Spreadsheet Title:	Pile Group Analysis, ver. 3.12 ((c) DesignSpreadsheets.com 2003-2008)
Last Revision Date:	2/6/2006
	All blue fields are used for input.
	by DesignSpreadsheets.com www.designspreadsheets.com/pile-group email: info@designspreadsheets.com

Project	Demo of Pile Group Analysis Spreadsheet for DesignSpreadsheets.com webpage.
Job No.	xy
Subject	xy
Sheet No.	xy
Made By	admin
Date Made	2/6/2006
Checked By	admin
Date Checked	2/6/2006

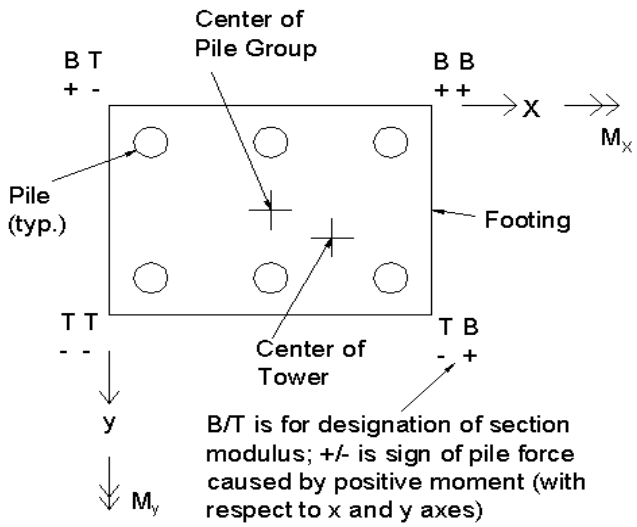
Comments

2/6/2006	Created by BridgeArt.net.

Spreadsheet Instructions

This spreadsheet can be used to calculate pile forces for regular or irregular pile groups.

Sign Convention



Pile Layout Tab

Enter pile layout into the table provided.

Pile Forces Summary Tab

Enter additional pile information. Forces in corner piles are calculated on this tab.

Individual Pile Forces Tab

User can review individual pile forces for all load combinations available from the drop down menu.

Aux1 Tab

Auxiliary tab used to assemble source data for pile group graph.

Log of Spreadsheet Author (Info for Prospective Developers)

TO DO	Write macro to populate the pile layout table from pile coordinates entered pile by pile.

Color coding

[CYAN shading]	User's input.
[LIGHT GREEN shading]	Cell whose content was copied to adjacent cells AS FORMULA.

Disclaimer

Spreadsheet Revision History

3/14/2005 [ver. 3.1]	Spreadsheet graphical interface was standardized.
2/6/2006 [ver. 3.12]	Added graph to show the actual pile layout. Placed all the input other than pile layout on the "Pile Forces Summary tab". Expanded instructions. First BridgeArt.net version.

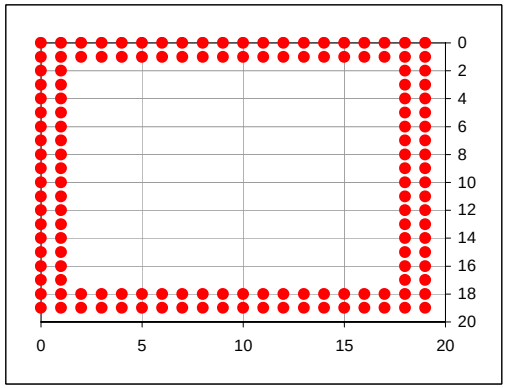
Registration

Unregistered Demo Version

DESIGN SPREADSHEETS .COM

Pile Group Analysis, ver. 3.12
((c) DesignSpreadsheets.com 2003-2008)

Project: ***Demo of Pile Group Analysis Spreadsheet for DesignSpreadsheets.com webpage.***	Made By: *admin* Date: *2/6/2006*	Job No: *xy*
Subject: *xy*	Checked By: *admin* Date: *2/6/2006*	Sheet No: *xy*



Enter Pile Layout

Input Verification

- check 1 (x)	OK
- check 2 (x)	OK
- check 1 (y)	OK
- check 2 (y)	OK

Update Graph

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
y[ft]\x[fy] PILE AREA	0.000	1.000	2.000	3.000	4.000	5.000	6.000	7.000	8.000	9.000	10.000	11.000	12.000	13.000	14.000	15.000	16.000	17.000	18.000	19.000
1	0.000	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	1.000	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3	2.000	1	1																1	1
4	3.000	1	1																1	1
5	4.000	1	1																1	1
6	5.000	1	1																1	1
7	6.000	1	1																1	1
8	7.000	1	1																1	1
9	8.000	1	1																1	1
10	9.000	1	1																1	1
11	10.000	1	1																1	1
12	11.000	1	1																1	1
13	12.000	1	1																1	1
14	13.000	1	1																1	1
15	14.000	1	1																1	1
16	15.000	1	1																1	1
17	16.000	1	1																1	1
18	17.000	1	1																1	1
19	18.000	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
20	19.000	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

