PEYSANJ

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About

PEYSANJ

PEYSANJ is a bundle of powerful geotechnical tools for bearing capacity and settlement estimation, pressure meter and plate loading test analysis, lateral earth pressure analysis, etc. For more information please visit *our website*.

Although all efforts have been undertaken to ensure that this software is of the highest possible quality and that the results obtained are correct, the authors do not warrant the functions contained in the program will meet your requirements or that the operation of the program will be uninterrupted or error-free. The authors are not responsible and assume no liability for any results or any use made thereof, nor for any damages or litigation that may result from the use of the software for any purpose. All results to be verified independently by user.

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Vancouver, Canada

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Getting Started ...

We recommend minimum 1024*768 screen resolution for using PEYSANJ.

If you are using the dongle key version, please make sure that it is plugged in before you run the program.

To invoke the help, please press [?] button on top-right corner of each page.

Make sure you prepare backup from your data periodically. Your database is **PEYSANJ4.MDB** file (see more).

After each installation, please open the "Options" page and set the default parameters and choose your favorite analyses methods. This is a very important step in PEYSANJ installation and setup, otherwise you may end up with incorrect results.

You can print, zoom, set the scales and do more with charts. To activate a chart, simply double-click on it. A new dialog will appear which allows you to configure the look of the chart as well as saving the chart as image files, printing the graph, etc.

Please contact us at support@novotechsoftware.com if you had any questions or suggestions.

Units System

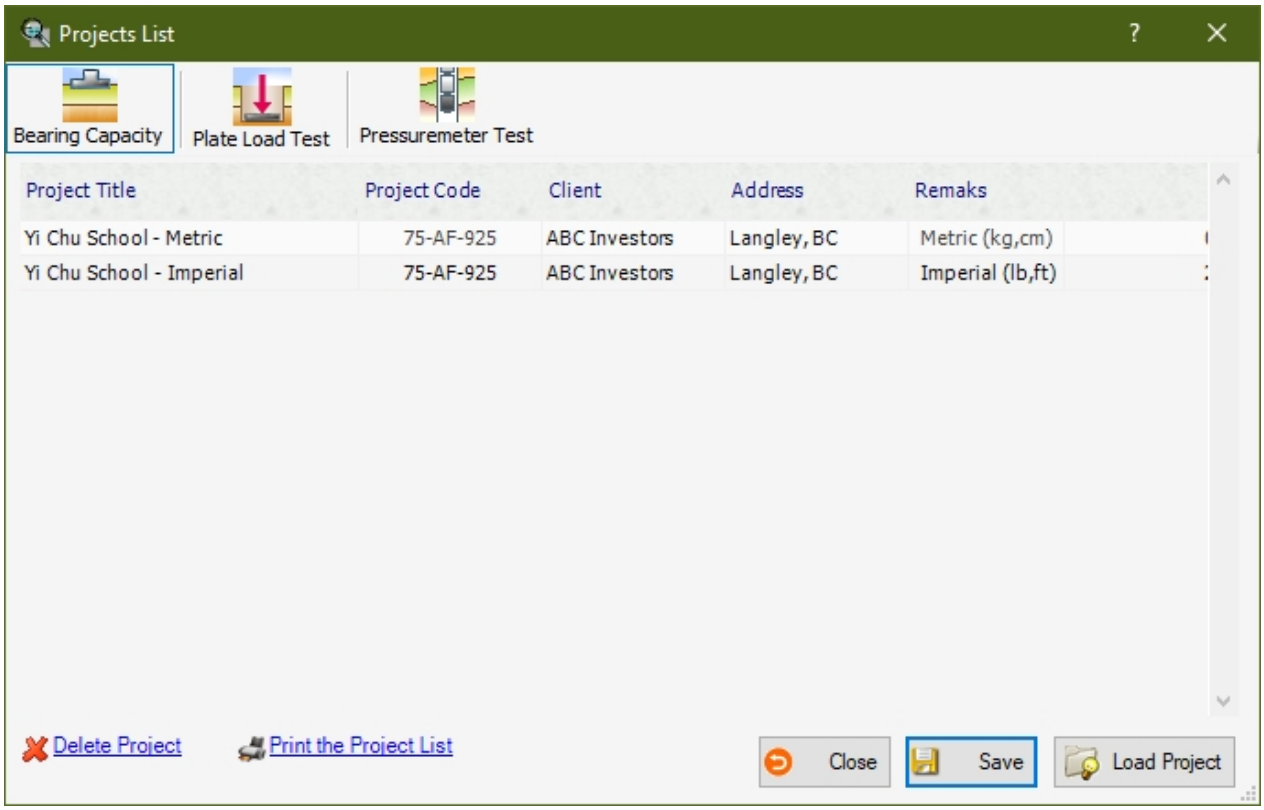
This version of PEYSANJ supports the following unit systems:

- Metric Asia (kg, cm)
- Metric US (kN, m)
- US Customary / Imperial (lb, ft, in)

You can set the unit system on the Options page.

Projects List

This page lists all the projects saved in the PEYSANJ database. This page can be accessed from the *Project → Load* from the top toolbar:



In order to load a project, first select the type of analysis (Bearing Capacity, Plate Load Test, etc) from the top toolbar. Then simply select the project on the list and click on *Load Project* button. You can also edit project information such as client name or address, etc.; Please click on *Save* button to save the data before loading the project or closing this page.

Deleting a Project

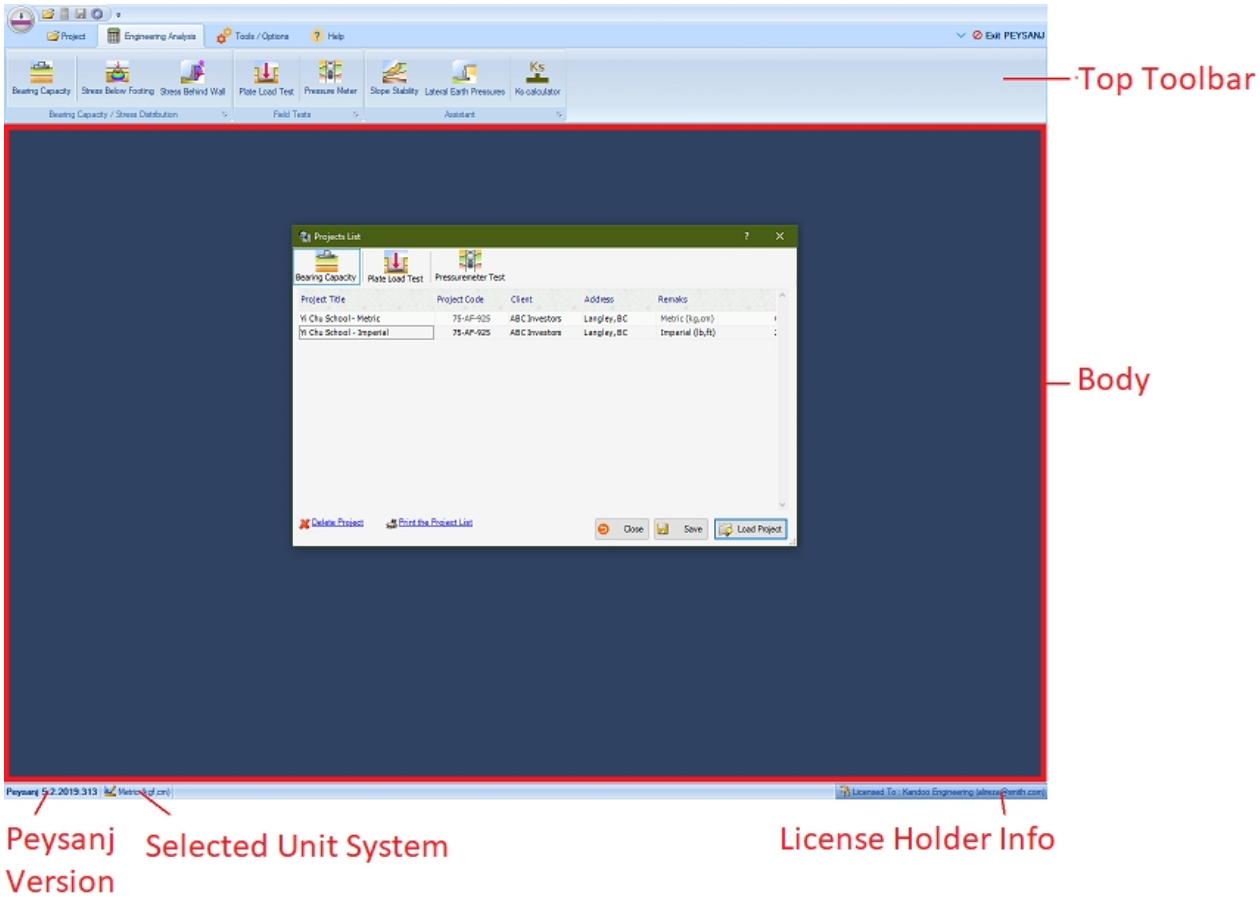
In order to delete a specific project, click on *Delete Project* link at the bottom-left of the page. Please notice that this can not be reversed.

Print the Project List

In order to print the list of all projects, click on *Print the Project List* link at the bottom-left of the page. This will show the print preview page.

Main Screen

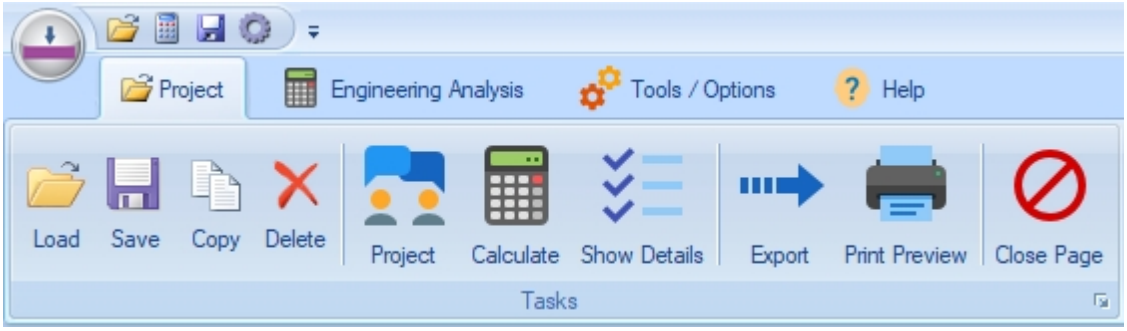
This is the main page of PEYSANJ and provides so many features through the top menu-bar / toolbar. Each part of this page is illustrated below:



Top Toolbar

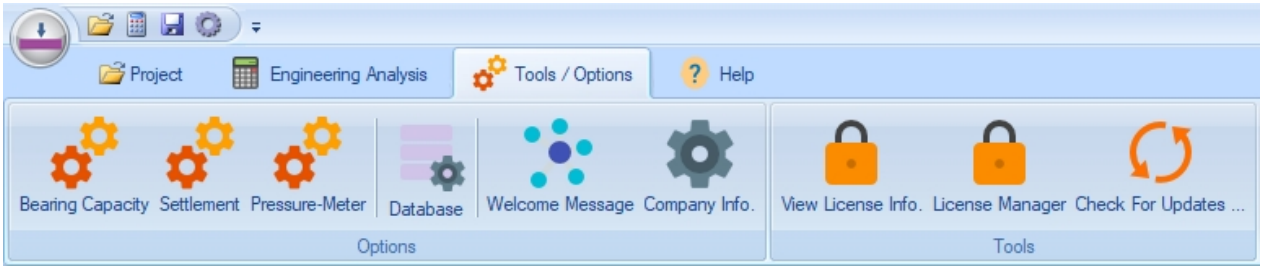
The toolbar provides you the access to load/save projects, performing the calculations, accessing the help file, etc. Different tabs are illustrated in the following sections:

Project tab

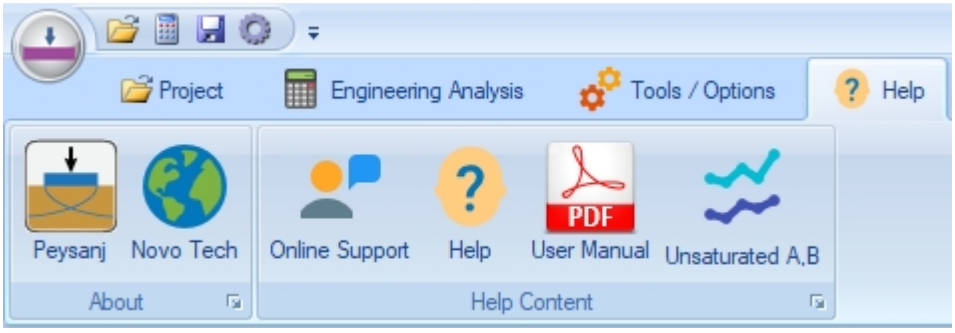


Engineering Analysis tab

Tools / Options tab



Help tab



Body

Most of the PEYSANJ analyses are opened in this part of the page. Multiple pages can be opened in this part of the screen.

