

# **High Strain Dynamic Testing**

Abe Construction Services, Inc. (ACS) is a deep foundation testing, monitoring, and consultation firm with over twenty years of experience, based in California, that services clients throughout the world.

### Why Choose High Strain Dynamic Testing?

The most common method of determining pile capacities is with static load tests. However, these can be expensive and time consuming, and are usually only performed on a small percentage of piles. High strain dynamic testing is a far cheaper and quicker alternative to static load tests. Using the proven technology of the Pile Driving Analyzer (PDA), each individual pile can be tested for a fraction of the cost of a static load test, and a larger percentage of piles can be tested in the same amount of time. High Strain Dynamic Testing can be performed on many different pile types including:

- Driven Piles Including (Steel, Concrete, and Timber Piles).
- Auger-cast Piles
- CISS Piles
- FunDex Piles
- Drilled CIDH piles



ACS, Inc.'s propriety drop hammer

### **Drop Hammer from ACS Inc.**

High Strain Dynamic Testing is most often performed with a drop hammer, capable of variable drop heights and weights. Clients can provide their own hammer or utilize ACS's proprietary drop hammer available for rental across the U.S. This self-contained hammer can be used on a range of pile types and sizes.

# This testing is performed in accordance with ASTM D4945

ACS, Inc. www.acspile.com 925-944-6363 sa.acs@att.net



Load Cell with attached force transducers

## **Drop Hammer Specifications**

The hammer includes a ram that can be modified for different weights from 11,000 lbs to 19,000 lbs, which allows us to choose the amount of energy necessary to activate the friction and end bearing capacities of the pile. With the lowest weight, the entire hammer and frame weigh less than 20,000 lbs, easily able to be moved by small tracked or truck mounted cranes. The hammer frame permits it to be completely free standing. This allows it to moved and/or operated by a single lined crane and to be easily adjusted to account for differing grade levels around each pile. The hammer also comes equipped with a hydraulic winch capable of quickly lifting the ram without outside assistance from a crane.

### **Easy to Assemble**

The hammer is modular in design and is connected with just 8 heavy duty bolts. This allows it to be shipped anywhere in the country and can be assembled and disassembled on-site in less than an hour.

## Procedure

High Strain Dynamic Testing is performed in a method similar to dynamic pile testing for driven piles. Each pile has directly attached accelerometers and strain gauges that transmit data to the Pile Driving Analyizer. For Auger-Cast, CIDH, and Prestressed Precast Concrete Piles, the sensors are attached directly to the concrete while for CISS and FunDex piles, the sensors can be attached to the steel shell. For piles that don't have enough clearance above grade, the hammer can utilize a load cell with attached force transducers. This load cell sits on top of the pile during testing and records the force data that would normally be read by the strain gauges. All piles must have some area exposed above grade to attach accelerometers.

For testing, the hammer is placed on the pile and sheets of plywood are placed in between the striker plate and pile to act as a pile cushion. The sensors are then attached to the pile. Based off of pile size, type, and required ultimate capacity, the ram drop height is determined by a qualified ACS engineer on site in order to activate the required soil resistance. The ram is released with a manual quick release hook and impacts on either the pile or the load cell. The procedure is then repeated at the discretion of the engineer on site.

This data can be read in the field to relay preliminary information regarding pile integrities while an in-depth analysis is performed later to provide a complete picture of pile and soil properties, most importantly pile capacity. This in-depth analysis is performed using the tested CAPWAP analysis program.