



# GEO DYNAMICS

AN ISO 9001-2008 COMPANY

**NON DESTRUCTIVE TESTING SERVICES  
FOR PILE FOUNDATIONS AND SUPER STRUCTURES**

## COMPANY

We started in 1998 in Vadodara with commitment to introduce innovative and effective technologies to the deep foundations industry based on our past work experience in Singapore and South East Asia. Today, Geo Dynamics is India's leading company in Non Destructive Testing of Foundations and Superstructures using the world's latest state of art techniques and equipments. The team consists of dedicated professionals who have executed challenging projects in India and abroad. We take credit for introducing and popularizing NDT of pile foundations on major infrastructure and real estate projects of the country like Railways, Metro Rails, NHAI, Power sector, Oil & Gas, Offshore and real estate. Starting as a company for NDT of pile foundations, Geo Dynamics has grown considerably to provide services for testing of super structures, Ground Penetrating Radar (GPR) and cable locator applications, conventional load tests for pile foundations, span load tests and a variety of end user specific applications.



We have created a deep foundation testing industry in India and are a market leader in our segment with eight offices across the country and more in the pipeline. Apart from India, we have also executed projects across continents in Africa, Gulf, Middle East, South Asia and Australia. We have ensured our quality standards are significantly ahead of the industry and that has made us leaders in areas that we operate.

## MISSION

GEO DYNAMICS is committed to introduce and implement new technologies to the Indian piling & construction industry. We intend to create benchmarks for quality testing and be leaders in areas that we operate. To that extent we are already an acknowledged leader for pile foundation testing across the country having popularized High Strain Dynamic Testing, Pile Integrity Testing and introduced CAPWAP as well as Cross Hole Sonic Logging on major infrastructure and real estate projects. We look forward to develop long term relationship with our clients, owners, consultants and contractors by providing them real time cost effective quality solutions.

## OUR SERVICES

Geo Dynamics owns an array of Pile Driving Analyzers (PDA), Pile Integrity Testers (PIT) and Cross hole Analyzers (CSL tests) located across the country through our regional offices. Most offices are also equipped with super structure testing services like UPV, Rebound Hammer, Half Cell Potential, Rebar Locator for bridges, flyovers, buildings, silos, chimneys etc. Span load tests for bridge and metro rails are offered through the HO. Geo Dynamics has increased its services to provide static load tests, lateral, pullout tests across the country for pile foundations and has now several sets of jacks and girders based on client requirements. We also provide speciality services like GPR and cable locator surveys, Parallel Seismic Tests, instrumentation etc. The services can generally be listed as follows. Do check with us for any additions to our existing setup.

# PILE FOUNDATION TESTING AND ANALYSIS

## HIGH STRAIN DYNAMIC PILE TESTING

Geo Dynamics is a market leader and pioneer in this testing and owns sets of Pile Driving Analyzers (PDA) for assessment of bored / driven concrete and steel piles. We follow ASTM D4945, IRC:78 (on sub-committee) and comply with worldwide codes. Our efforts have led to acceptance of high strain dynamic tests for evaluating pile capacity in the country. Today we offer turnkey testing arrangements including guides and hammers for bored pile testing. With proper site arrangements two or more bore concrete piles can be tested per day resulting in increased quality assurance and huge savings in time and cost. The method is a replacement of static load tests and we have conducted extensive tests for metro rails, DFCC, NHAI, ports, power sector and real estate projects. The test requires significant expertise about pile, soil and hammers and Geo Dynamics is an accepted authority in India and abroad. We have

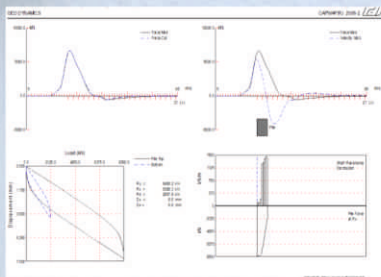


executed steel and concrete pile testing projects at Mauritius, Madagascar, Jordan, Saudi Arabia, Qatar, Nigeria, Gabon, etc. We have generated an extensive database of more than 150 correlation studies on a variety of pile types and materials. For bored and micro piles, our database is available for diameters ranging from 275mm micro piles to 1600mm diameter piles with load from 30 tons to 2500 tons. Seven technical papers

with clients are a testimony to our commitment and expertise in this field.