Status-bar

This is located at the bottom of the screen and provides you more information about the program version, license holder information and selected units system.

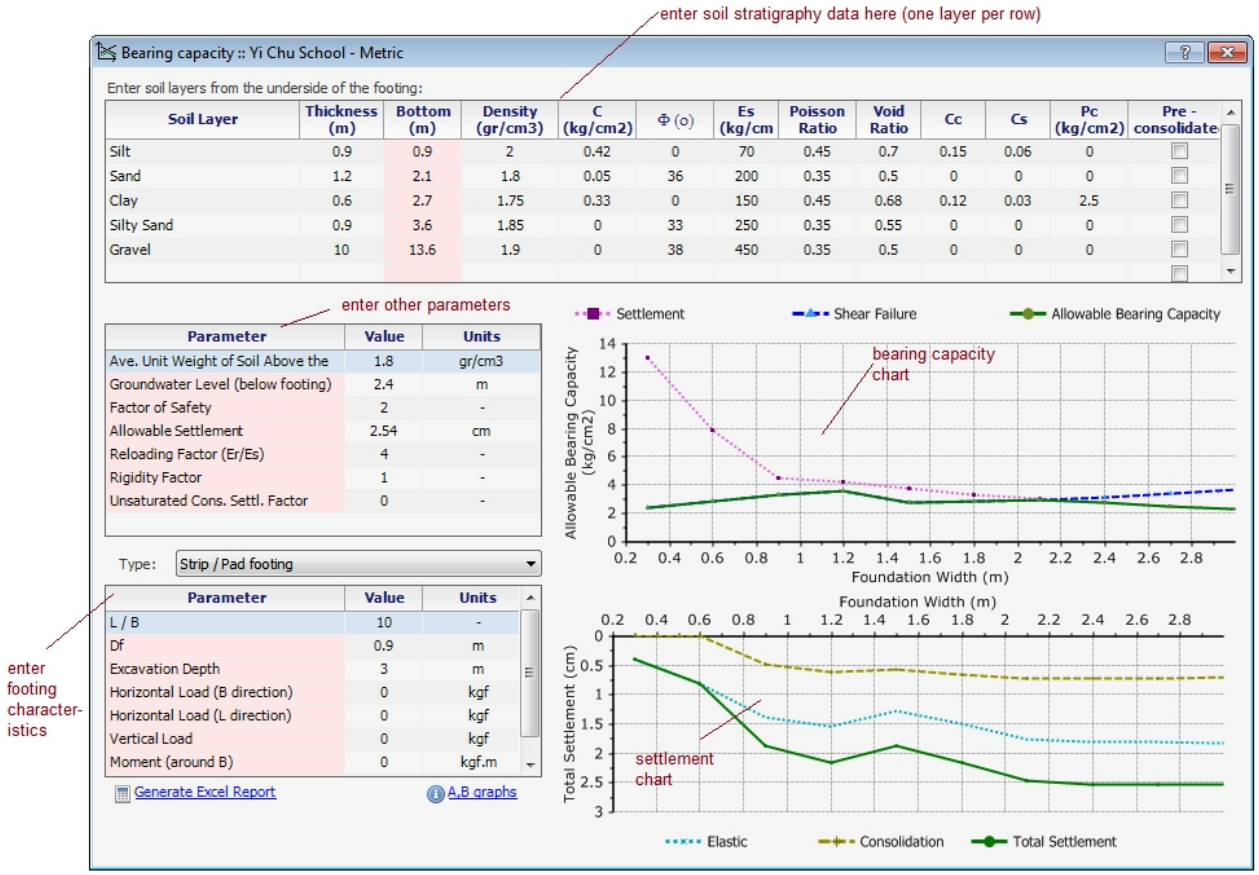
Engineering Analysis

Various types of engineering analysis are available via *Engineering Analysis* tab of the top toolbar:

Bearing Capacity & Settlement

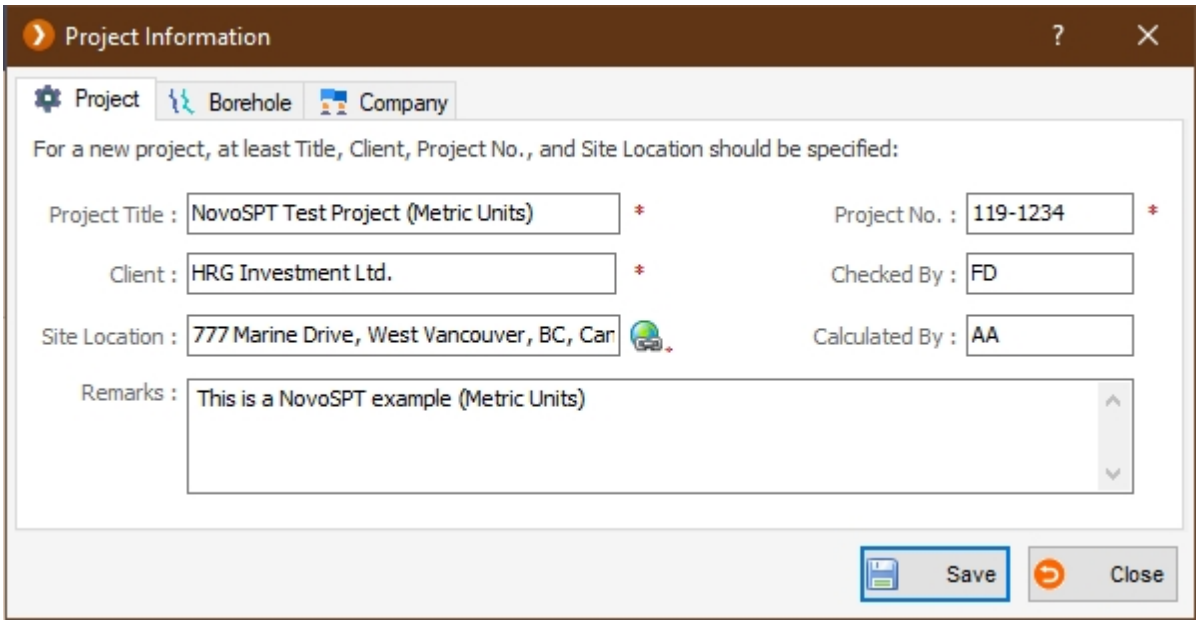
This module is used to calculate allowable bearing capacity of shallow foundations with simultaneously checking both shear failure and settlement. Each part of this page is explained below.

Note: Please read this article to see how PEYSANJ carries out bearing capacity analysis.



Project Information

From the top toolbar, select the Project tab, then click on Project button.



On this page, please enter project title, client name, project code, etc. This data will be shown on the reports.

Soil Layers Table

Your stratigraphy model may contain unlimited soil layers. Please specify the following parameters for each layer:

- **Soil Layer:** simple description for layer. This field is only for user's information and does not have any effect on bearing capacity analysis
- **C:** Coefficient of cohesion.
- **Φ (deg):** Internal angle of friction (between zero and 45 degrees).
- **Es:** Modulus of elasticity.
- **v:** Poisson ratio (between zero and 0.5).
- **γ:** Total unit weight.
- **Z1:** top depth of the layer.
- **Z2:** bottom depth of the layer. There should be no gap between layers, so Z1 for this layer should be same as Z2 for layer above. For the last layer use a very large number like 1000m to assure that stress bulb would not pass the bottom of your model.
- **Su:** Undrained shear strength. This parameter should only be entered when Φ=0; based on Hanson bearing capacity theory, when Φ=0 then Su will be considered for shear failure analysis.
- **Cc , Cs:** Consolidation compression and re-compression indexes. They should only be entered when you want the consolidation settlement to be calculated for this layer. If these parameters are entered but water level is below this layer, unsaturated consolidation settlement will be calculated for this layer ($Su_{unsaturated}=Su_{saturated}*a$ where a is a factor less than one). You may specify 'a' in the "Analysis Parameters" frame.
- **Pc:** Pre-consolidation stress for consolidation settlement.
- **eo:** Void ratio.
- **Pre-consolidated:** Select this checkbox if the clay layer is pre-consolidated.

To delete a soil layer, select the corresponding row and press SHIFT + DELETE on your keyboard.

If there is bedrock in your subsurface model, enter only the soil layers; When program

computes the stress bulb, no settlement will be calculated below the model.

We recommended you save the data periodically to avoid data loss.

In this section, ground water level and wet unit weight for soil above the foundation level should be specified. Please notice that ground water level is measured from underneath the footing (always positive number).

Analysis Settings

This section contains the main parameters that are used for bearing capacity analysis:

- **Allowable Settlement:** this is usually one inch (25.4mm) for pad/strip footings.
- **Er/Es:** is the ratio of modulus of elasticity of re-loading (Er) to loading (Es) part. The best way to estimate the Er is to conduct a Plate Loading Test; at the beginning of the second cycle of a Plate Loading Test, the slope of the stress-deformation curve (Er) is much sharper than the normal slope of the curve (Es). PEYSANJ uses this Er/Es ratio to apply the stress history effect on the elastic settlement. For example, if your footing Df = 3 ft and γ=115 pcf then γ.Df=345 psf; So during elastic settlement analysis, PEYSANJ will use Er for stress range 0 to 345 psf and thereafter, Es will be used for estimation of settlement.
- **Rigidity Factor (Ir):** This factor is less than zero and depends on rigidity of the footing (usually 0.9 to 1). PEYSANJ applies this factor to the total settlement of the footing S=(Se+Sc)*Ir where Se and Sc are elastic and consolidation settlements, respectively.
- α **Factor**: this factor is used for calculation of un-saturated consolidation settlement. If a fine-grained layer is unsaturated (e.g. S=80%), then the actual consolidation settlement is a fraction of calculated saturated consolidation settlement.
- **Safety Factor:** this parameter is applied to the estimated ultimate shear failure of the soil present below the footing.

Foundation Size

- **Shape:** you may choose among "Pad/Strip", "Raft/Spread/Mat" and "Circular" foundations.
- **Size Ratio (L/B):** is used to specify the length to width ratio of the footing.
- **Df :** is the height of the soil around and above the footing (affects the shear failure).
- **D :** depth of placement of the foundation (usually depth of excavation).
- **MB, ML:** The bending moment applied on the footing.
- **HB, HL:** The horizontal forces applied to the footing.
- **V :** The vertical force applied on the footing.

Note : For raft foundations, consider Df and D same as the excavation depth.

Calculating

Please press *Calculate* button on the top toolbar (Project tab) once the input parameters are entered.

Pad/Strip Footings Outputs

For this type of footings, two charts are presented:

Bearing Capacity Graph: Includes 3 curves; for all of them vertical axis is the allowable stress and horizontal axis is the foundation width (B); please note that, you have already entered L/B ratio so as B increases, the chart covers various foundation sizes:

- **Shear Failure Curve (blue):** Only encompasses the shear failure criteria for the model.
- **Allowable Settlement Curve (purple):** This curve shows the allowable stress, provided that the total settlement is around the allowable settlement already introduced by the user.
- **Allowable Bearing Capacity Curve (green):** This curve is the lower intersection of two above-mentioned curves and assures that on each point along the curve, both settlement and shear failures are within the allowable limits.

