

# CONCRETE DESIGN CALCULATOR: Quiz-4 Solution Section (I)

Select Strength:	fy = 60000 psi; fc = 4000 psi	Select design p:	pmax	Select Load Case:	1.2D + 1.4L	Diagram:							
$f_y = 60000$	$f_y = 4000$	Design $p = 0.0065$			$\text{Ext. w.} = [h/t] = 1.78$								
$\rho_{max} = 0.0013$	$\rho_{max} = 0.0083$	Design $R_c = 388.79$			$M_c (\text{ft-lb}) = 227.8$								
$R_c \text{ at } \rho_{max} = 392.3$ (psi) =	$R_c \text{ at } \rho_{max} = 932.0$ (psi) =	$b \cdot e^2 = 7823.549$			$M_c (\text{ft-lb}) = 259.2$								
		$\phi = 0.75$			Density (pcf) 150								
Enter Given & Estimates:						Neutral Axis Calculations:							
$w_1 (\text{ft/lb})$	0.50	$b_s (\text{in})$	16	$b_{ns} (\text{in})$	80	$\text{N.A. is in the Flange}$							
$w_2 (\text{ft/lb})$	0.4	$h (\text{in})$	27	$t (\text{in})$	3	$T (\text{kip})$ 142.2							
Length (ft)	32	$d (\text{in})$	28	$a (\text{in})$	0.49	$z (\text{in}) = 21.60$							
Clear Cover (in)	3	$A_s (\text{in}^2)$	2.65	$\rho_s$	0.05	$A_s (\text{in}^2)$ 41.8							
Ext. Self Wt (kip)	400	$A_{sh,max} (\text{in}^2)$	1.254	$c (\text{in})$	0.57	$z (\text{in}) = 22.30$							
Active Soil (kip)	400.00	$A_{sh,max} (\text{in}^2)$	1.280	$\epsilon_c$	0.1227	$A_{sh,max} (\text{in}^2)$ 240							
						Governing $z = 22.30$							
Select $A_s$ in Tension:						Flange:							
						$A_s (\text{in}^2)$ 2.6456							
						$b (\text{in})$ 16.64							
						$c (\text{in})$ 17.22							
						$e_s$ 0.00							
						$A_{sh} (\text{in}^2)$ 13.27							
						$A_s (\text{in}^2)$ 24.15							
Bar Selection:						Neutral Axis Calculations:							
BAR:	Number of Bars in a Single Layer of Reinforcing:												
	2		3		4		5		6		7		
Area	Width	Area	Width	Area	Width	Area	Width	Area	Width	Area	Width		
0.38	6.80	0.58	8.30	0.78	9.80	0.98	11.30	1.18	12.80	1.37	14.30	1.57	15.80
0.61	6.90	0.92	8.50	1.23	10.20	1.53	11.80	1.84	13.40	2.15	15.00	2.45	16.70
0.88	7.00	1.32	8.60	1.77	10.50	2.21	12.50	2.65	14.00	3.09	15.80	3.55	17.50
1.20	7.20	1.80	9.00	2.43	10.90	3.01	13.80	3.63	14.70	4.21	16.50	4.81	18.40
1.57	7.30	2.35	9.20	3.14	11.90	3.93	15.30	4.71	15.30	5.50	17.50	6.28	19.30
2.00	7.60	3.00	9.80	4.00	12.10	5.00	14.90	6.00	16.40	7.00	18.80	8.00	21.10
2.55	7.80	3.79	10.40	5.06	12.90	6.35	15.50	7.59	18.00	8.86	20.50	10.12	23.20
3.12	8.00	4.68	10.90	6.25	13.80	7.81	16.60	9.37	19.40	10.84	22.20	12.90	25.00
4.50	8.90	6.75	12.30	9.00	15.70	11.25	19.00	13.50	22.40	15.75	25.80	18.00	29.20
8.00	10.60	13.00	15.10	16.00	19.60	20.00	24.50	24.00	28.00	23.10	31.00	27.70	

# Excel Formula For Electrical Engineering Calculations

**Siddappa N.Byrareddy**

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