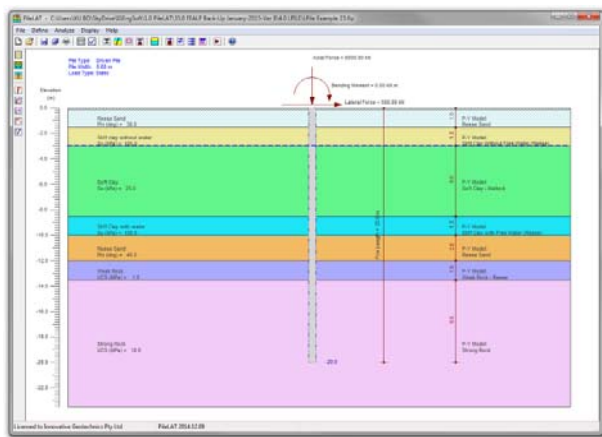


Innovative Geotechnics Pty Ltd

PileLAT 2014 – Finite element based program for single piles under lateral loading

PileLAT 2014 is a finite-element based program that analyzes the behaviour of single piles mainly under lateral loading based on p-y curves. One of the important advantages which PileLAT 2014 has over other pile lateral force analysis software is that it also has some basic capability of calculating pile settlement under compressive axial loading.



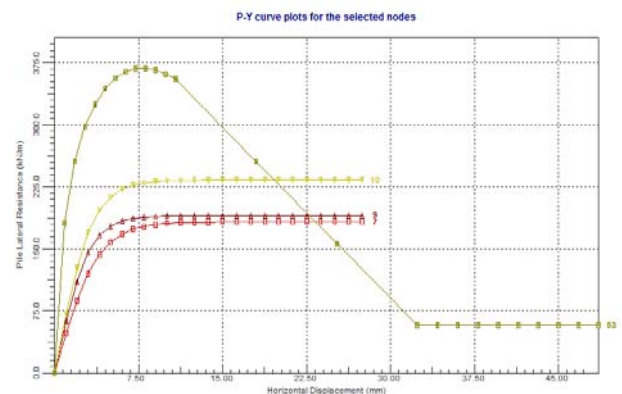
PileLAT 2014 is powerful and easy to use. It is a useful tool for pile design and analysis by both structural and geotechnical engineers

Various P-Y models are adopted in PileLAT 2014 to analyze the pile behaviour under the lateral loading. Those models include:

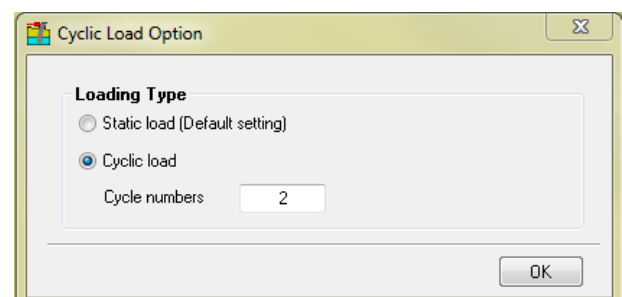
Material Type	Model
Cohesive Soils	API Soft Clay
	Matlock Soft Clay
	Stiff Clay without Water (Reese)
	Stiff Clay with Initial Modulus
	Stiff Clay with Water (Reese)
Cohesionless Soils	API Sand
	Reese Sand
	Liquefied Sand
	Weak Rock (Reese)
	Strong Rock
Rock	Massive Rock
	Calcareous Rock
	Elastic-Plastic Model
General	Elastic Subgrade Modulus

Features and Benefits

1. Standard window-style dialogs, push buttons, drop menus, list boxes, EXCEL-like data grid cells, slide bars, radio buttons, check boxes and toolbars can be accessed in the program;
2. Automatic generation of nonlinear soil resistance p-y curves for various soil types such as cohesive soils, cohesionless soils and rocks. Soil resistance (p-y) curves for each node can be viewed, copied and printed. No need to specify the node locations before the analysis in order to access the p-y curve information. Once the analysis is completed successfully, p-y curves for all the nodes are automatically available to the user;