Settlement Graph: This includes 3 curves representing Immediate (elastic), Consolidation and Total settlements. Please be advised that these settlement values are calculated based on the resulting allowable bearing capacity calculated for each specific footing size. See how PEYSANJ conducts bearing capacity analysis.

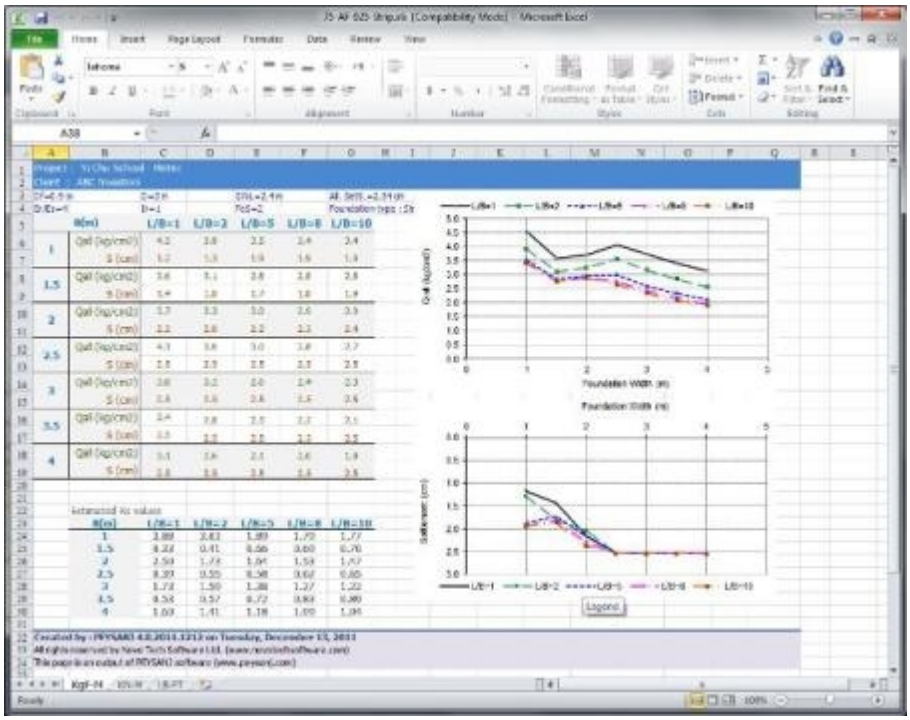
Raft Foundation's Output

For raft foundations since the footing size is considerable, shear failure is typically not governing the design, and restricting the settlement to allowable settlement will control the bearing capacity. Based on user-defined allowable settlement for the footing, the corresponding allowable stress is picked from the settlement plot and is shown on a box.

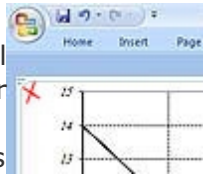
Failure Based Qall=4.43 kg/cm2
Settlement Based Qall=1.3 kg/cm2

Exporting the Results to Microsoft Excel

Click on the Excel tab in the bearing capacity page. This will generate an Excel file containing all Allowable bearing capacity and settlement values for various L/B ratios and different foundation widths (B). The width range and L/B ratios can be specified in the Option page.



1. To generate the Excel file, please click on "Export to Excel" button on Excel tab. This will take few minutes to prepare the file. Please be patient.
2. When you prompt to open the Excel file, please select Yes. When Excel opens the file click on the tabs below the page to view the charts or calculation summary.
3. You can easily copy and past all charts into your other Windows applications (such as Word). please click on top-left corner of charts and right-click. Then choose Copy from the popup menu. Now you just need to paste the chart into your destination program (such as Word).



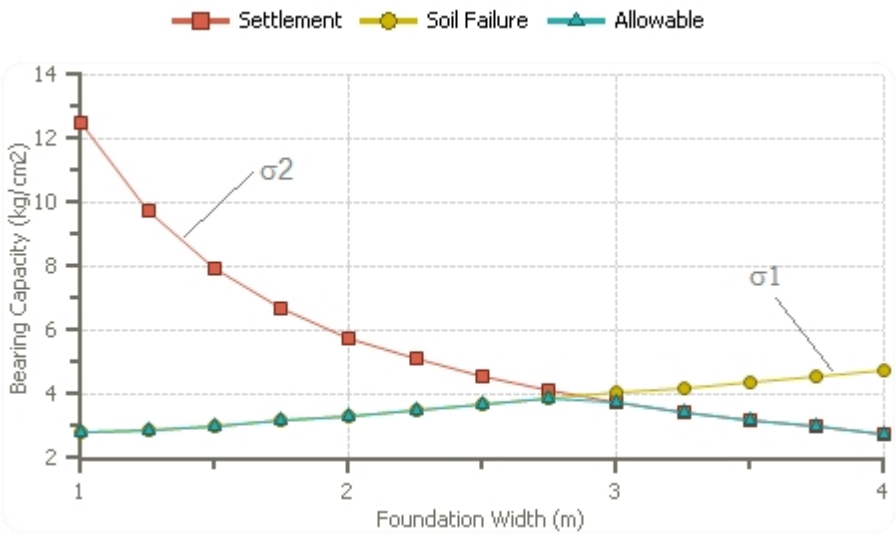
Printing the Results

Press Print button from the toolbar to see the calculation details and the report.

Theory (Bearing Capacity)

For strip and pad footings, PEYSANJ calculates both shear failure and settlement criteria for a range of footing widths (i.e. B1 to B2). At each footing size:

1- Shear Failure: The allowable bearing pressure based on shear failure ($\sigma 1$) is calculated.
2- Settlement: For settlement control, stress is increased from zero to $\sigma 1$ (calculated above) with $\Delta\sigma$ increments. At each step, settlement is calculated and compared with the allowable settlement specified by user. Once the settlement has met the user's criterion, this stress ($\sigma 2$) is recorded as the allowable stress based on settlement.



3- Allowable Stress: Then $\sigma 1$ and $\sigma 2$ are compared at each footing size, and minimum of these two values is introduced as the allowable bearing capacity.

For spread (mat) foundations, however, due to relatively larger footing size, shear failure will not be a limiting criterion. Therefore settlement of the footing is calculated and plotted versus stress. This stress can be set by user to vary from $\sigma 1$ to $\sigma 2$ with $\Delta\sigma$ increment specified by user. This procedure can be configured by user through Options page.

Shear Failure Analysis

PEYSANJ performs bearing capacity analysis of the footings based on Hansen equations, which is a modified version of original Terzaghi bearing capacity. The effect of water level in bearing capacity is taken into account using the method recommended by Braja M. Das in the book "Principles of Foundation Engineering" (6th Edition), Section 3.5 titled "Modification of Bearing Capacity Equations for Water Table".

Settlement Analysis

Three methods can be chosen for elastic (immediate) settlement calculation of footings. For further reference and detailed description of each methodology please refer to reference books. For the purpose of calculating 1-D Terzaghi consolidation settlement, stress increase dP is calculated at the top, middle and the bottom of the layer and an average is calculated $\delta P_{ave}=(\delta p_t+4\delta P_m+\delta P_b)/6$

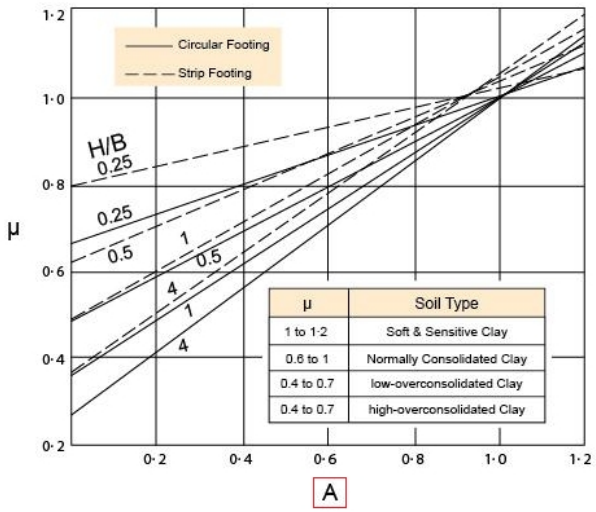
If "Goodier and Timoshenko" method is used for elastic settlement calculation, then stress influence depth H should be calculated first. In this section user can choose how H is calculated. Usually H is taken as the depth in which δP is reached a certain percentage of the stress below footing, where this percentage can be defined by user in Options page.

In general, the total settlement is defined as below in PEYSANJ software:

$$S = I_r\ (S_e+\alpha.S_c)$$

where:

Ir : Rigidity factor (between zero and one; usually more than 0.9). The idea is to allow a rigid foundation to decrease the total settlement due to its ability to uniformly spread the stress.
Se : Elastic settlement
Sc: Consolidation settlement
α : User can specify what percentage of consolidation settlement should be considered in the total settlement calculation. The default value is 1. However, user can choose a lower value if the layer is not saturated to account for lower moisture contents in clay/silt layer:



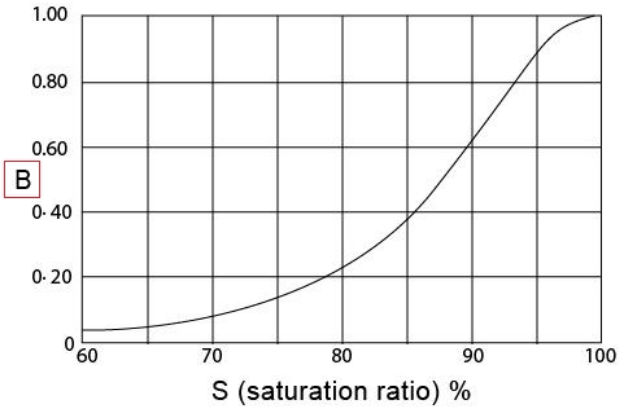
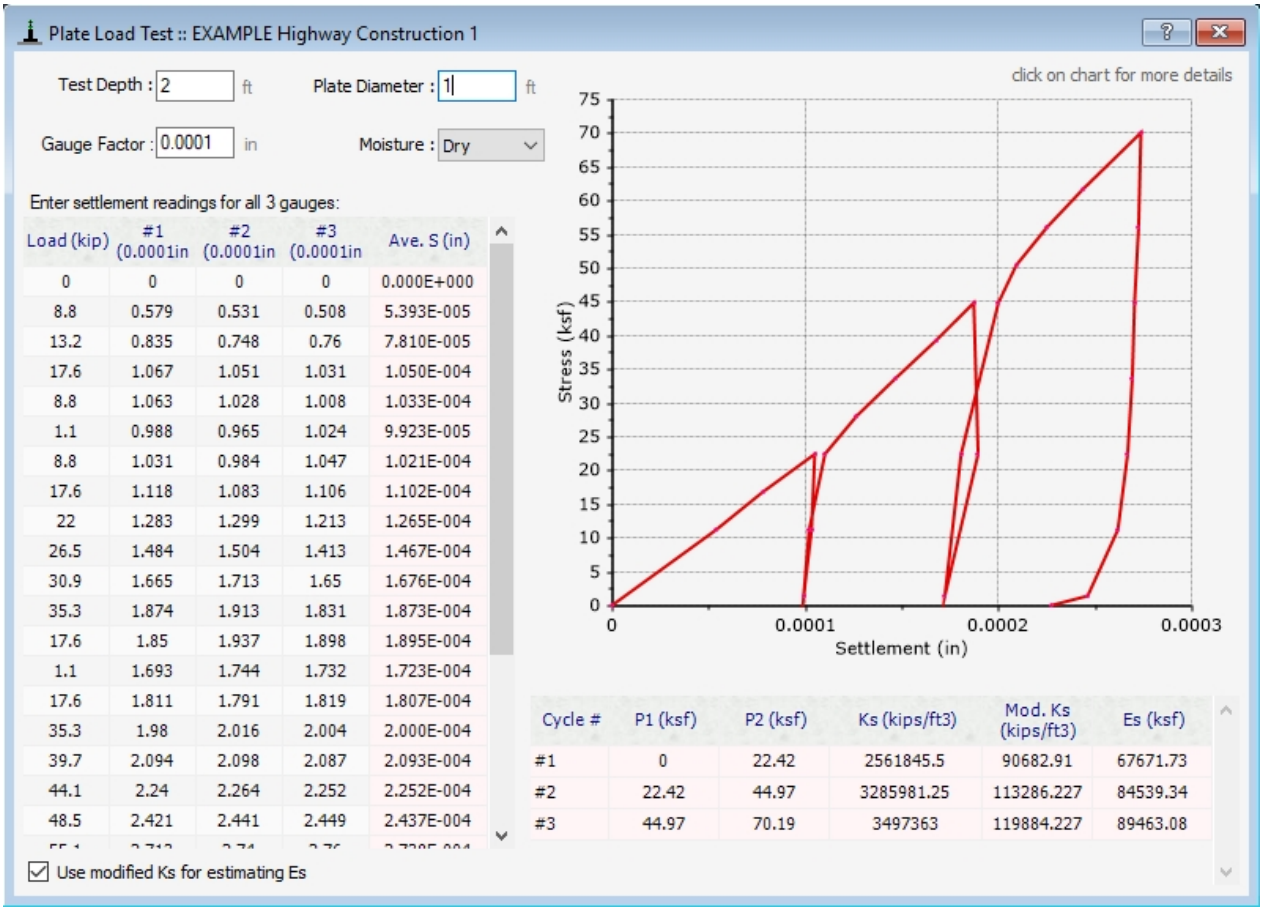


