



DaryakhakPay

Geotechnical, Civil & Marine Engineering
Services)

Pile and Micropile Specialized Engineering Services



46, Abdeh St., Valiasr Ave.,
Tehran, Iran

88941670-71

88938614-15

88930500-3

www.daryakhak.com
info@daryakhak.com

Dynamic Load Testing

PDA Test (ASTM-D4645) is an accurate method for estimation of geotechnical capacity of driven and cast in situ piles. This method, which is referred **High Strain Dynamic Test (HSDT)**, is based on analysis of longitudinal wave, which is recorded in pile (Force and Velocity near pile top). Longitudinal wave is produced by either of piling hammer or drop hammer. High accuracy of the test, short execution time and low cost made this test as one of the common tests in pile design and analysis. Test results include:

Determination of static capacity	Determination of skin friction	Determination of end bearing
Pile stress during driving	Hammer energy assessment	Hammer efficiency assessment
Hammer adequacy for mobilization of required capacity	Pile integrity assessment	Static load-displacement curve

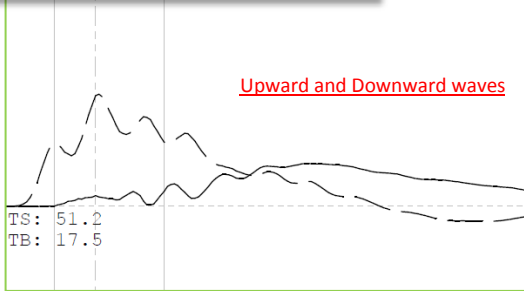
Pile preparation before fixing sensors



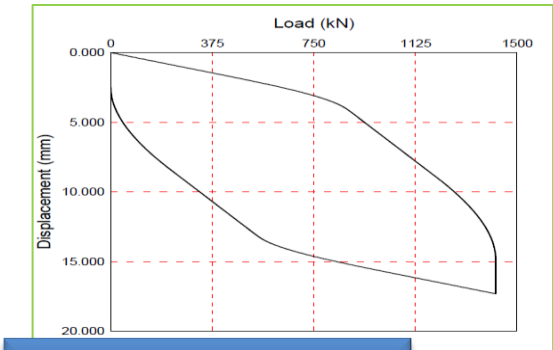
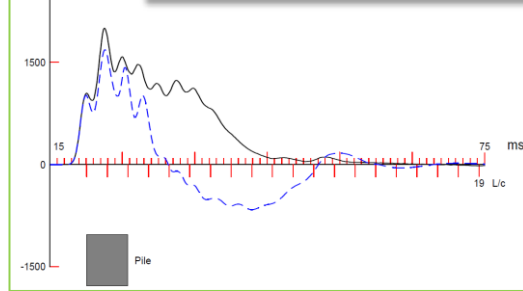
Data acquisition



Upward and downward waves in PDA



Force and velocity in CAPWAP



Load-displacement in CAPWAP

CAPWAP STEADY STATE RESULTS

Total CAPWAP Capacity: 1420.8; along Shaft		696.8; at Toe		724.0 kN					
Soil Spgot No.	Dist. Below Gages	Depth Below Gages	Unit Resist. in Pile	Force Sum in Pile	Unit Resist. (Depth)	Unit Resist. (Area)	Smith Damping Factor		
	m	m	kN	kN	kN/m	kPa	s/m		
1420.8									
1	1.0	0.3	5.7	1415.1	5.7	17.07	15.67		
2	2.0	1.3	18.2	1396.9	23.9	17.07	15.67		
3	3.1	2.4	18.2	1378.6	42.1	17.07	15.67		
4	4.1	3.4	18.2	1360.6	60.3	17.07	15.67		
5	5.1	4.4	34.4	1324.1	96.7	35.76	31.37		
6	6.1	5.4	36.3	1287.9	132.9	35.65	31.24		
7	7.1	6.4	82.2	1205.7	215.1	80.72	70.81		
8	8.1	7.4	120.4	1085.3	335.5	118.23	103.71		
9	9.2	8.5	120.4	964.9	455.9	118.23	103.71		
10	10.2	9.5	120.4	844.5	576.3	118.23	103.76		
11	11.2	10.5	120.4	724.0	696.8	118.23	103.76		
Avg. Shaft			63.3		66.36	88.21	0.729		
Toe			724.0			8914.13	0.682		
Soil Model Parameters/Restrictions				Shaft				Toe	
Quake				(mm)				1.760	8.734
Case Damping Factor								0.568	0.552
Damping Type									Smith
Unloading Quake				(% of loading quake)				297	113
Reloading Level				(% of Ru)				100	100
Unloading Level				(% of Ru)				81	
Resistance Gap (included in Soil Model)				(mm)				1.760	