DESIGN SPREADSHEETS .COM

Pile Group Analysis, ver. 3.12
((c) DesignSpreadsheets.com 2003-2008)

Project: ***Demo of Pile Group Analysis Spreadsheet for DesignSpreadsheets.com webpage.***	Made By: *admin* Date: *2/6/2006*	Job No: *xy*
Subject: *xy*	Checked By: *admin* Date: *2/6/2006*	Sheet No: *xy*

Additional Input

Other Inputs (For Calculation of Addtitional Forces):

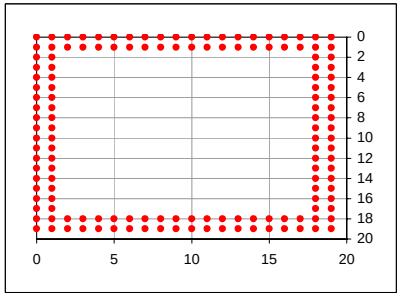
Footing Length:		*ft*
Footing Width:		*ft*
Foooting Height:		*ft*
Footing Material Density	0.15	*kip/ft³*
Footing DL:	0.0	*kips*
P due to assymetrical block		*kips*
Mx due to assymetrical block (Longitudinal)		*kip-ft*
My due to assymtrical block (Transverse)		*kip-ft*
Tower x eccentricity (Transverse)		*ft*
Tower y eccentrity (Longitudinal)		*ft*
(El. Base of Tower) - (El. Bottom of Footing)		*ft*

Pile Group Properties:

x_cg	9.500	*ft*
y_cg	9.500	*ft*
Modulus Sx Top (Longitudinal):	827.37	*ft³*
Modulus Sx Bottom (Longitudinal):	827.37	*ft³*
Modulus Sy Top (Transverse):	827.37	*ft³*
Modulus Sy Bottom (Transverse):	827.37	*ft³*

Pile Capacity:

In Compression:	70	*kips*
In Uplift:	20	*kips*



Group Loadings and Resulting Pile Forces (Min and Max):

	Forces at the Tower Base					Multipliers		Moments due to tower eccentricity		Total Forces at the Bottom of the Footing			Corner Pile Forces				Multiplier	Max Pile C Force	Max Pile T Force
	P	Longitudinal		Transverse		for ftg self-weight	for assym. block												
		Fy	Mx	Fx	My			Mx	My	P	Mx	My							
	[kips]	[kips]	[kip-ft]	[kips]	[kip-ft]	[-]	[-]	[kip-ft]	[kip-ft]	[kips]	[kip-ft]	[kip-ft]	[kips]	[kips]	[kips]	[kips]		[kips]	[kips]
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
Group I	-6529.0					0.0	0	0.0	0.0	-6529.0	0.0	0.0	-45.3	-45.3	-45.3	-45.3	1.000	-45.3	-45.3
Group IIa	-3207.0			-331.0	13819.0	0.0	0	0.0	0.0	-3207.0	0.0	13819.0	-39.0	-5.6	-39.0	-5.6	0.800	-31.2	-4.5
Group IIb	-3207.0	760.0	27523.0	-112.0	4535.0	0.0	0	0.0	0.0	-3207.0	27523.0	4535.0	5.5	16.5	-61.0	-50.1	0.800	-48.8	13.2
Group IIIa	-6454.0	238.0	8955.0	-187.0	8199.0	0.0	0	0.0	0.0	-6454.0	8955.0	8199.0	-43.9	-24.1	-65.6	-45.7	0.800	-52.4	-19.3
Group IIIb	-6454.0	572.0	21200.0	-64.0	2742.0	0.0	0	0.0	0.0	-6454.0	21200.0	2742.0	-22.5	-15.9	-73.8	-67.1	0.800	-59.0	-12.7
Group IV	-6529.0	132.0	4967.0			0.0	0	0.0	0.0	-6529.0	4967.0	0.0	-39.3	-39.3	-51.3	-51.3	0.800	-41.1	-31.5
Group Va	-3207.0	132.0	4967.0	-331.0	13819.0	0.0	0	0.0	0.0	-3207.0	4967.0	13819.0	-33.0	0.4	-45.0	-11.6	0.714	-32.1	0.3
Group Vb	-3207.0	892.0	32489.0	-112.0	4535.0	0.0	0	0.0	0.0	-3207.0	32489.0	4535.0	11.5	22.5	-67.0	-56.1	0.714	-47.9	16.1
Group VIa	-6454.0	370.0	13921.0	-187.0	8199.0	0.0	0	0.0	0.0	-6454.0	13921.0	8199.0	-37.9	-18.1	-71.6	-51.7	0.714	-51.1	-12.9
Group VIb	-3207.0			-331.0	13819.0	0.0	0	0.0	0.0	-3207.0	0.0	13819.0	-39.0	-5.6	-39.0	-5.6	0.714	-27.8	-4.0
x1								0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
x2								0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
x3								0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
x4								0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
x5								0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
x6								0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
x7								0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
x8								0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0