Plate Loading Test

This page is designed for calculating plate loading test. Please enter all 3 settlement gauge readings and press Calculate button from the top toolbar. Modulus of subgrade reaction for each cycle of loading-unloading will be calculated separately and will be presented in the table.

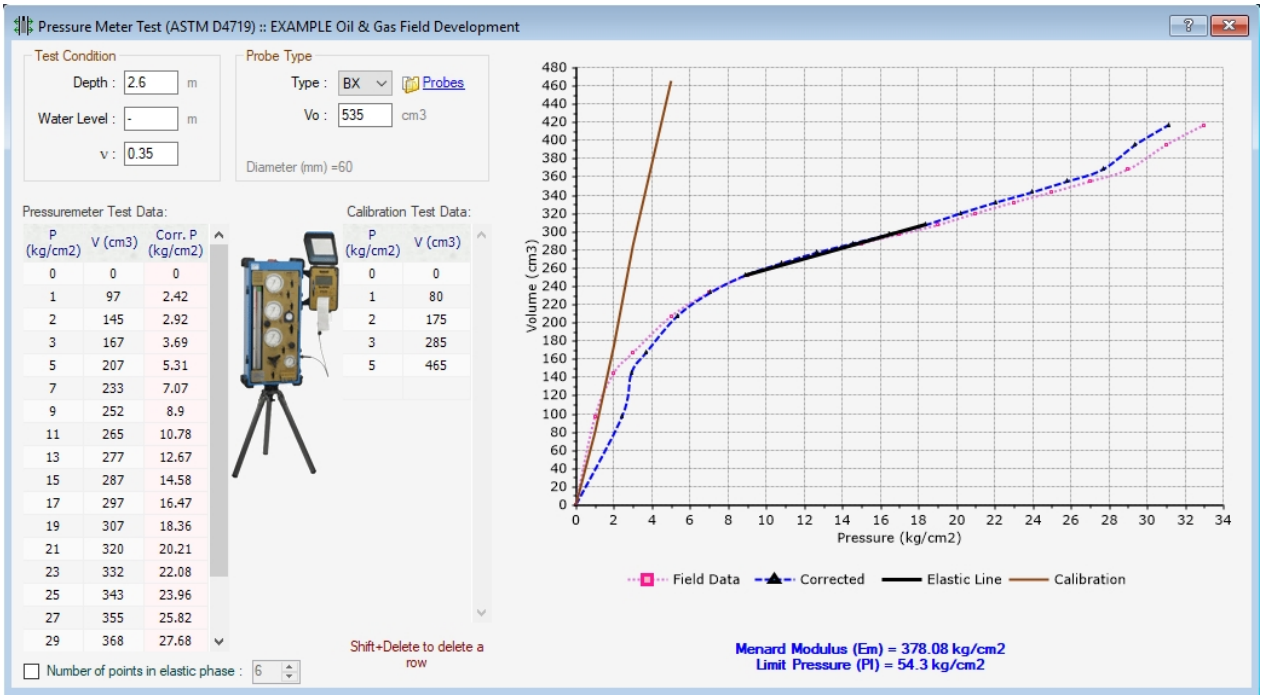


Printing the Results

Press Print button from the toolbar to see the calculation details and the report.

Pressure-meter Test

This page is designed for calculating pressure meter test. Please enter calibration data and test data (including pressure and volume pairs); then press Calculate button from the top toolbar. Menard modulus (Em) and limit pressure (P_L) will be calculated and presented in the table.

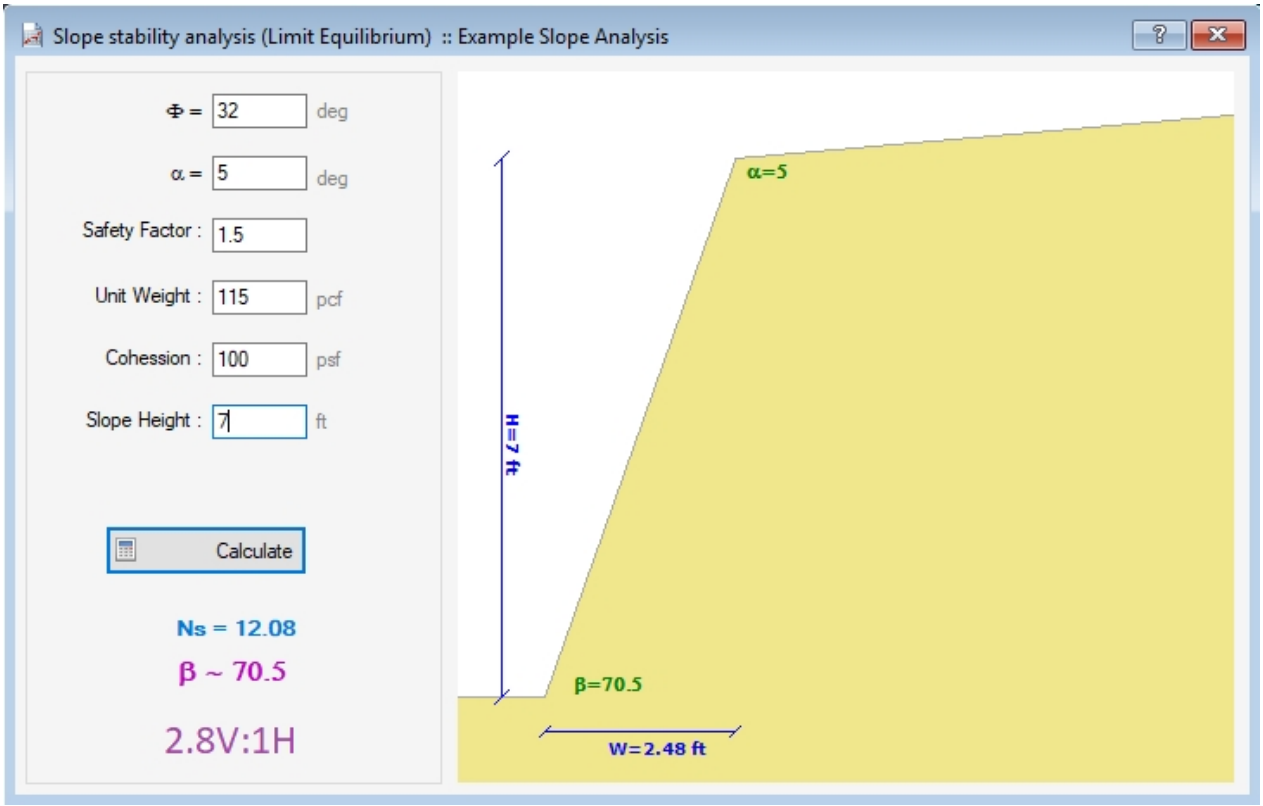


Printing the Results

Press Print button from the toolbar to see the calculation details and the report.

Simplified Slope Analysis

Using this page user can roughly estimate the stable slope based on the design chart proposed by Fang et al. This chart is prepared based on a series of limit equilibrium analyses, and should be only used as a rough estimate since it does not take many parameters such as groundwater level, surcharge, etc. into consideration.

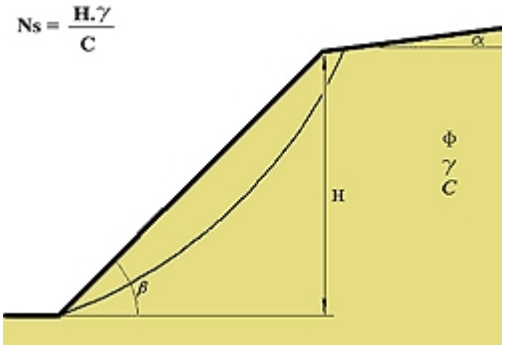


Soil and Slope Parameters

Enter friction angle, unit weight and cohesion of soil along with slope height and backslope angle. Please notice that safety factor will be applied on Tan(Φ). Press Calculate button when you entered all data.

Stability Factor and β

Ns or stability factor is calculated based on slope height (H), soil unit weight (γ) and soil cohesion (C) as shown below:



This parameter is a key factor for estimating the angle of slope stability. Ns is interpolated from the results of a series of limit equilibrium slope stability analyses carried out by Fang et al. (see below).

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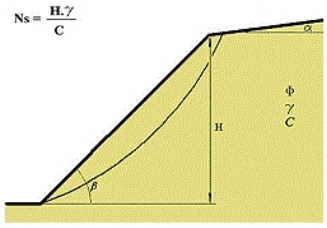
TABLE 10.2 STABILITY FACTOR, $N_s = H_c\gamma/c$ (LIMIT ANALYSIS SOLUTION).

