

MEMBER NAME : S08

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

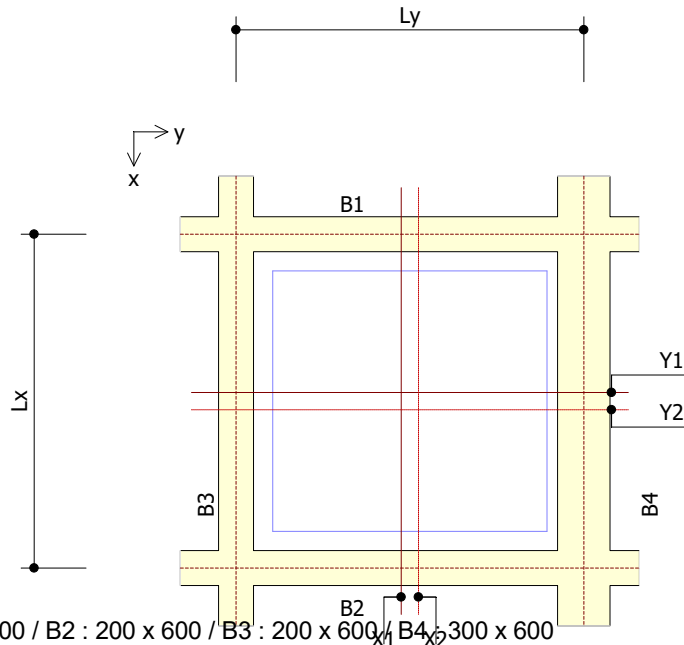
- (1) Dead Load : 1.961KPa
(2) Live Load : 1.961KPa

4. Section Size

- (1) Span(X) : 1.910m
(2) Span(Y) : 1.990m
(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 : 300 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)	0.751	5.296	0.142	
Moment Capacity (Middle) (kN·m)	0.386	5.296	0.0729	
Moment Capacity (Bottom) (kN·m)	0.751	5.296	0.142	
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)	2.430	60.88	0.0399	
Shear Capacity (Middle) (kN)	0.000	60.88	0.000	
Shear Capacity (Bottom) (kN)	2.430	60.88	0.0399	

(3) Calculate Moment & Shear (Y Direction)

Category	Value	Criteria	Ratio	Note
Moment Capacity (Left) (kN·m)	0.725	4.729	0.153	
Moment Capacity (Center) (kN·m)	0.373	4.729	0.0789	
Moment Capacity (Right) (kN·m)	0.725	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)	2.305	54.45	0.0423	
Shear Capacity (Center) (kN)	0.000	54.45	0.000	
Shear Capacity (Right) (kN)	2.305	54.45	0.0423	

7. Determine the design type of slab

(1) Calculate span ratio [Use clear span]

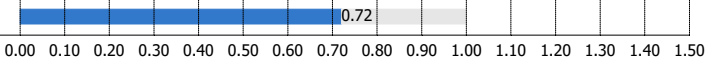
- $L_x = 1.710\text{m}$
- $L_y = 1.740\text{m}$
- Span Ratio(L_x / L_y) = 0.983 $\geq$ 0.5 -> 2-Way Slab

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

- $\beta = I_{ny} / I_{nx} = 1.018$
- $\alpha_m = 24.35$ ($\alpha_1 = 22.91$, $\alpha_2 = 22.91$, $\alpha_3 = 21.99$, $\alpha_4 = 29.61$)

(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)	0.751	5.296	0.142	
Moment Capacity (Middle) (kN·m)	0.386	5.296	0.0729	
Moment Capacity (Bottom) (kN·m)	0.751	5.296	0.142	
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)	2.430	60.88	0.0399	
Shear Capacity (Middle) (kN)	0.000	60.88	0.000	
Shear Capacity (Bottom) (kN)	2.430	60.88	0.0399	

Moment Capacity (Top)	0.14																		
Moment Capacity (Middle)	0.07																		
Moment Capacity (Bottom)	0.14																		
Rebar Ratio (Top)	0.71																		
Rebar Ratio (Middle)	0.71																		
Rebar Ratio (Bottom)	0.71																		
Shear Capacity (Top)	0.04																		
Shear Capacity (Middle)	0.00																		
Shear Capacity (Bottom)	0.04																		

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

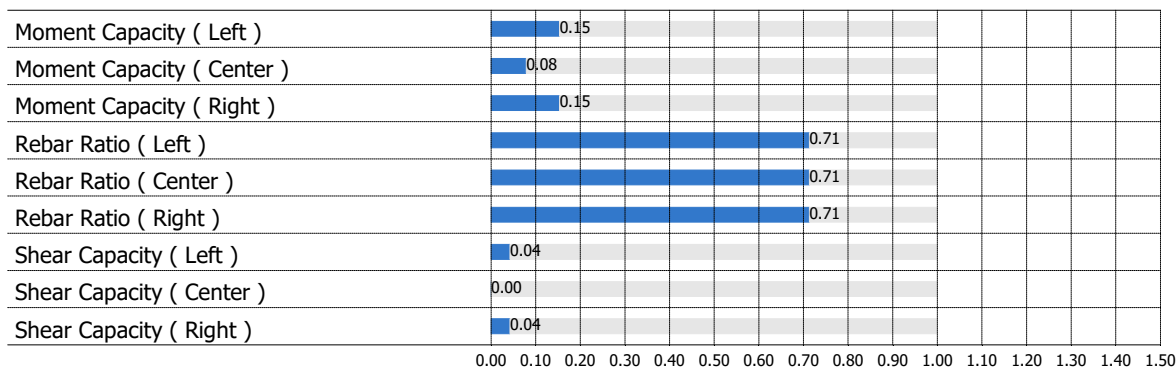
MEMBER NAME : S08

Bar-2	#3@450	#3@450	#3@450
Bar-3	-	-	-
Moment Coefficient (DL)	0.000	0.0187	0.000
Moment Coefficient (LL)	0.000	0.0280	0.000
Moment Coefficient (FL)	0.0467	0.000	0.0467
Shear Coefficient	0.518	0.000	0.518
M_u (kN·m/m)	0.751	0.386	0.751
V_u (kN/m)	2.430	0.000	2.430
ϕM_n (kN·m/m)	5.296	5.296	5.296
ϕV_n (kN/m)	60.88	60.88	60.88
$M_u / \phi M_n$	0.142	0.0729	0.142
$V_u / \phi V_n$	0.0399	0.000	0.0399
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)	0.725	4.729	0.153	
Moment Capacity (Center) (kN·m)	0.373	4.729	0.0789	
Moment Capacity (Right) (kN·m)	0.725	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)	2.305	54.45	0.0423	
Shear Capacity (Center) (kN)	0.000	54.45	0.000	
Shear Capacity (Right) (kN)	2.305	54.45	0.0423	



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	0.0173	0.000
Moment Coefficient (LL)	0.000	0.0263	0.000
Moment Coefficient (FL)	0.0436	0.000	0.0436
Shear Coefficient	0.482	0.000	0.482
M_u (kN·m/m)	0.725	0.373	0.725
V_u (kN/m)	2.305	0.000	2.305
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	0.0789	0.153

MEMBER NAME : S08

$V_u / \phi V_n$	0.0423	0.000	0.0423
ρ_{min} / ρ	0.713	0.713	0.713