#Roshan Chawan 22CV013

# To Determine the bearing capacity of soil with water table

BulkDensity =float(input("Enter the value of Bulk Density of soil:"))

SatDensity = float(input("Enter the value of Saturated Density of soil:"))

WaterDensity = float(input("Enter the unit Weight of Water:"))

Df= float(input("Enter the value of depth of footing:"))

Dw = float(input("Enter the value of water table above footing level:"))

Dw1= float(input("Enter the value of Water table below the level of footing:"))

B=float(input("Enter the value of width of footing:"))

Nq= float(input("Enter the vaiue of Nq:"))

Ng =float(input("Enter the value of N ganna (N):")) # Corrected variable name

SubDensity = SatDensity - WaterDensity # Corrected variable assignment

print("Submerged Weight of soil is:", SubDensity)

# The bearing capacity of soil when water table is at ground

print ("CASE A")

qu= (SubDensity\* Df\*Nq) + (0.5\*0.8\*B\*SubDensity\*Ng) # Corrected variable name and multiplication

print ("The value of ultimate bearing capacity of soil is:", qu)

# Approximate calculation of Bearing capacity of soil is.

Rw= 0.5 + 0.5\*(Dw/B)

print ("The value of Rw is:", Rw)

Rw1 = 0.5 + 0.5\*(Dw1/B) # Corrected division operator

print ("The value of Rw1 is:", Rw1)

qu= (BulkDensity\*Df\*Nq\*Rw) + (0.5\*0.8\*B\*BulkDensity \*Ng\*Rw1) # Corrected variable names and multiplication

print ("The value ultimate bearing capacity of soil is:", qu)

# Case B

print ("CASE B")

qu= (BulkDensity \* Df\*Nq) + (0.5\*0.8\*B\*SubDensity) # Corrected multiplication and variable name

print ("The value of ultimate bearing capacity is:", qu)

Dw = float(input("Enter the value of water table above footing level:"))

Dw1 = float(input("Enter the value of Water table below the level of footing: ")) # Corrected closing quote

print ("The approximate value of ultimate bearing capacity is: ")

Rw=0.5 + 0.5\*(Dw/B)

print ("The value of Rw is:", Rw)

Rw1= 0.5 + 0.5\* (Dw1/B) # Corrected division operator

qu= (BulkDensity \* Df \* Nq \* Rw) + (0.5 \* 0.8 \* B \* BulkDensity \* Ng \* Rw1) # Corrected multiplication and variable names

print ("The approximate value of ultimate hearing capacity is: ", qu)

# Case C

print ("CASE C")

x = float(input("Enter the value of depth of water below footing:"))

qu = (BulkDensity \* Df \* Nq) + (0.5 \* 0.8 \* (BulkDensity \* x) + (SubDensity \* (B-x)) \* Ng) # Corrected multiplication and variable names

print ("The value of ultimate bearing capacity is:", qu)

Dw = float(input("Enter the value of water table above footing level:"))

Dw1= float(input("Enter the value of Water table below the level of footing:")) # Corrected closing quote

print ("The approximate value of ultimate bearing capacity is:")

Rw= 0.5 + 0.5\*(Dw/B) # Corrected

print ("The value of Rw is:", Rw)

Rw1 = 0.5 + 0.5\*(Dw1/B) # Corrected division operator

print ("The value of Rwl is: ", Rw1)

qu= (BulkDensity \* Df \* Nq \* Rw) + (0.5\*0.8\*B\*BulkDensity\*Ng\*Rw1) # Corrected multiplication and variable names

print ("the value of ultimate bearing capaciy is:", qu)

Output –

Enter the value of Bulk Density of soil:18

Enter the value of Saturated Density of soil:20

Enter the unit Weight of Water:10

Enter the value of depth of footing:2

Enter the value of water table above footing level:0

Enter the value of Water table below the level of footing:0

Enter the value of width of footing:3

Enter the vaiue of Nq:33

Enter the value of N ganna (N):34

Submerged Weight of soil is: 10.0

CASE A

The value of ultimate bearing capacity of soil is: 1068.0

The value of Rw is: 0.5

The value of Rw1 is: 0.5

The value ultimate bearing capacity of soil is: 961.2

CASE B

The value of ultimate bearing capacity is: 1200.0

Enter the value of water table above footing level:3

Enter the value of Water table below the level of footing: 0

The approximate value of ultimate bearing capacity is:

The value of Rw is: 1.0

The approximate value of ultimate hearing capacity is: 1555.2

CASE C

Enter the value of depth of water below footing:1

The value of ultimate bearing capacity is: 1875.2

Enter the value of water table above footing level:3

Enter the value of Water table below the level of footing:1

The approximate value of ultimate bearing capacity is:

The value of Rw is: 1.0

The value of Rwl is: 0.6666666666666666

the value of ultimate bearing capaciy is: 1677.6

#Roshan Chawan 22CV013

# To find the ultimate load carring capacity of pile

UCS = float(input("Enter the value of UCS of soil:"))

Cu = UCS/2

B = float(input("Enter the value of dimension of pile:"))

l=float(input("Enter the length of pile:"))

Alpha = float(input("Enter the value of adhesion factor:"))

Nc= float(input("The value of Nc: "))

Ab = B\*B

print("the Base area of footing is:", Ab)

As = 4\*B\*l

print("The value of chohesion of soil is:", Cu)

Qpu = Cu\*Nc\*Ab

print("'Qpu:", Qpu)

Qf = Alpha\*Cu\*As

print ("Qf:", Qf)

Qu= Qpu + Qf

print("the value of load carrying capacity of pile is (Qu):", Qu)

Output –

Enter the value of UCS of soil:75

Enter the value of dimension of pile:0.45

Enter the length of pile:15

Enter the value of adhesion factor:0.8

The value of Nc: 9

the Base area of footing is: 0.2025

The value of cohesion of soil is: 37.5

'Qpu: 68.34375

Qf: 810.0

the value of load carring capacity of pile is (Qu): 878.34375

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# To Determine the bearing capacity of soil with water table

BulkDensity = float (input ("Enter the value of Bulk Density of soil:"))

SatDensity = float (input ("Enter the value of Saturated Density of soil:"))

WaterDensity = float (input ("Enter the unit Weight of Water:"))

Df = float (input ("Enter the value of depth of footing:"))

B = float (input ("Enter the value of width of footing:"))

Nq = float (input ("Enter the value of Nq:")) # Added missing Nq input

Ng = float (input ("Enter the value of Ng:"))

# N Gamma = float (input ("Enter the value of N gamma (N):")) # Corrected variable name

SubDensity = SatDensity - WaterDensity

print ("Submerged Weight of soil is:", SubDensity)

M = int (input("Number of data values of Water table above footing level: "))

N = int (input("Number of data values of Water table below footing level: "))

Dw = []

Dw1 = [] # Corrected list initialization

for i in range (M) : # Range should start from 0

    print ("Enter the value of water table above footing level measured w.r.t. ground (Dw) : ")

    Depth\_Dw = float (input ())

    Dw. append (Depth\_Dw)

    Rw = 0.5 + 0.5\* (Depth\_Dw/B) # Corrected variable name

    print ("The value of Rw is:", Rw)

for j in range (N): # Range should start from 0

    print ("Enter the value of water table below footing level measured w.r.t. ground (Dw1): ")

    Depth\_Dw1 = float (input())

    Dw1.append (Depth\_Dw1) # Corrected variable name

    Rw1 = 0.5 + 0.5\*(Depth\_Dw1/B) # Corrected variable name

    print ("The value of Rw1 is:", Rw1)

    qu= (BulkDensity\*Df\*Nq\*Rw) + (0.5\*0.8\*B\*BulkDensity\*Ng\*Rw1) # Corrected variable name

    print ("qu: ", qu, "kN/m^2")

Output –

Enter the value of Bulk Density of soil:18

Enter the value of Saturated Density of soil:20

Enter the unit Weight of Water:10

Enter the value of depth of footing:2

Enter the value of width of footing:3

Enter the value of Nq:33

Enter the value of Ng:34

Submerged Weight of soil is: 10.0

Number of data values of Water table above footing level: 3

Number of data values of Water table below footing level: 3

Enter the value of water table above footing level measured w.r.t. ground (Dw) : 0

The value of Rw is: 0.5

Enter the value of water table above footing level measured w.r.t. ground (Dw) : 1

The value of Rw is: 0.6666666666666666

Enter the value of water table above footing level measured w.r.t. ground (Dw) : 2

The value of Rw is: 0.8333333333333333

Enter the value of water table below footing level measured w.r.t. ground (Dw1): 0

The value of Rw1 is: 0.5

qu: 1357.1999999999998 kN/m^2

Enter the value of water table below footing level measured w.r.t. ground (Dw1): 1

The value of Rw1 is: 0.6666666666666666

qu: 1479.6 kN/m^2

Enter the value of water table below footing level measured w.r.t. ground (Dw1): 2

The value of Rw1 is: 0.8333333333333333

qu: 1602.0 kN/m^2