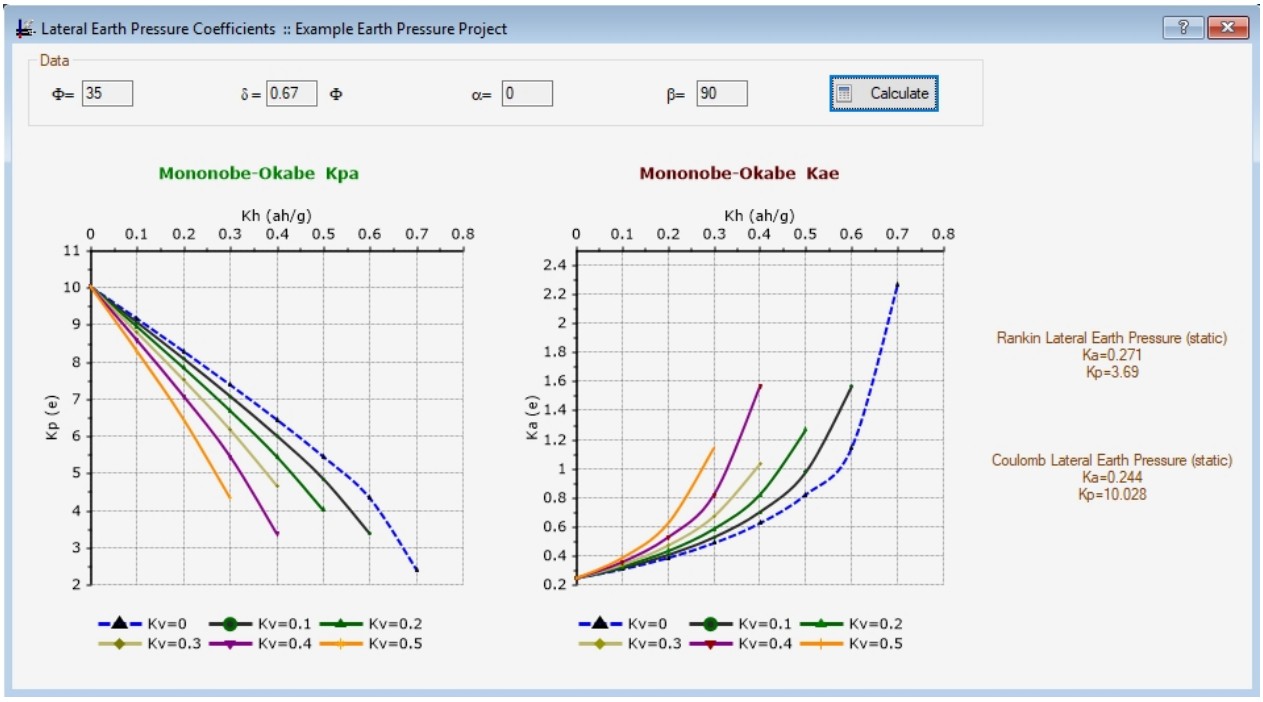
Friction Angle φ, Degrees	Slope Angle α, Degress	Slope Angle β, Degrees															
		90	85	80	75	70	65	60	55	50	45	40	35	30	25	20	15
0	0	3.83	4.081	4.325	4.57	4.789	5.026	5.25	5.462	5.760	5.86	6.063	6.249	6.51	6.602	6.787	7.35
5	0	4.19	4.502	4.818	5.14	5.469	5.807	6.17	6.526	6.920	7.33	7.839	8.414	9.17	10.130	11.668	14.80
	5	4.14	4.436	4.740	5.05	5.366	5.691	6.03	6.384	6.764	7.18	7.645	8.194	8.93	9.821	11.271	14.62
10	0	4.59	4.971	5.375	5.80	6.249	6.732	7.26	7.844	8.515	9.32	10.298	11.606	13.53	16.636	23.137	45.53
	5	4.53	4.907	5.300	5.72	6.153	6.625	7.14	7.717	8.375	9.14	10.129	11.416	13.26	16.368	22.785	45.15
	10	4.47	4.829	5.207	5.61	6.301	6.487	6.98	7.543	8.180	8.93	9.872	11.109	12.97	15.839	21.957	44.56
15	0	5.02	5.498	6.012	6.57	7.176	7.854	8.64	9.537	10.642	12.05	13.972	16.829	21.71	32.108	69.404	
	5	4.97	5.437	5.940	6.49	7.084	7.754	8.52	9.418	10.513	11.91	13.816	16.652	21.50	31.850	69.047	
	10	4.90	5.363	5.853	6.39	6.971	7.628	8.38	9.262	10.339	11.73	13.591	16.383	21.14	31.378	68.256	
	15	4.83	5.270	5.743	6.28	6.825	7.460	8.18	9.045	10.088	11.42	13.228	15.916	20.59	30.254	65.173	
20	0	5.51	6.099	6.751	7.48	8.299	9.253	10.39	11.799	13.628	16.18	19.998	26.655	41.27	94.632		
	5	5.46	6.040	6.681	7.40	8.212	9.157	10.30	11.687	13.506	16.04	19.850	26.485	41.06	94.377		
	10	5.40	5.969	6.598	7.31	8.105	9.038	10.15	11.542	13.346	15.87	19.641	26.232	40.73	93.776		
	15	5.33	5.882	6.496	7.20	7.970	8.886	9.98	11.347	13.122	15.59	19.322	25.818	40.16	92.898		
	20	5.25	5.773	6.366	7.04	7.793	8.681	9.78	11.066	12.785	15.17	18.770	25.011	39.19	88.632		
25	0	6.06	6.793	7.624	8.59	9.696	11.048	12.75	14.972	18.098	22.92	31.333	50.059	120.0			
	5	6.01	6.735	7.556	8.52	9.611	10.955	12.65	14.864	17.981	22.78	31.188	49.887	119.8			
	10	5.96	6.666	7.475	8.41	9.508	10.842	12.54	14.727	17.829	22.60	30.986	49.635	119.5			
	15	5.89	6.584	7.378	8.30	9.382	10.700	12.40	14.547	17.623	22.37	30.687	49.234	118.7			
	20	5.81	6.483	7.258	8.16	9.220	10.514	12.17	14.297	17.325	21.98	30.198	48.503	117.4			
	25	5.71	6.354	7.104	7.97	9.003	10.257	11.80	13.922	16.851	21.35	29.245	46.759	115.5			
30	0	6.69	7.607	8.675	9.96	11.485	13.439	16.11	19.712	25.413	35.63	58.274	144.199				
	5	6.63	7.550	8.607	9.87	11.400	13.348	16.00	19.607	25.298	35.44	58.127	144.011				
	10	6.58	7.483	8.529	9.79	11.301	13.239	15.87	19.475	25.151	35.25	57.924	143.738				
	15	6.53	7.404	8.436	9.67	11.180	13.104	15.69	19.305	24.956	34.99	57.629	143.307				
	20	6.44	7.309	8.323	9.54	11.029	12.931	15.48	19.076	24.682	34.64	57.159	142.538				
	25	6.34	7.190	8.181	9.37	10.833	12.700	15.21	18.744	24.265	34.12	56.302	140.842				
	30	6.22	7.038	7.995	9.15	10.561	12.369	14.81	18.216	23.544	33.08	54.252	134.524				
35	0	7.43	8.581	9.969	11.68	13.857	16.774	20.94	27.448	39.109	65.53	166.378					
	5	7.38	8.524	9.902	11.60	13.774	16.685	20.84	27.344	38.995	65.39	166.220					
	10	7.32	8.458	9.825	11.51	13.676	16.578	20.71	27.216	38.851	65.22	166.003					
	15	7.26	8.382	9.735	11.41	13.560	16.448	20.55	27.053	38.662	65.03	165.720					
	20	7.18	8.291	9.627	11.28	13.417	16.285	20.36	26.836	38.401	64.74	165.188					
	25	7.11	8.180	9.494	11.12	13.234	16.072	20.07	26.533	38.015	64.18	164.298					
	30	6.99	8.041	9.325	10.93	12.990	15.778	19.73	26.071	37.384	63.00	162.333					
	35	6.84	7.858	9.098	10.66	12.641	15.337	19.21	25.271	36.150	60.80	154.978					
40	0	8.30	9.771	11.608	14.00	17.152	21.724	28.99	41.887	71.485	185.6						
	5	8.26	9.713	11.541	13.94	17.069	21.635	28.84	41.784	71.370	185.5						
	10	8.21	9.649	11.465	13.85	16.974	21.530	28.69	41.657	71.226	185.3						
	15	8.15	9.574	11.377	13.72	16.860	21.405	28.54	41.498	71.038	185.0						
	20	8.06	9.487	11.273	13.57	16.723	21.249	28.39	41.290	70.780	184.6						
	25	7.98	9.382	11.147	13.42	16.551	21.049	28.16	41.002	70.406	184.0						
	30	7.87	9.252	10.989	13.21	16.326	20.779	27.88	40.578	69.812	183.2						
	35	7.76	9.086	10.784	12.95	16.016	20.391	27.49	39.885	68.728	182.3						
	40	7.61	8.863	10.501	12.63	15.551	19.773	26.91	38.525	66.119	181.1						



Lateral Earth Pressure Coefficients

You can calculate lateral earth pressure coefficients in static and earthquake conditions

using this page.



Wall Geometry and Soil Data

Please enter the soil parameters and geometry as specified in the legend and press Calculate button.

Static Conditions (Rankine Method)

Ka=Tan(45 - Φ/2)^2

Ko=1-Sin(Φ)

Kp=Tan(45 + Φ/2)^2

Earthquake Conditions (Mononobe/Okabe Method)
Horizontal and vertical acceleration ratios of the earthquake:
Kh=ah/g, Kv=av/g

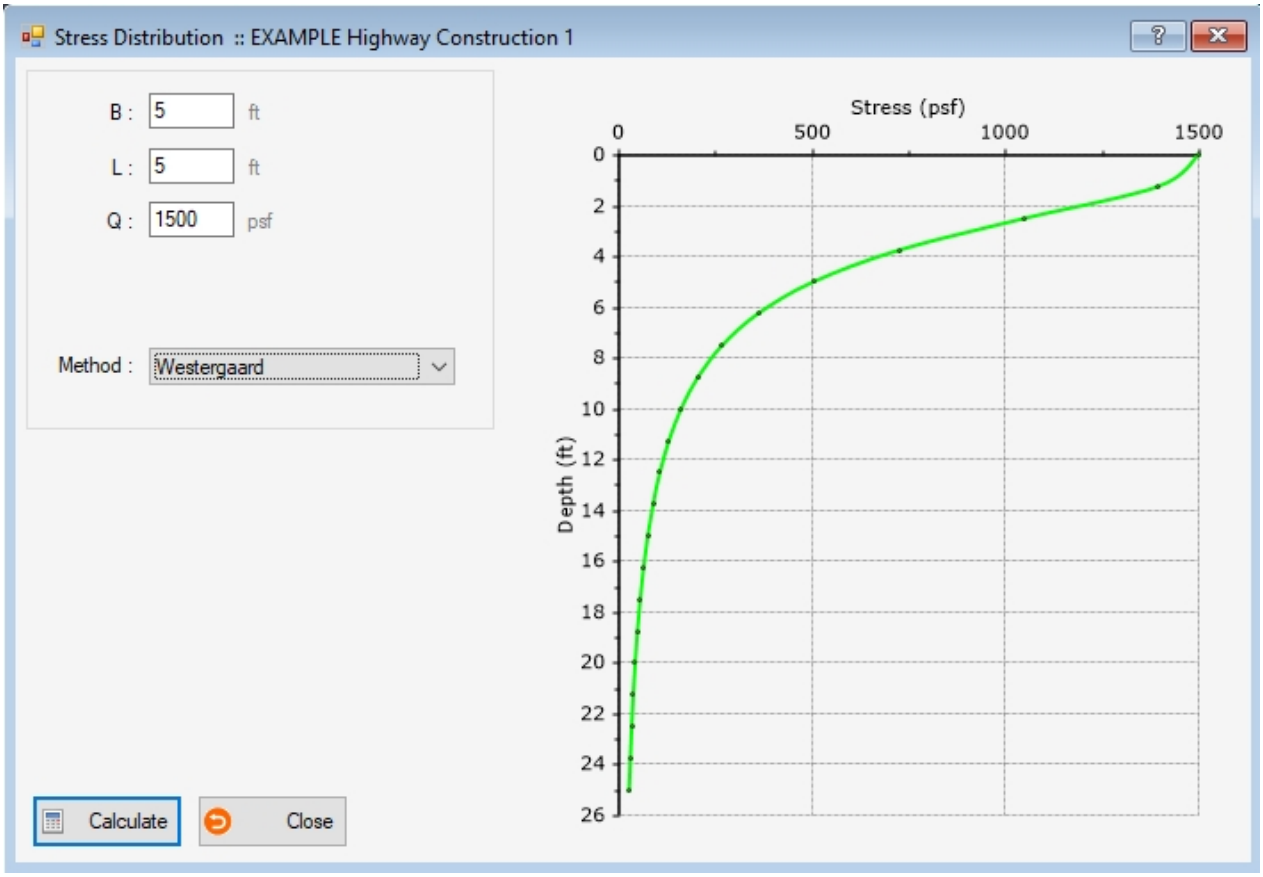
Kae : Active earthquake pressure coefficient
Kpe : Passive earthquake pressure coefficient