## CAPWAP

An essential tool with PDA, Geo Dynamics has introduced CAsE Pile Wave Analysis Program (CAPWAP) for pile foundation testing in the country and is mandatory to verify field PDA results especially for bored piles and the first few driven piles at any site. The CAPWAP software models PDA data as the input boundary condition to provide useful information. Output like static pile capacity, skin friction along the pile, end bearing, pile integrity, total pile displacement etc. is quickly obtained and aids the designer and client to take quick decisions. Geo Dynamics has significant expertise in analyzing, using the software and its interpretations and normally meet or exceed match quality requirements a pre-requisite for its correct use. Our work has been validated by our clients who have written technical papers based on our analyses and also acknowledged our contribution. We also provide third party CAPWAP reviews worldwide and have provided such services in the Gulf and African region in addition to India.



## GRLWEAP

The GRL Wave Equation Analysis Program (GRLWEAP) software available with us simulates pile driving using typical Wave Equation numerical analysis technique prior to actual pile installation for driven piles. It helps in hammer selection, drivability analysis and assess any potential driving issues before start of work. For bored piles, it can be used to estimate hammer weight and drop height prior to the test program although thumb rules generally govern. Geo Dynamics has used this program for major driven piling projects in Jordan, Madagascar, Australia, Saudi Arabia and for marine projects in India. The program is particularly useful to evaluate if a particular hydraulic, diesel, drop hammer etc. can be used to drive a certain type of pile to the desired capacity and sets.

## PILE INTEGRITY TESTING

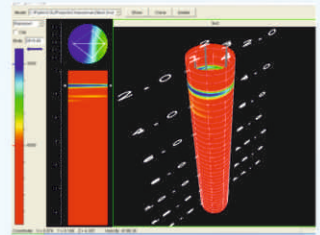
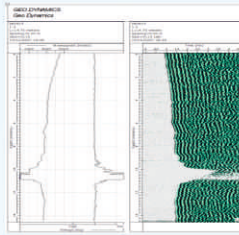
We are considered as an industry standard for Low Strain Pile Integrity Testing due to our consistent results and performance. We conform to ASTM D5882 and IS:14893. Our data base and experience of testing more than 20,000 piles annually helps us to evaluate critical information like necking, soil inclusion, cold joints, concrete quality, other potential pile defects etc., in quick time. With minimal but proper site arrangements, upto 30-50 piles can be tested per day to have a complete quality assurance. Testing is conducted through our various offices or alongside major projects and across the country. Often our team is fully equipped to provide site reports and analysis to avoid delays in construction activity.



Geo Dynamics has the complete setup and expertise in use of Pulse Echo alongwith PILE PROFILE, TDR and Force-Velocity approach, although the only Pulse Echo is more preferred and recommended. We are also on the code committee of IS: 14893 to form the revised guidelines for this testing in India.