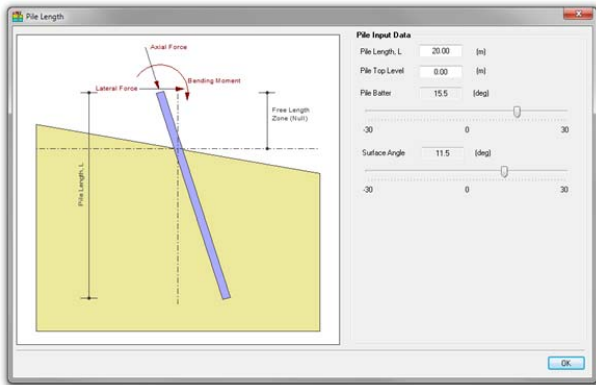


3. Both static and cyclic behaviour of soils can be considered. The user can input the cycle number of the cyclic load;

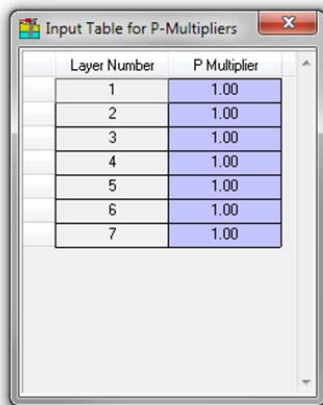


4. Pile batter and sloping ground surface can be modelled through an interactive dialogue where the geometry of the pile batter and ground surface slope can be graphically updated and viewed by the user with moving the relevant slide bars. An interactive graphical presentation of pile and soil layer geometry is provided. Important changes in the input

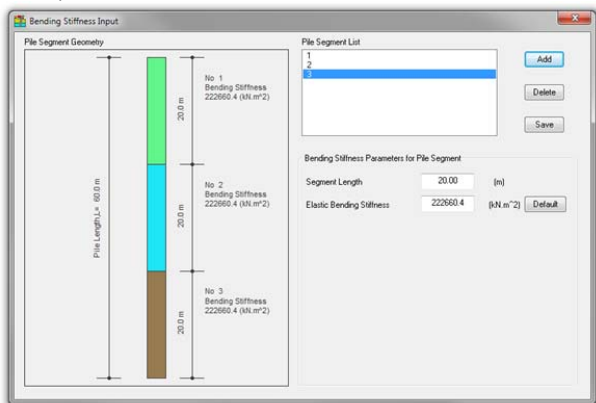
data such as pile length, the number of soil layers, soil layer name, soil layer thickness, soil layer color, p-y model type, water table position, certain soil parameters and pile loading will be automatically updated in the graph. It is very convenient for the user to visually view the input change;



5. P-multipliers can be defined by the user for each soil layer to consider the potential pile group effects for closely-spaced piles. The user also can use this option to purposely reduce the resistance of some soil layers if required;

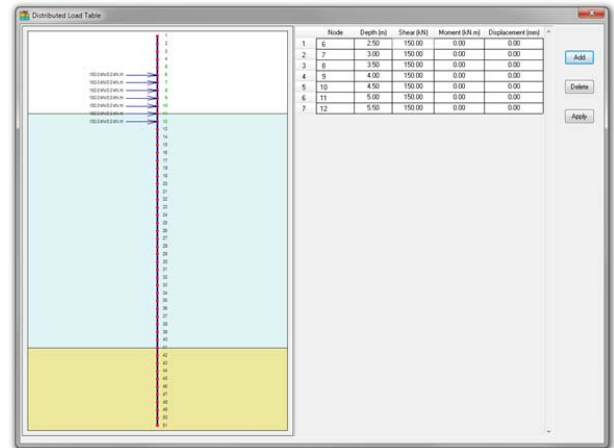


6. Multiple pile segments with different user-defined elastic bending stiffness or plastic bending moments can be specified by the use in PileLAT 2014;

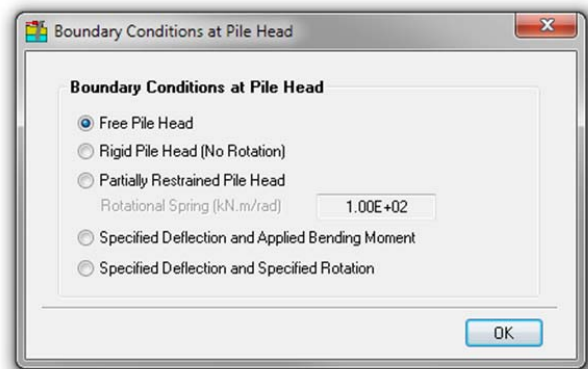


7. An interactive dialogue is available to the user to specify the distributed loading along the pile length

and the user is able to see the locations of the nodes with the applied loading. Free-field soil lateral displacement loading along the pile length can be considered by the program at the specified node locations. Distributed horizontal shear forces and bending moments can be specified by the user at the node positions;



9. Various boundary conditions at the pile head can be considered by the program. Those boundary conditions include free head, rigid head, partially restrained head with elastic rotational spring, specified deflection with the applied bending moment and specified deflection and rotation.