Earthquake Conditions (Mononobe & Okabe)

To use this charts please choose the curve corresponding your Kv. Then find the desired Kh from horizontal axis and follow the curve to get the K values from the vertical axis. Kv=0.1

Stress Distribution

Using this feature to calculate distribution of the stress below the footing, according to 'Westergaard' or '2:1 Slope' methods. The input data comprises footing size and load (bearing pressure):

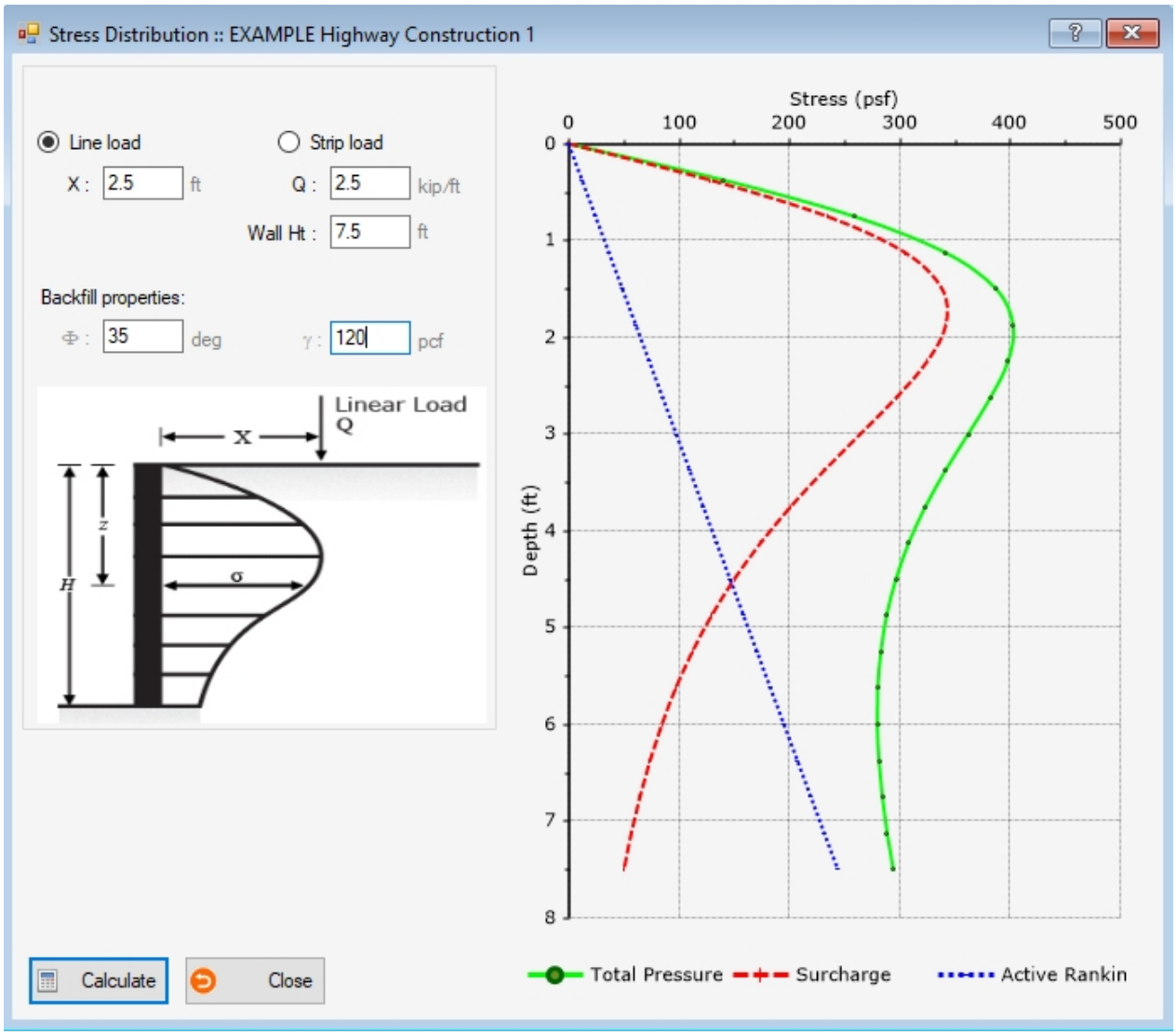


Printing the Results

Press Print button from the toolbar to see the calculation details and the report.

Retaining Wall Pressure

Use this feature to calculate the distribution of the lateral earth pressure behind a retaining wall, due to a surcharge load. This surcharge can be 'line load' or 'strip load'. The input data comprises retaining wall information, backfill information and the load type:

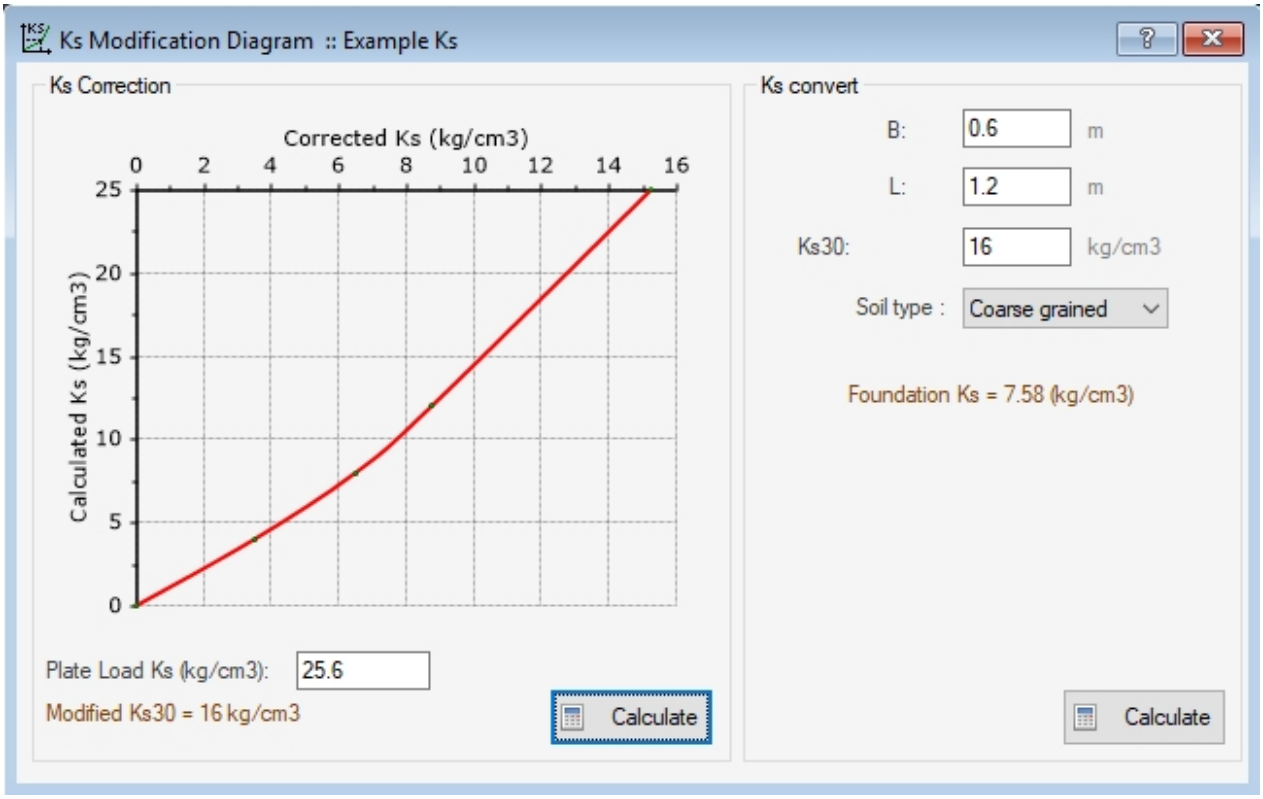


Printing the Results

Press Print button from the toolbar to see the calculation details and the report.

Ks Conversion

This page is used for conversion and correction of Ks30 resulted from the plate load test:



Ks Correction

Due to thickness/stiffness of the steel plate used in the plate loading test, the resulted Ks30 is recommended to be corrected for the stiffness of the plate. The chart shown on the left portion of the page is used for correction of Ks30. Please enter your test Ks30 in the box below the chart and press Calculate button to get the corrected Ks30.

Ks Conversion

This part of the page uses the common formulas for converting Ks30 to your desired footing's size. Different equations are used based on the subgrade soil type.

Calculation Details

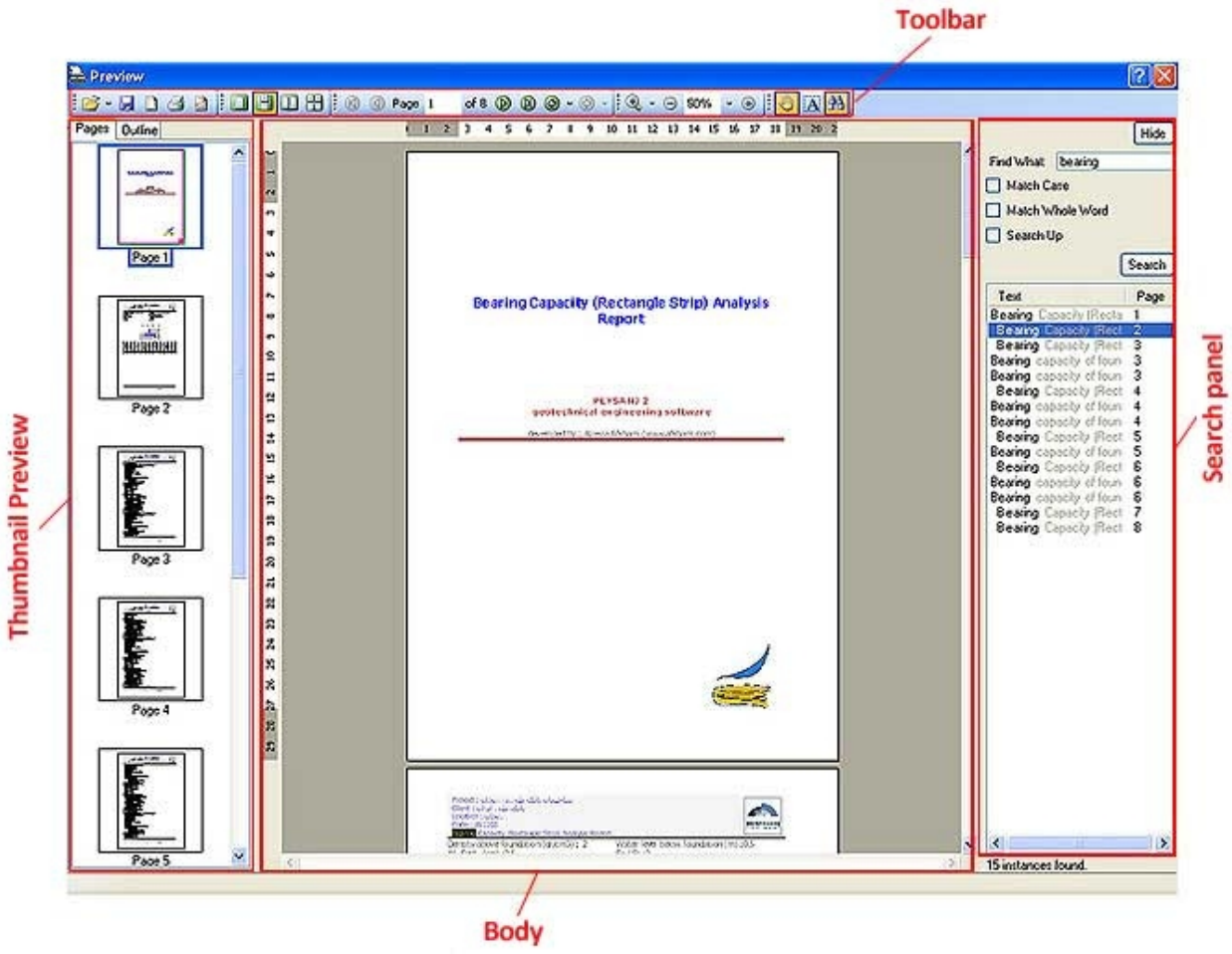
All calculations in PEYSANJ come with step-by-step calculation details. Please press *Calculation Details* button on the top toolbar after performing the calculations. This will open another page containing the calculation details. If you want to print a report, click on *Print* button on the top toolbar; This will open the Print Preview page. A report comprises:

- Cover page
- Assumptions: including all input data and other applicable assumptions
- Details: including step-by-step details of the calculations
- Graphs: including all graphs

The report may be saved and exported to various formats such as Microsoft Excel, PDF, etc.