## CROSS HOLE SONIC LOGGING

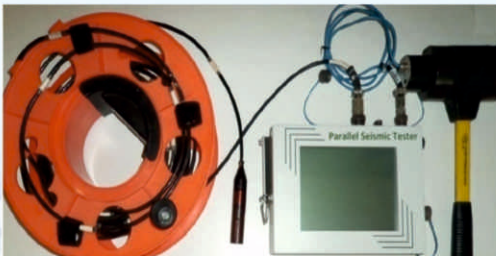
Geo Dynamics is again at the fore front of introducing yet another technology that has become popular worldwide. We are the first company in India to provide complete services for CSL testing. The method was successfully introduced by us at Sone River Bridge, Bihar. Our work led to the acceptance of this method for metro rails, marine and railway project. We have provided extensive testing for Bandra Worli Sea Link, metro rails at Delhi, Mumbai, Lucknow etc., and also includes the tallest tower in the world at Mumbai. Our services conform to ASTM D6760 and there is no Indian codal provision currently. The method is particularly useful for large diameter piles and diaphragm walls, barettes and eliminates the need to interpret the waveform unlike PIT or PDA tests. It determines the quality and consistency of concrete between pairs of steel tubes pre-installed in bored piles or any foundation structure that does not have rebars



interfering between the tubes. The output is in the form of waterfall map along with wave speed and energy plot. Tomography software gives a good 2-D or 3-D image to visualize the defects if any inside the pile for future corrective action.

## PARALLEL SEISMIC TESTING

Geo Dynamics also provides services to determine the depth of existing foundations using Parallel Seismic Method. This is another pioneering effort from us that has been



successfully implemented for foundations. The method requires drilling boreholes adjacent to the existing foundations and taking readings at every pre-defined interval. When access to the top of foundation is limited, the Parallel Seismic test is more accurate and more versatile than other nondestructive surface techniques for determination of unknown foundation depths. Geo Dynamics conducts Parallel Seismic Testing using a hydrophone which can be lowered into the borehole and with impact on the pier/foundation. Obtained PS graphs are analyzed and foundation depth is accurately determined below existing ground level.

## SPT ENERGY ANALYSIS & HAMMER PERFORMANCE

The standard SPT test depends greatly on the energy transferred during each hammer impact. Because equipments and procedures are not really standardized there is a huge variation in the values for measurements done with different setups and systems. SPT values also need to be standardized to N60, else serious errors may result in understanding correct SPT values. Geo Dynamics measures the energy transferred to the SPT rod to evaluate the actual efficiency of the driving system. Corrections are then applied to the measured N-values to improve the SPT tests. We also monitor hammer performance for diesel and hydraulic hammers to measure their actual energy transfer. This is greatly useful for contractors to make decisions before purchasing expensive systems and also helps designers refine their calculations based on actual hammer efficiency recorded on site.



# CONVENTIONAL LOAD TESTS

## STATIC LOAD TESTS

Since the launch of our load testing services in 2015, Geo Dynamics has quickly enhanced its capabilities to provide static load tests all over the country. We have multiple sets of girders capable of providing load testing from 100 tons to 2000 tons with rock anchors and reaction piles. We maintain adequate spares and assembly with branded jacks and powerpacks to ensure minimum downtime. Our strong deliver model has made us a market leader in quick time. Geo Dynamics provides complete solutions from design to execution of load tests, monitoring and reports in real time. We have successfully executed testing projects for metro rails, highways, power projects as well as the prestigious Sardar Patel Statue of Unity Project in Gujarat.



## LATERAL AND PULLOUT LOAD TESTS

Geo Dynamics provides lateral load testing services for land and marine piles and has executed test for capacity more than 100 tons. We also offer lateral load testing with inclinometer measurements for determination of point of fixity. Our capability for pullout tests is also proven with our inhouse arrangements.



## INSTRUMENTATION

A load test complemented with instrumentation provides much more information. Geo Dynamics provides instrumentation for vertical load tests by placing vibrating wire strain gages at pre-selected levels on reinforcement cage.



A conventional static load test conducted provides readings from strain gages at each location and it is then possible to evaluate unit friction from a set of complex calculations and expert interpretation. Extensometers are also installed at specified levels for measuring pile shaft movements. For lateral load tests and to monitor lateral ground movement, Geo Dynamics provides inclinometer services to plot the lateral movement of the ground or pile and also to determine the depth of fixity.

## SUPER STRUCTURE TESTING SERVICES

Geo Dynamics has significant experience in Non Destructive testing of concrete structures and super structure load tests. We have executed niche projects across the country for Metro Rails, flyovers, industrial structures and multi-storey apartments, chimneys, silos, TG decks etc. Our expertise includes the following tests.