Governing Min and Max Pile Forces [kips]:

-59.0	16.1

OK

Notes:

(A) See ReadMe tab for additional instructions.

(B) Minimum and maximum pile forces are based on the following contributions: (a) forces at the base of the tower transferred to the bottom of the pile cap, (b) self-weight of the footing, (c) assymetrical block and (d) tower eccentricity relative to the footing.

(C) All compression forces have negative sign.

(D) Reversible transverse moments (e.g. due to wind) are entered with corresponding sign to amplify moments caused by tower eccentricity.

Project: ***Demo of Pile Group Analysis Spreadsheet for DesignSpreadsheets.com webpage.***	Made By: *admin*	Date: *2/6/2006*	Job No: *xy*
Subject: *xy*	Checked By: *admin*	Date: *2/6/2006*	Sheet No: *xy*

Individual Pile Forces (Including Multiplier)

Select Load Combination: Group IIa

Multiplier: 0.800
P -2565.6 *kips*
Mx 0.0 *kip-ft*
My 11055.2 *kip-ft*

Results:
Max Pile Compression: -31.2 *kips*
Max Pile Uplift: -4.5 *kips*

OK

		x [ft]	0.000	1.000	2.000	3.000	4.000	5.000	6.000	7.000	8.000	9.000	10.000	11.000	12.000	13.000	14.000	15.000	16.000	17.000	18.000	19.000
		Sy [ft^3]	-827.4	-924.7	-1048.0	-1209.2	-1429.1	-1746.7	-2245.7	-3144.0	-5240.0	-15720.0	15720.0	5240.0	3144.0	2245.7	1746.7	1429.1	1209.2	1048.0	924.7	827.4
y [ft]	Sx [ft^3]																					
0.000	827.4		-31.2	-29.8	-28.4	-27.0	-25.6	-24.1	-22.7	-21.3	-19.9	-18.5	-17.1	-15.7	-14.3	-12.9	-11.5	-10.1	-8.7	-7.3	-5.9	-4.5
1.000	924.7		-31.2	-29.8	-28.4	-27.0	-25.6	-24.1	-22.7	-21.3	-19.9	-18.5	-17.1	-15.7	-14.3	-12.9	-11.5	-10.1	-8.7	-7.3	-5.9	-4.5
2.000	1048.0		-31.2	-29.8																	-5.9	-4.5
3.000	1209.2		-31.2	-29.8																	-5.9	-4.5
4.000	1429.1		-31.2	-29.8																	-5.9	-4.5
5.000	1746.7		-31.2	-29.8																	-5.9	-4.5
6.000	2245.7		-31.2	-29.8																	-5.9	-4.5
7.000	3144.0		-31.2	-29.8																	-5.9	-4.5
8.000	5240.0		-31.2	-29.8																	-5.9	-4.5
9.000	15720.0		-31.2	-29.8																	-5.9	-4.5
10.000	-15720.0		-31.2	-29.8																	-5.9	-4.5
11.000	-5240.0		-31.2	-29.8																	-5.9	-4.5
12.000	-3144.0		-31.2	-29.8																	-5.9	-4.5
13.000	-2245.7		-31.2	-29.8																	-5.9	-4.5
14.000	-1746.7		-31.2	-29.8																	-5.9	-4.5
15.000	-1429.1		-31.2	-29.8																	-5.9	-4.5
16.000	-1209.2		-31.2	-29.8																	-5.9	-4.5
17.000	-1048.0		-31.2	-29.8																	-5.9	-4.5
18.000	-924.7		-31.2	-29.8	-28.4	-27.0	-25.6	-24.1	-22.7	-21.3	-19.9	-18.5	-17.1	-15.7	-14.3	-12.9	-11.5	-10.1	-8.7	-7.3	-5.9	-4.5
19.000	-827.4		-31.2	-29.8	-28.4	-27.0	-25.6	-24.1	-22.7	-21.3	-19.9	-18.5	-17.1	-15.7	-14.3	-12.9	-11.5	-10.1	-8.7	-7.3	-5.9	-4.5