Print Preview

This page will be shown when you click on Print button from the toolbar. Different parts of the page are described below:



Thumbnail Preview

Shows a set of thumbnails for all pages of the report. Click on each thumbnail to open that page of the report in the Body part of the page.

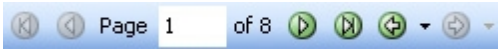
Body

Is used to show the full preview of the specific page of the report. Please use the toolbar buttons to zoom in/out, save, print, etc

Toolbar

This toolbar located on top of the page and its buttons are described below:

	Opens a report file which is already saved under c1d format
	Is used to save the current report with XLS, PDF, HTML, or even image formats such as JPG, BMP, TIFF, PNG, etc. Some limitations apply to this feature.
	Used to adjust the page setup such as margins, etc.

	Click on this button to print the report
	This will redraw the whole report again
	Sets the view of report by showing 1, 2 and 4 pages of the report within the Body part of the viewer.
	Used to navigate among the report pages. Enter the exact page number in the box to jump to that page.
	Used for zoom
	Used for pan (moving the preview page). Hold your left mouse button and move the page.
	If you click on this button, you will be able to select a text within the report. This feature can be used to copy a text from the report for use in another Windows application such as Microsoft Word.
	Use this button to find a phrase in the report.

Search Panel

Enter the searching phrase in this panel and click the Search button. A list will be populated with all pages containing your search criteria. Click on each item to browse to that page.

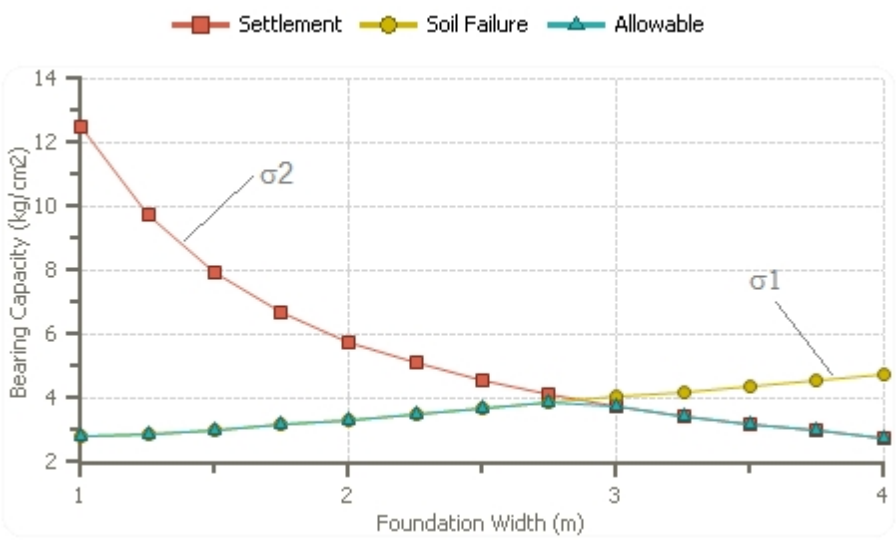
Options and Settings

The Options page provides access to analysis settings and default values used during the calculations and analyses. As shown in the following screenshot, settings are grouped into three tabs:

Bearing Capacity tab

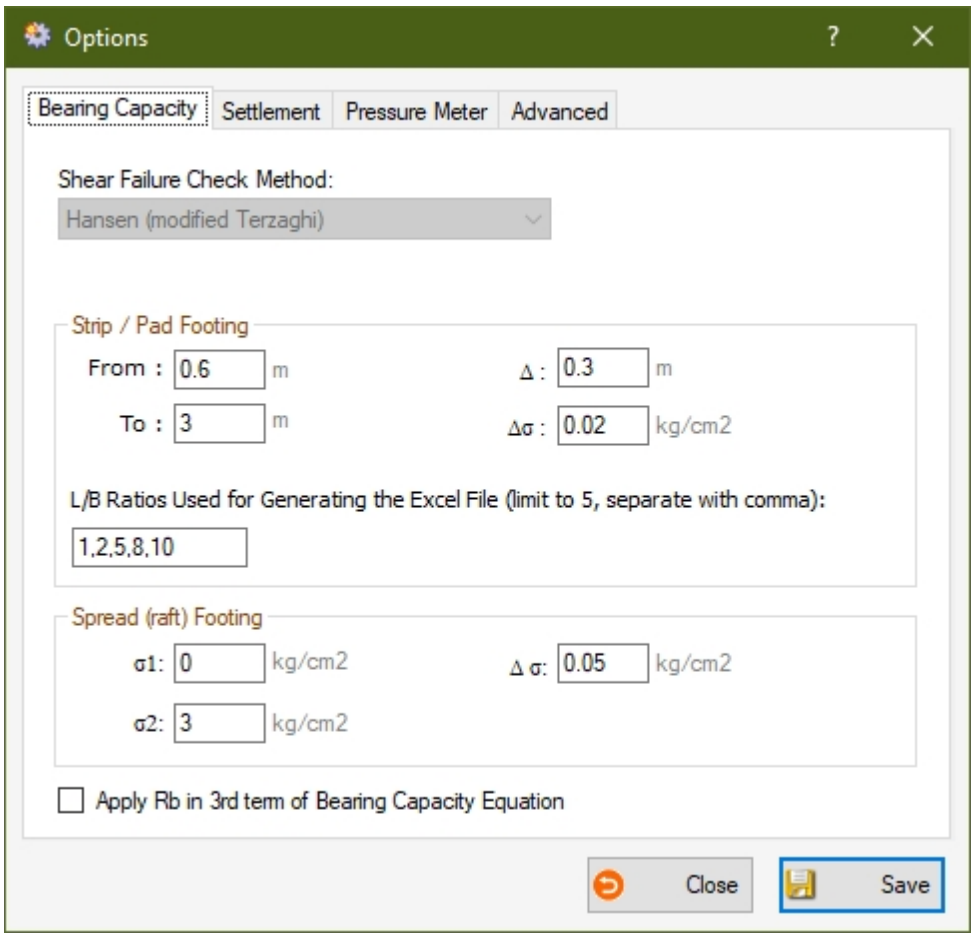
This tab allows user defining the analysis methods used for the calculation of bearing and settlement. For strip and pad footings, PEYSANJ calculates both shear failure and settlement criteria for a range of footing width. For each footing size, the allowable bearing pressure is calculated based on shear failure (σ**1**).

For settlement check, the program starts checking settlement for stress values starting from zero to σ**1**, with a $\Delta\sigma$ increment. The stress corresponding to the tolerable settlement (defined by user) will be recorded as σ**2**.



Then σ1 and σ2 are compared for each footing size, and the minimum of these two values is introduced as the final allowable bearing capacity.

For spread (mat/raft) foundations, due to relatively larger footing size, shear failure will not be a limiting criterion. Therefore settlement of the footing is calculated and plotted versus stress. This stress can be set to vary from σ1 to σ2 with δσ increment. The following sections describe how this procedure can be configured by user:



Shear Failure

PEYSANJ calculates bearing capacity of the footings based on Hansen (modified Terzaghi) equations.

Strip / Pad Footing

From: the minimum footing width (B1) used for bearing capacity and settlement calculation
To: the maximum footing width (B2) used for bearing capacity and settlement calculation
Δ: the width step used for calculation
$\Delta\sigma$: the stress increment used for calculation
Excel L/B: a list of L/B ratios is entered. PEYSANJ will calculate and export to Excel, the bearing capacity for all these L/B values. Please enter maximum five L/B values, separated by comma.

Spread (raft) Footing

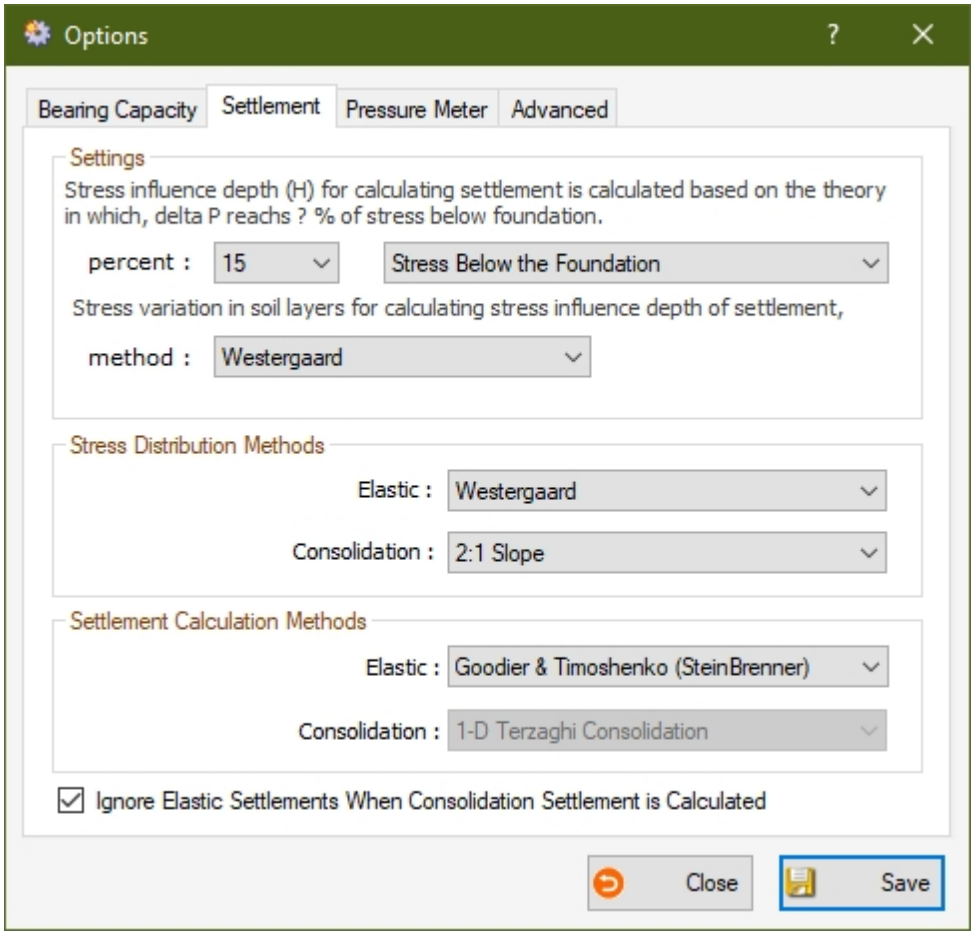
$\sigma 1$: the minimum stress for which settlement of foundation is calculated
$\sigma 2$: the maximum stress for which settlement of foundation is calculated
$\Delta\sigma$: the stress increment used for calculation

Apply Rb in the 3rd Term

If this option is selected selected **Rb = 1 - 0.25 Log(0.5B)** will be applied to the 3rd term of Hansen bearing capacity formula.

Settlement tab

On this tab of the Options page, you can specify the methods used for calculation of settlement:



Settings

If "Goodier and Timoshenko" method is chosen for elastic settlement calculation, then stress influence depth H should be calculated first. In this section user can choose how H is calculated. Usually H is taken as the depth in which δP is reached **X** percent of the stress below footing, where **X** can be set by user on this page.