10. Different pile section types such as circular section, rectangular section, steel H-section, steel pipe section, octagonal section and user-defined section can be selected by the user. Driven piles or bored piles / drilled shafts can be selected by the user. The load settlement curve at the pile head will be determined by the program based on the input axial loading and the selected pile installation type. API recommendations will be adopted for driven piles and FHWA recommendations will be used for bored piles / drilled shaft in PileLAT 2014. More advanced options are available in PileAXL 2014 for the pile settlement analysis under axial loading.

Pile Type and Cross Section

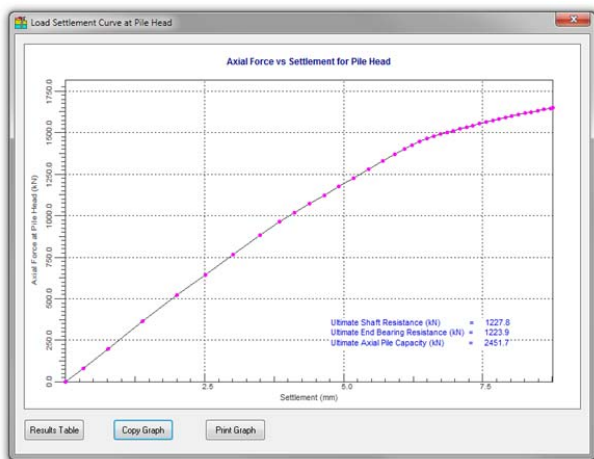
Pile Type Selection
Pile Type: Driven Pile

Cross Section Type
☐ Circular Section
☐ Octagonal Section
☒ Pipe Section
☐ Rectangular Section
☐ H Section
☐ User Defined
 Edit Section Dimension

Section Properties
 Perimeter, Ls: 1.885 (m)
 Section Area, Ab: 0.283 (m²)
 Moment of Inertia, I: 1.534E-03 (m⁴)
 Young's Modulus, E: 2.000E+08 (kPa)

OK

11. Load-settlement curve can be generated by the program for the specified axial loading at the pile head. Preliminary estimations on the ultimate shaft resistance, ultimate end bearing resistance and ultimate axial pile capacity are carried out by the program and the preliminary results are shown on the load-settlement curve graph.



12. Innovative soil layer and parameter input dialog is provided to help the user to enter the input data more easily and smoothly. Important changes in the input data such as pile length, the number of soil layers, soil layer name, soil layer thickness, soil layer color, p-y model type, water table position, certain soil parameters and pile loading will be automatically updated in the graph. It is very convenient for the user to visually view the input change;

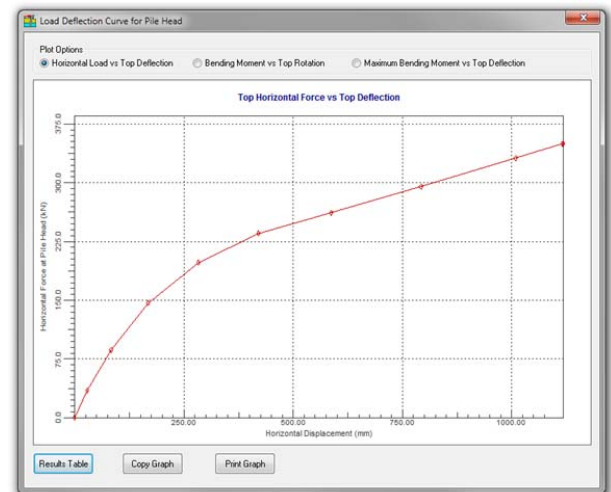
Soil Layer

Layer Name: Soft Clay
 Soil Type: Cohesive Soil
 Layer Thickness: 15.00 (m)
☒ Input Layer below Water Table (if Checked)
 Total Unit Weight: 15.0 (kN/m³)
 Undrained Shear Strength: 25.0 (kPa)
 Strength Parameters - Advanced
☐ Set to Default Value
 Strength increment with layer depth, Surc: 1.000 (kPa/m)

