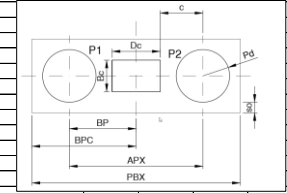


Step 4) Check for maximum load on one pile									
Forces On Piles									
Weight of pilecap + Overburden weight of soil	Soil Wt + Pilecap Wt								146.574 kN
Total Weight on Pile	Pcomb + Soil Wt + Pilecap Wt								1,808.60 kN
Load transfer to pile P1	(Ptotal / No of Piles)-(Mux/(2*Px/1000))								903.18 kN
Load transfer to pile P2	(Ptotal / No of Piles)+(Mux/(2*Px/1000))								905.42 kN
Maximum load on one pile	Max(P1, P2)								905.42 kN
Allowable load on pile									1,650 kN
Check	Max load on one pile < All. load on one Pile								OK
Step 5) Check for maximum load on pile group									
Weight of pilecap + Overburden weight of soil									
Weight of pilecap + Overburden weight of soil	Soil Wt + Pilecap Wt								146.574 kN
Total Weight on Pile	Pcomb + Soil Wt + Pilecap Wt								1,765.78 kN
Maximum load on pile group									1,765.78 kN
Allowabl load on pile group									3,360 kN
Check	Max load on pilegroup < All. load on Pilegroup								OK
Step 6) Check for maximum shear on pile group									
Maximum shear on pile group									
Maximum shear on pile group	Sqrt (Vx^2 + Vy^2)								45.19 kN
Shear Capacity of pile group	Shear capacity x No of piles								400 kN
Check	Max shear on pilegroup < All. shear on Pilegroup								OK
Step 7) Check for uplift on one pile									
No uplift in any pile									
Step 8)Design for Bending									
Weight of pilecap + Overburden weight of soil									
Weight of pilecap + Overburden weight of soil	Soil weight + Pilecap Weight								175.89 kN
Total Weight on Pile	Pu+Soil weight + Pilecap Weight								2,336.20 kN
Forces On Piles									
Load transfer to pile P1	(Ptotal / No of Piles)-(Mux/(2*Px/1000))								1,164.11 kN
Load transfer to pile P2	(Ptotal / No of Piles)+(Mux/(2*Px/1000))								1,172.09 kN
Bottom reinforcement Along Column D									
Effective depth of pilecap	Depth- Cover- 20/2								1,040.00 mm
Effective width of pile cap	Pile Dia + 2*Pile offset								900 mm
offset from column face	(Pbx/2-Dc/2-Pilecap offset-Pile dia/2)/1000								0.40 m
Bending moment due to pile load	p + Dicol								900.00 kN-m
% reinf. Required for Bending moment	(0.85*f _c /f _y)*(1-SQRT(1-(2*(Bmux*10^6/(Beff*Deff^2)))/(0.9*0.85*f _c))))*100								0.25 %
% minimum reinforcement									0.18 %
Area of reinf. Required	Pt *Deff *1000								8.6.1.1
Area of reinforcement provided									
Check	Ast provided > Ast req								OK
Top reinforcement Along Column D									
Area of reinf. Required	Pt *Deff *1000								1980.00 sqmm/m
Area of reinforcement provided									1985.57 sqmm/m
Check	Ast provided > Ast req								OK
Bottom reinforcement Along Column B									
Area of reinf. Required	Pt *Deff *1000								990.00 sqmm/m
Area of reinforcement provided									1,013.41 sqmm/m
Check	Ast provided > Ast req								OK
Top reinforcement Along Column B									
Area of reinf. Required	Pt *Deff *1000								1980.00 sqmm/m
Area of reinforcement provided									1985.57 sqmm/m
Check	Ast provided > Ast req								OK
Step 9)Design for Shear									
Weight of pilecap + Overburden weight of soil									
Weight of pilecap + Overburden weight of soil	Soil Wt + Pilecap Wt								175.89 kN
Total Weight on Pile	Pu+Soil weight + Pilecap Weight								2,336.20 kN
Forces On Piles									
Load transfer to pile P1	Ptotal /No of Piles -(Mux/(2*Px/1000))								1,164.11 kN
Load transfer to pile P2	Ptotal /No of Piles +(Mux/(2*Px/1000))								1,172.09 kN
Along Column D									
Section location from column center									870.00 mm
Data For Pile									
Pile No	Load (kN)	Covered(mm)	% covered						Shear(kN)
P1	2,250.00	2	420	70.00					675.00
P2	2,250.00	2	420	70.00					675.00
* Covered & % Covered calculation- Refer 4piles validation sheet									
Design Shear Force									
Effective depth of pilecap	Depth- Cover- 20/2								675.00 kN
Effective width of pile cap	Deff								1,040 mm
Reinforcement required	Beff								900.00 mm
design shear strength of concrete	Ast req/ (1000*Deff)								0.0025
Check	Vu > φVc								525.81 kN
	(Vu - φVc) / φ								199 kN
Check	Vs > Vs perm								2762.71 kN
									OK
Shear Reinforcement Calculations									
Area of shear reinforcement required	(Vs*1000/(Deff*fyt))*1000								455 sqmm/m
Provided Shear reinforcement									473 sqmm/m
Shear capacity by Shear reinforcement	Asv prv* Deff* fyt								206.4 kN
Check	(φ * (Vc + Vs)) > Vu								OK
Along Column B									
One Way shear check do not applicable for 2 piles pile-cap design Along B									
11.4.7.9 $0.66 \sqrt{f'_c} b_w d$									
Step 10)Design of Face reinforcement									
Beff considered for SFR									
Area of side face reinf. Required	SFR% x D x Beff sfr								500 mm
Area of side face reinf. Provided									275 Sqmm
									284 Sqmm
Step 11)Design For Column Load Transfer									
Area of pilecap base	Area of Pilecap	A1							2.16 sqm
Area of column	Bc x Dc	A2							0.49 sqm
Modification Factor	Sqrt(A1/A2)<=2								2
Concrete Bearing capacity	Φ ₂ x 0.85 x Modification Factor x A2 x F _{ck} x 1000	Φ ₂ Pnb							10829 kN
Check	Φ ₂ Pnb > Pu								SAFE
Area Of Dowels									sqmm



$$11.2.2.1 \quad V_c = (0.16 \lambda \sqrt{f'_c} + 17 \rho_w \frac{V_{pd}}{M_{pd}}) b_w d$$

$$= 0.29 \lambda \sqrt{f'_c} b_w d$$

$$11.4.7.9 \quad 0.66 \sqrt{f'_c} b_w d$$

$$11.2.2.1 \quad V_c = (0.16 \lambda \sqrt{f'_c} + 17 \rho_w \frac{V_{pd}}{M_{pd}}) b_w d$$

$$= 0.29 \lambda \sqrt{f'_c} b_w d$$

10.14 — Bearing strength

10.14.1 — Design bearing strength of concrete shall not exceed $(0.85 f'_c A_1)$, except when the supporting surface is wider on all sides than the loaded area, then the design bearing strength of the loaded area shall be permitted to be multiplied by $\sqrt{A_2/A_1}$, but by not more than 2.