Stress Distribution Methods

User can set the stress distribution methods for calculation of elastic and consolidation settlements.

Settlement Calculation Methods

Elastic: Three methods can be chosen for elastic (immediate) settlement calculation of footings. For further reference and detailed description of each methodology please refer to reference books.
Consolidation: for the purpose of calculating 1-D Terzaghi consolidation settlement, stress increase dP is calculated at the top, middle and the bottom of the layer and an average is calculated $\delta P_{ave}=(\delta p_t+4\delta P_m+\delta P_b)/6$

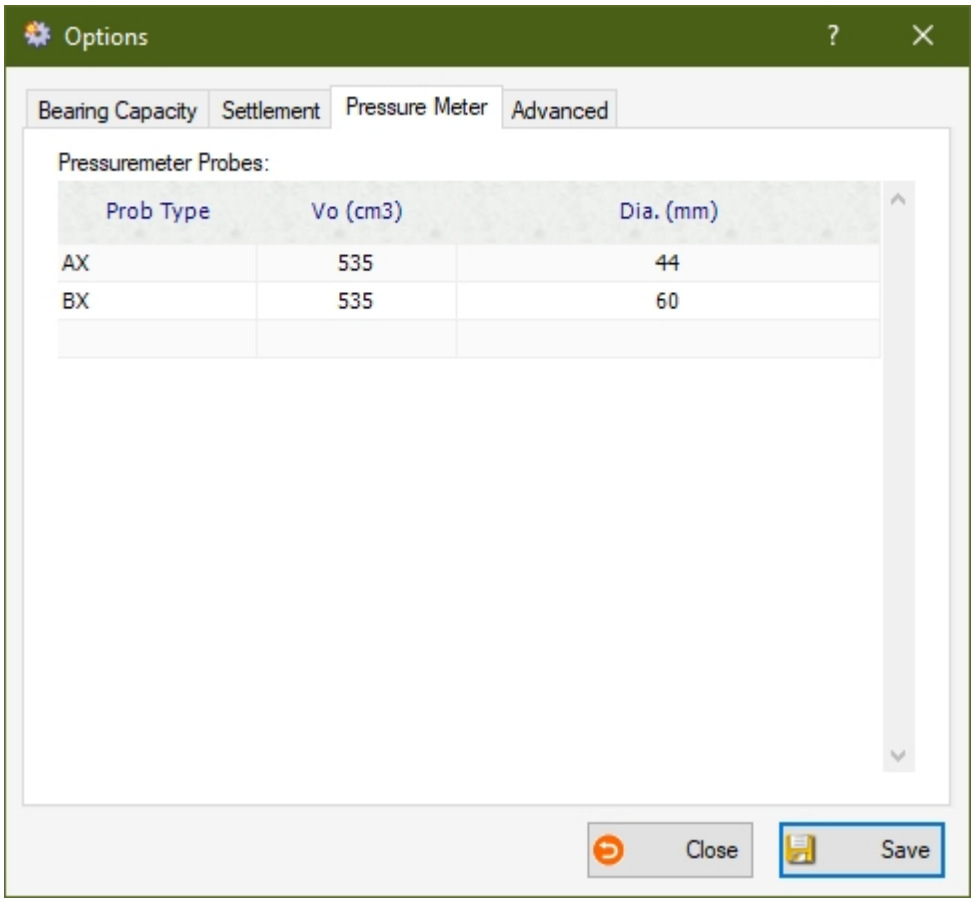
Ignore Elastic Settlement : If this options is selected by user, during the calculation of total settlement of the footing, if consolidation settlement is calculated for a layer, the elastic settlement will be ignored in calculation of total settlement. In general, the total settlement is defined as below:

$$S = I_r\ (S_e+\alpha.S_c)$$

where:
Ir : Rigidity factor (between zero and one; usually more than 0.9). The idea is to allow a rigid foundation to decrease the total settlement due to its ability to uniformly spread the stress.
Se : Elastic settlement
Sc: Consolidation settlement
α: User can specify what percentage of consolidation settlement should be considered in the total settlement calculation. The default value is 1. However, user can choose a lower value if the layer is not saturated to account for lower moisture contents in clay/silt layer.

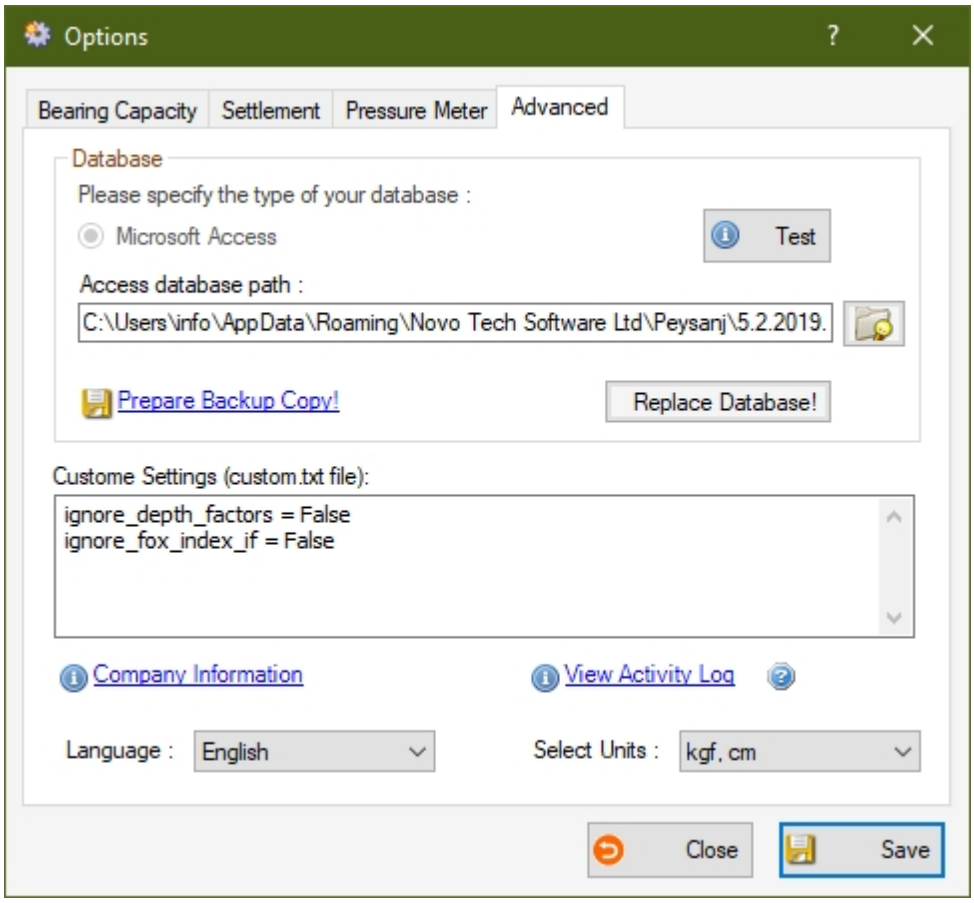
Pressure-Meter tab

This tab allows user defining the analysis methods used for the calculation of liquefaction and pressure-meter test. Here is a list of default probes used for pressure-meter test. User can expand this list by adding more probes to the list.



Advanced tab

This tab allows user to configure and prepare backup from PEYSANJ database file, as well as choosing the user-interface language and units.



Database

Please see this article for help on Database Settings.

Custom Settings

Although not every user may use this feature, it is possible to edit **custom.txt** file (copied in the PEYSANJ installation folder) and change the value of these two parameters:
ignore_depth_factors : If set to True, all depth factors will be considered =1 during bearing capacity analysis.
ignore_fox_index_if : If set to True, the Fox factor (I_f) used for reduction of settlement in Goodier & Timoshenko method, will be assumed =1 during settlement analysis.

Company Information

This allows user to select company logo, enter address and company name. This information is used in the reports.

View Activity Log

This will show a list of user activities such as Save, Delete, Print, etc. during working with the program.

Language

Currently, user interface is only available in English language.

Units

Three unit systems are available in PEYSANJ. Select your units and re-start the program for

this setting to take effect.

Working with Charts

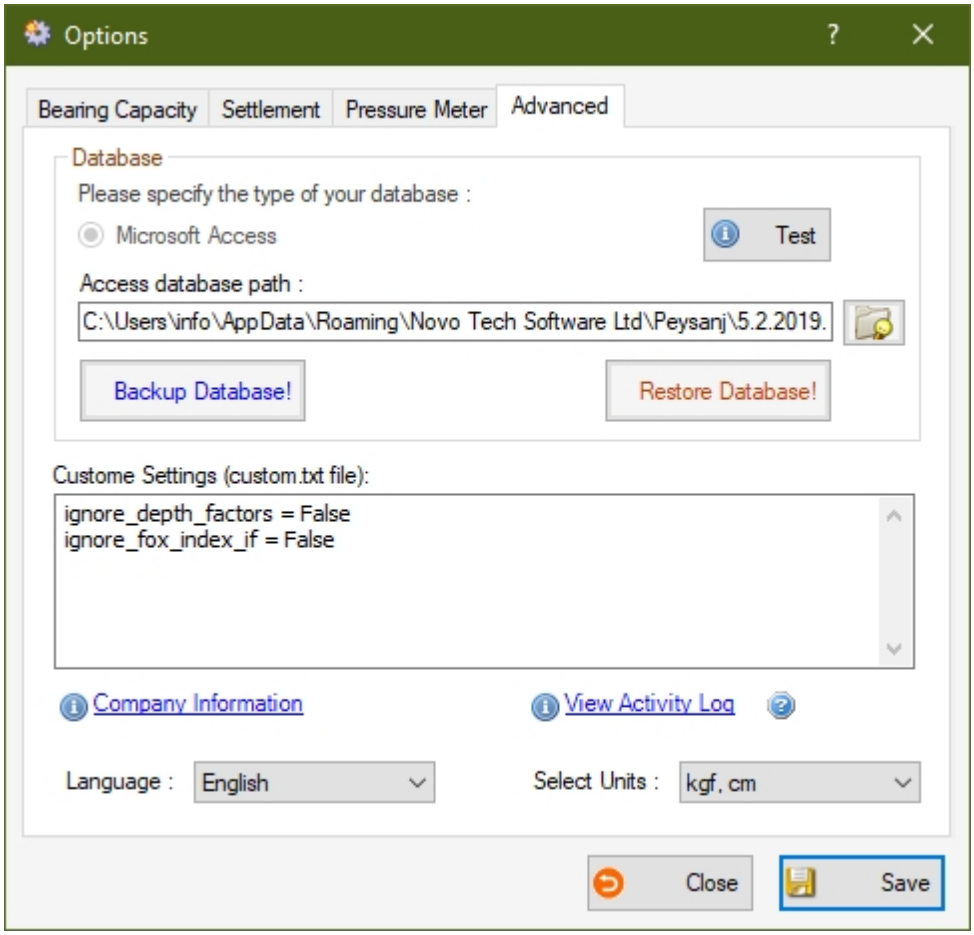
Please read the most up-to-date article from our website.

Export to Graphic Format

Please read the most up-to-date article from our website.

Database Settings

PEYSANJ database is a Microsoft Access file stored in the path shown by "Access database path" in the Advanced tab of the Options page. Your project data for bearing capacity analysis, plate loading test analysis, and pressure-meter test analysis is saved in a database file. It is very important to prepare periodic backups of your database file.



Preparing a Backup of Your PEYSANJ Database

Click on *Backup Database* button and specify the location on your hard drive where you want the backup file (**PEYSANJ4.MDB**) to be copied. When the backup file is prepared, simply copy it to your flash drive, burn on CD, etc. and keep in a safe place.

Restoring PEYSANJ Database

If you are transferring PEYSANJ to another computer, or recovering from a computer crash, you may want to restore your PEYSANJ database to be able to load the old projects. If you want to restore a database, click on *Restore Database!* button, and select the database file (this is the file already backed up by you). This will replace the existing database file.

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