CAPWAP output table

Pile Integrity Test, PIT

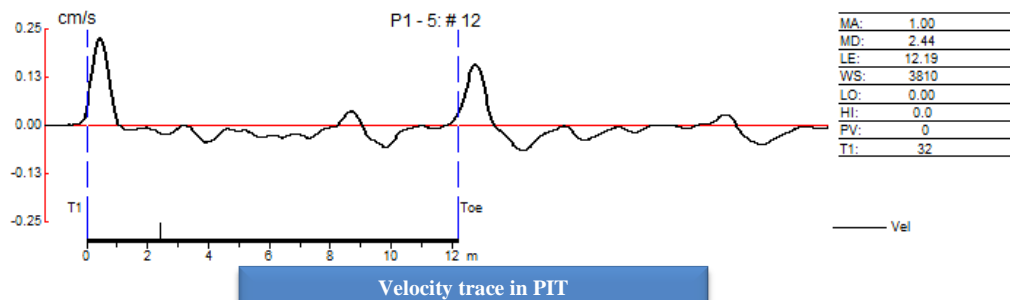
PIT test is a quick and cost effective method for determination of pile integrity which can be undertaken in the most or all piles of a project. In this method, which is referred Low Strain Dynamic Test (LSDT), pile defects can be evaluated via evaluation of recorded velocity in pile.



PIT test



PIT test equipment



Pile and Micropile Static Load Test, SLT

Static axial compression test

Static lateral test

Static axial tension test



Static lateral test of pile



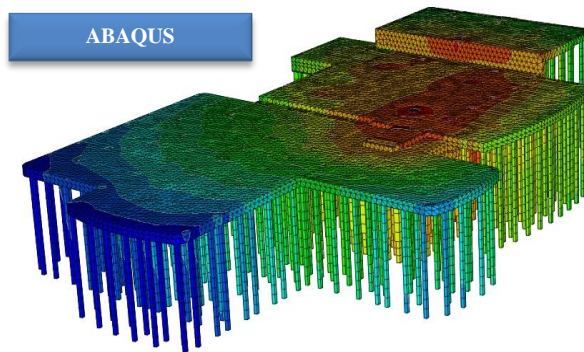
Static tension test of micropile

Pile Design

- Geotechnical and structural design of pile and micropile
- Geotechnical and structural design of pile group, pile cap and respective structures
- Geotechnical and structural design of raft foundation

Pile and pile group analysis softwares:

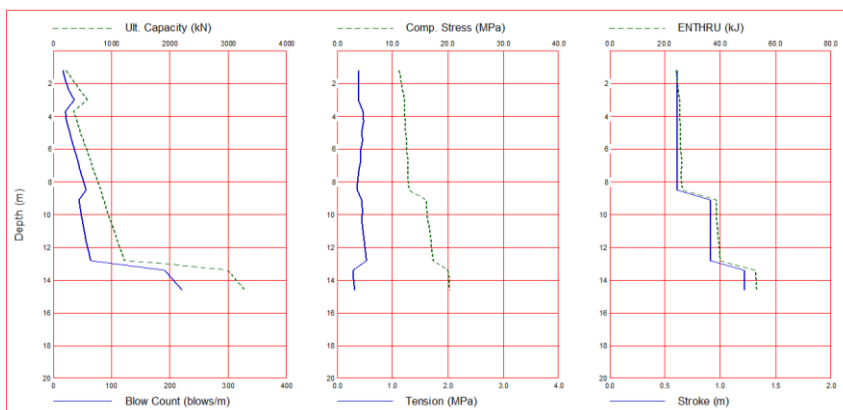
ABAQUS-PLAXIS-ALLPILE-LPILE-REPUTE-PYGMY-SAFE-GEOSTUDIO



Pile Driveability Analysis

One of difficulties in pile driving projects is selection of an appropriate driving hammer, which in addition to being accessible can drive pile to the required depth without major damages. GRL WEAP software can be used for determination of appropriate hammer for a project. Pile behavior while driving in this software is modeled based on longitudinal wave propagation in pile. Test outputs include:

- Estimation of maximum length which selected hammer can drive a pile
- Estimation of temporary compression (T_c) and plastic settlement of pile (Set) during driving
- Compression and tension stress assessment at pile top and pile length



GRL WEAP Output



GRLWEAP Software