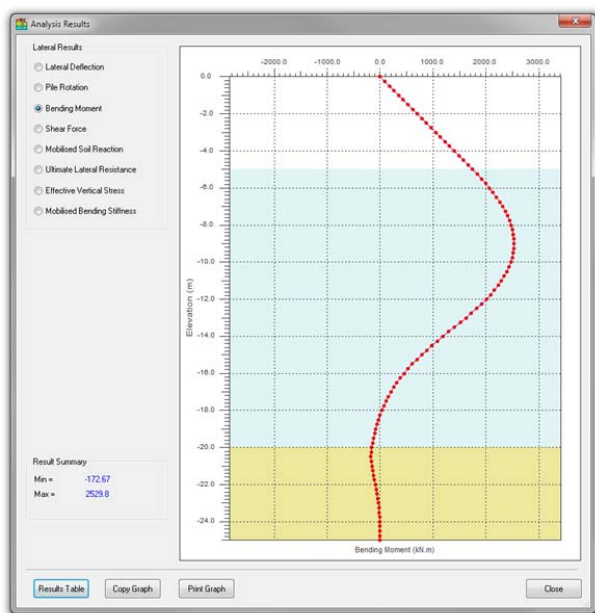
No.	Layer Name
1	Nyl Material
2	Soft Clay
3	Medium Dense Sand

Add Insert Delete Close

13. Automatic generation of load deflection curves such as horizontal load vs top deflection, bending moment vs top deflection and maximum bending moment vs top deflection once the analysis is successfully completed;



14. A well-designed result output dialog is provided for the user to view all the relevant results graphically. Switching among different results is very straightforward. All the analysis results along the pile length are presented together with the soil layer geometry. Therefore, the analysis results within each soil layer can be viewed by the user conveniently from the graph of the results.



Analysis Results Summary

Node	Depth (m)	Level (m)	Width (m)	Pu (kN/m)	Deflection (mm)	Rotation (Rad)	Bending (kN.m)
41	8.00	-8.00	0.60	144.45	-2.99	0.001031	124.11
42	8.20	-8.20	0.60	144.99	-2.77	0.001128	93.87
43	8.40	-8.40	0.60	145.53	-2.54	0.001200	64.47
44	8.60	-8.60	0.60	146.07	-2.29	0.001245	35.86
45	8.80	-8.80	0.60	146.61	-2.04	0.001264	7.96
46	9.00	-9.00	0.60	147.15	-1.79	0.001259	-19.31
47	9.20	-9.20	0.60	147.69	-1.54	0.001230	-46.02
48	9.40	-9.40	0.60	148.23	-1.30	0.001177	-72.25
49	9.60	-9.60	0.60	660.00	-1.07	0.001100	-98.08
50	9.80	-9.80	0.60	660.00	-0.86	0.001004	-116.02
51	10.00	-10.00	0.60	660.00	-0.67	0.000895	-126.91
52	10.20	-10.20	0.60	660.00	-0.50	0.000779	-131.57
53	10.40	-10.40	0.60	660.00	-0.36	0.000661	-130.83
54	10.60	-10.60	0.60	660.00	-0.24	0.000546	-125.55
55	10.80	-10.80	0.60	660.00	-0.14	0.000437	-116.56
56	11.00	-11.00	0.60	660.00	-0.06	0.000338	-104.75
57	11.20	-11.20	0.60	660.00	0.00	0.000250	-91.06
58	11.40	-11.40	0.60	660.00	0.04	0.000174	-77.29
59	11.60	-11.60	0.60	1209.99	0.07	0.000110	-65.05
60	11.80	-11.80	0.60	1312.26	0.09	0.000057	-53.35
61	12.00	-12.00	0.60	1418.40	0.09	0.000014	-42.35
62	12.20	-12.20	0.60	1528.41	0.09	-0.000019	-32.14
63	12.40	-12.40	0.60	1642.25	0.09	-0.000044	-22.74
64	12.60	-12.60	0.60	1759.93	0.07	-0.000060	-14.13
65	12.80	-12.80	0.60	1881.41	0.06	-0.000070	-6.24
66	13.00	-13.00	0.60	2006.70	0.05	-0.000072	1.04
67	13.20	-13.20	0.60	2135.77	0.03	-0.000068	7.83
68	13.40	-13.40	0.60	2268.61	0.02	-0.000058	14.26

Row 41 Column 1

15. Detailed analysis results are presented in EXCEL-like format and can be easily selected and copied into the third-party program such as EXCEL for further processing;

Contact us

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