### ULTRASONIC PULSE VELOCITY TEST

A very simple but effective tool to evaluate quality of concrete, cracks or defects in the structure. Geo Dynamics is equipped with several PROCEQ equipment that conforms to BS: 4408, ASTM C: 597 and IS: 13311 (Part 1)-1992 to provide UPV testing for both old and new concrete structures to evaluate potential problems. Ultrasonic Pulse Velocity (UPV) test can be used to assess the condition of member with regard to its homogeneity, integrity, presence of voids, cracks etc. and relative quality between or within members.



### REBOUND HAMMER TEST

This is one of the most primitive and simplest test to evaluate strength of concrete. Although results using this test vary significantly based on surface hardness, carbonation and variety of other factors, it is still preferred primarily due to its speed and ease of use. Geo Dynamics is equipped with several PROCEQ Rebound Hammers that conforms to BS:1881:202, ASTM:C805 and IS:13311 (Part 2)-1992.



### HALF CELL POTENTIAL TEST

The test is used to estimate the probability of corrosion in steel reinforcement and is normally used in conjunction with the other tests. The method eliminates the requirement of hacking concrete to physically view rebar condition, however readings are weather sensitive and require that concrete is moist before conducting the test.

### REBAR LOCATOR

The test is used to determine effective concrete cover, detect reinforcement and bar diameter. Very useful for corrosion testing and to locate rebars before hacking of concrete. We are equipped with the latest PROCEQ covermeters available worldwide.



### CARBONATION TEST

It is a simple yet effective test to assess carbonation in concrete and possible risk of reinforcement corrosion for fire damaged or old concrete structures. The test is conducted by spraying phenolphthalein solution on concrete.

## CONCRETE CORE TESTS

Geo Dynamics often extracts concrete cores from structures to ascertain insitu compressive strength of concrete and for establishing calibration for UPV and rebound hammer testing results. Geo Dynamics has two Hilti diamond coring systems and our current capabilities include core diameters of 50 mm, 75 mm & 100 mm.



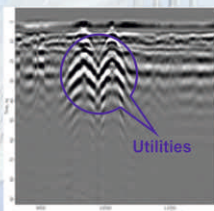
## SPAN AND SLAB LOAD TESTS

Geo Dynamics has developed significant capabilities for span and slab load tests. We have executed projects for flyovers and metro rails and slab load tests for industrial structures. Our engineering team has executed these tests for a variety of structures by ensuring proper monitoring of span deflections, temperature and even sometimes to ultimate loads.



## GROUND PENETRATING RADAR (GPR) AND CABLE LOCATOR

Geo Dynamics provides multi-utility services using Ground Penetrating Radar (GPR) with a variety of antennas ranging from 1500MHz to 100MHz. Our expertise includes Subsurface Utility Engineering (SUE) which is a complete package to determine and mark utilities like pipe-lines, cables, drainage and sewage ducts in cities and towns. GPR profiles are used for evaluating the location and depth of buried objects, voids, etc and locating reinforcement and anomalies for concrete structures. With the available antennas, we can scan depths which are from 500mm thick to underground utilities upto 6m deep. Several times, GPR surveys are coupled with a Cable Locator to effectively scan and locate live metallic cables underground.



*Excellence in Testing*



**GEO DYNAMICS**

49, Atmajyoti Nagar Society, Near Atmajyoti Ashram, Ellora Park, Vadodara - 390 023 India

Tel: +91-265-2393205, 2388139

**Website:** [www.geodynamics.net](http://www.geodynamics.net)

**E-mail:** [info@geodynamics.net](mailto:info@geodynamics.net)

**MUMBAI • DELHI • VADODARA • KOLKATA • CHENNAI  
NAGPUR • GUWAHATI • KOCHI • LUCKNOW**