Project : **Geotechnical Investigation for Biswarjan Ghat, New Town**
Bearing Capacity Calculation For Shallow/Well Foundation
Code used:- IS:6403-1981

Bore hole data used	**BH-1**
Depth of Foundation below ground level, D=	1.30m
Width/Diameter of Foundation,B=	3.00m
Ratio of Depth to Width,D/B=	0.43
Hence the Foundation is(As per Cl.2.2.5)=	Shallow
Depth of Water Table,Dw=	.000m
Depth of Water Table after Base of Footing,Dw-D=	.000m
Length of Foundation,L=	3.00m
Ratio of Length to Width,L/B=	1.0
Inclination of the load to the vertical in degrees,α=	0

Code of Foundation=	3	**Code:**	Continuous Strip=	1
Put 1 for raft/well foundation and 0 for others:	0		Rectangle =	2
			Square=	3
			Circle=	4

Layer Details:

Layer No.	Level of different layers(m)		Thickness of Layers above Footing(m)	Cohesion (t/m^2)	$\phi(^0)$	Density(t/m^3)	
	Top	Bottom				Bulk	Submerged
I	0.00	1.10	1.10	2.00	0	1.60	0.60
II	1.10	3.80	0.20	2.90	0	1.84	0.84
III	3.80	16.00	0.00	1.70	0	1.68	0.68

Bearing Capacity Equation:

$q_d = cN_c s_c d_c i_c + q(N_q-1)s_q d_q i_q + 0.5B\gamma N_\gamma s_\gamma d_\gamma i_\gamma W'$

Various values taken (when $\phi<28^0$ & $\phi>36^0$) :

Depth of influence of foundation=0.7xB=		2.10m
$\phi_{av=}$	0 (in degrees)	
$c_{av=}$	2.90 t/m^2	
$\Phi=$	0.00 (in degrees)	
$c=$	2.90 t/m^2	
$\gamma=$	0.84 t/m^3	
$N\phi=$	1	
$q=$	0.83 t/m^2	

Factors :

Shape Factors			Depth Factors			Inclination Factors		
s_c	s_q	s_γ	d_c	d_q	d_γ	i_c	i_q	i_γ
1.30	1.20	0.80	1.09	1.00	1.00	1.00	1.00	0.00

Bearing Capacity Factors :

$N_c=$	5.14
$N_q=$	1
$N_\gamma=$	0

Water Table Correction:

D=	1.300 m
(D+B)=	4.300 m
$D_w=$	0.000 m
W' =	0.50

Net Ultimate Bearing Capacity=	**21.06 t/m^2**
Considering Factor of Safety(F.O.S)=	2.5
Net Safe Bearing Capacity to be considered=	**8.4 t/m^2**

Settlement Calculation For Same Foundation :
Code Used: IS 8009(Part-I)-1976

Final settlement, $S_f = S_i + S_c$

$S_i = pB(1-\mu^2)*I/E$

where, p= Foundation pressure=	8.42 t/m^2	
B= Width/Diameter of foundation=	3.00 m	
D= Depth of foundation =	1.30 m	
L= Length of Foundation =	3.00m m	
μ= Poisson's Ratio=	0.5	
I= Influence Factor=	1.12	
C=	2.90 t/m^2	
E= Modulus of Elasticity =	1740.00 t/m^2	

$S_c = \Delta p X m_v X H$

where, Δp= Pressure increment, t/m^2

m_v= Coefficient of volume compressibility, m^2/ t

H= Thickness of compressible stratum measured from foundation level , m

Depth of influence of foundation for settlement=   6 m

Layer No.	m_v(m^2/t) for Pressure range (t/m2)						
	0.0	2.5	2.5	5.0	5.0	10.0	10.0	20.0
I	0.0000		0.0000		0.0000		0.0000	
II	0.0031		0.0031		0.0026		0.0018	
III	0.0047		0.0047		0.0035		0.0026	

Layer No.	Middle Point of Each Layer from Footing Level(m)	B/2z	L/2z	Influence value, I_B (from Fig.18)	Δp (t/m^2)	S_c (mm)
I	0.00	0.00	0.00	0.000	0.00	0.00
II	1.25	1.20	1.20	0.783	6.60	48.98
III	4.25	0.35	0.35	0.197	1.66	27.45

Immediate settlement , S_i =   12 mm
Total consolidation settlement , S_c =   76 mm

From Fox's Correction Curve Table , depth factor (d_f) =   0.8625
Co-efficient due to pore pressure for normally
consolidated soil (λ) =   1   Rigidity Factor   1
Total corrected settlement (S)=   76 mm

Computation of Allowable Bearing Capacity

Permissible settlement =   75.0 mm
Allowable bearing capacity (q_a)=   8.3 t/m^2