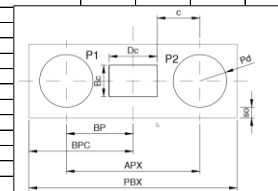


| Step 4) Check for maximum load on one pile | | | | | | | | | |
|---|-----------|---|---|-----------|---------|--------|-----------------|----------|------------------------------|
| Forces On Piles | | | | | | | | | |
| Weight of pilecap + Overburden weight of soil | | Soil Wt + Pilecap Wt | | 146.574 | kN | | | | |
| Total Weight on Pile | | Pcomb + Soil Wt + Pilecap Wt | Ptotal | 1,808.60 | kN | | | | |
| Load transfer to pile P1 | | Ptotal / No of Piles | | 903.18 | kN | | | | |
| Load transfer to pile P2 | | | | 905.42 | kN | | | | |
| Maximum load on one pile | | | | 905.42 | kN | | | | |
| Allowable load on pile | | | | 1,650 | kN | | | | |
| Check | | | | | | | | | OK |
| Step 5) Check for maximum load on pile group | | | | | | | | | |
| Weight of pilecap + Overburden weight of soil | | Soil Wt + Pilecap Wt | | 146.574 | kN | | | | |
| Total Weight on Pile | | Pcomb + Soil Wt + Pilecap Wt | Ptotal | 1,765.78 | kN | | | | |
| Maximum load on pile group | | | | 1,765.78 | kN | | | | |
| Allowabl load on pile group | | | Pgroup | 3,300 | kN | | | | |
| Check | | | | | | | | | OK |
| Step 6) Check for 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 | Ppile shear | 400 | kN | | | | |
| Check | | | | | | | | | 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 | | | | 175.89 | kN | | | | |
| Total Weight on Pile | | | | 2,336.20 | kN | | | | |
| Forces On Piles | | | | | | | | | |
| Load transfer to pile P1 | | | | 1,164.11 | kN | | | | |
| Load transfer to pile P2 | | | | 1,172.09 | kN | | | | |
| Bottom reinforcement Along Column D | | | | | | | | | |
| Effective depth of pilecap | | | Deff | 1,040.00 | mm | | | | |
| Effective width of pile cap | | | Beff | 900 | mm | | | | |
| offset from column face | | | Dfcol | 0.40 | m | | | | |
| Bending moment due to pile load | | | Bmux | 900.00 | kN-m | | | | |
| % reinf. Required for Bending moment | | | Ptreq | 0.25 | % | | | | |
| % minimum reinforcement | | | Pt min | 0.18 | % | | | | |
| Area of reinf. Required | | | Ast Req (BM) | 2,823.64 | sqmm/m | | | | |
| Area of reinforcement provided | | | Ast prv | 2,728.77 | sqmm/m | | | | |
| Top reinforcement Along Column D | | | | | | | | | |
| Area of reinf. Required | | | Ast req | 1980.00 | sqmm/m | | | | |
| Area of reinforcement provided | | | Ast provided | 1985.57 | sqmm/m | | | | |
| Check | | | | | | | | | OK |
| Bottom reinforcement Along Column B | | | | | | | | | |
| Area of reinf. Required | | | Ast req | 990.00 | sqmm/m | | | | |
| Area of reinforcement provided | | | Ast provided | 1,013.41 | sqmm/m | | | | |
| Check | | | | | | | | | OK |
| Top reinforcement Along Column B | | | | | | | | | |
| Area of reinf. Required | | | Ast req | 1980.00 | sqmm/m | | | | |
| Area of reinforcement provided | | | Ast provided | 1985.57 | sqmm/m | | | | |
| Check | | | | | | | | | OK |
| Step 9) Design for Shear | | | | | | | | | |
| Weight of pilecap + Overburden weight of soil | | | | 175.89 | kN | | | | |
| Total Weight on Pile | | | | 2,336.20 | kN | | | | |
| Forces On Piles | | | | | | | | | |
| Load transfer to pile P1 | | | | 1,164.11 | kN | | | | |
| Load transfer to pile P2 | | | | 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 | | | | |
| Design Shear Force | | | | Vu | 675.00 | kN | | | |
| Effective depth of pilecap | | | | Deff | 1,040 | mm | | | |
| Effective width of pile cap | | | | Beff | 900.00 | mm | | | |
| Reinforcement required | | | | pt | 0.0025 | | | | |
| design shear strength of concrete | | | | φVc | 525.57 | kN | clause 11.2.2.1 | | |
| Check | | | | | | | | | Shear Reinforcement Required |
| | | | | Vs | 199 | kN | | | |
| | | | | Vs perm | 2762.71 | kN | clause 11.4.7.9 | 11.4.7.9 | $0.66 \sqrt{f'_c} b_w d$ |
| Shear Reinforcement Calculations | | | | | | | | | |
| Area of shear reinforcement required | | | | Asv req | 456 | sqmm/m | | | |
| Provided Shear reinforcement | | | | Asv prv | 473 | sqmm/m | | | |
| Shear capacity by Shear reinforcement | | | | Vscap | 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 | | | | | | | | | 11.4.7.9 |
| | | | | | | | | | $0.66 \sqrt{f'_c} b_w d$ |
| Step 10) Design of Face reinforcement | | | | | | | | | |
| Area of side face reinf. Required | | | SFR% x D x Beff sfr | Asfr Req | 275 | sqmm | | | |
| Area of side face reinf. Provided | | | | Asfr pro | 284 | sqmm | | | |
| Step 11) Design For Column Load Transfer | | | | | | | | | |
| Area of pilecap base | | | Area of Pilecap | A1 | 2.16 | sqm | Clause 10.14 | | |
| Area of column | | | Bc x Dc | A2 | 0.49 | sqm | Clause 10.14 | | |
| Modification Factor | | | Sqrt(A1/A2) <= 2 | | 2 | | Clause 10.14 | | |
| Concrete Bearing capacity | | | φ _c x 0.85 x Modification Factor x A2 x Fck x 1000 | | 10829 | kN | Clause 10.14 | | |
| Check | | | | | | | | | OK |
| Area Of Dowels | | | | | - | sqmm | | | |



$$11.2.2.1 \quad V_c = (0.16 \lambda \sqrt{f'_c} + 17 \rho_w \frac{V_w d}{M_w}) b_w d - 0.29 \lambda \sqrt{f'_c} b_w d$$

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

$$11.2.2.1 \quad V_c = (0.16 \lambda \sqrt{f'_c} + 17 \rho_w \frac{V_w d}{M_w}) b_w d - 0.29 \lambda \sqrt{f'_c} b_w d$$

10.14 — Bearing strength
 10.14.1 — Design bearing strength of concrete shall not exceed $\phi(0.85 f'_c A_2)$ 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 $\sqrt{A_1/A_2}$ but by not more than 2.