	0.874	5.296	0.165	
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)	2.806	60.88	0.0461	
Shear Capacity (Middle) (kN)	0.000	60.88	0.000	
Shear Capacity (Bottom) (kN)	2.806	60.88	0.0461	

Moment Capacity (Top)	0.17																		
Moment Capacity (Middle)	0.09																		
Moment Capacity (Bottom)	0.17																		
Rebar Ratio (Top)	0.71																		
Rebar Ratio (Middle)	0.71																		
Rebar Ratio (Bottom)	0.71																		
Shear Capacity (Top)	0.05																		
Shear Capacity (Middle)	0.00																		
Shear Capacity (Bottom)	0.05																		

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

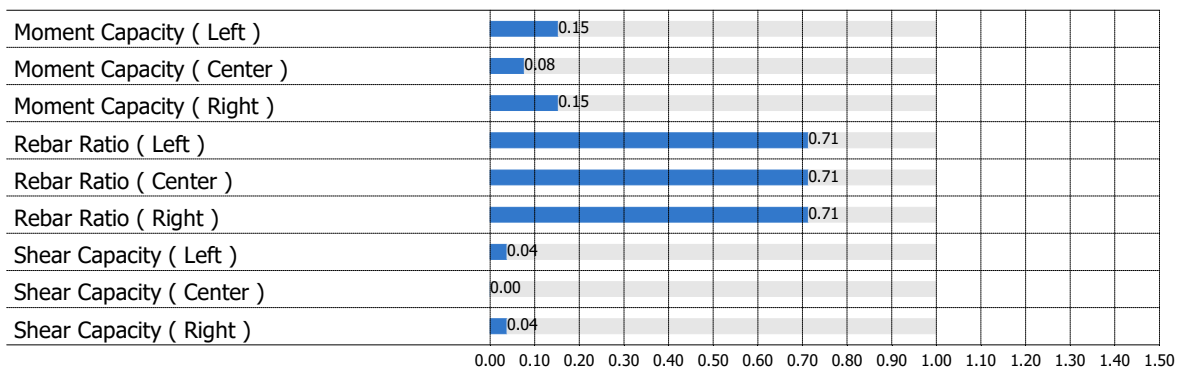
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Bar-2	#3@450	#3@450	#3@450
Bar-3	-	-	-
Moment Coefficient (DL)	0.000	0.0220	0.000
Moment Coefficient (LL)	0.000	0.0341	0.000
Moment Coefficient (FL)	0.0551	0.000	0.0551
Shear Coefficient	0.601	0.000	0.601
M_u (kN·m/m)	0.874	0.459	0.874
V_u (kN/m)	2.806	0.000	2.806
ϕM_n (kN·m/m)	5.296	5.296	5.296
ϕV_n (kN/m)	60.88	60.88	60.88
$M_u / \phi M_n$	0.165	0.0866	0.165
$V_u / \phi V_n$	0.0461	0.000	0.0461
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)	0.723	4.729	0.153	
Moment Capacity (Center) (kN·m)	0.363	4.729	0.0768	
Moment Capacity (Right) (kN·m)	0.723	4.729	0.153	
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)	2.070	54.45	0.0380	
Shear Capacity (Center) (kN)	0.000	54.45	0.000	
Shear Capacity (Right) (kN)	2.070	54.45	0.0380	



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	0.0140	0.000
Moment Coefficient (LL)	0.000	0.0219	0.000
Moment Coefficient (FL)	0.0369	0.000	0.0369
Shear Coefficient	0.399	0.000	0.399
M_u (kN·m/m)	0.723	0.363	0.723
V_u (kN/m)	2.070	0.000	2.070
ϕM_n (kN·m/m)	4.729	4.729	4.729
ϕV_n (kN/m)	54.45	54.45	54.45
$M_u / \phi M_n$	0.153	0.0768	0.153

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$V_u / \phi V_n$	0.0380	0.000	0.0380
ρ_{min} / ρ	0.713	0.713	0.713