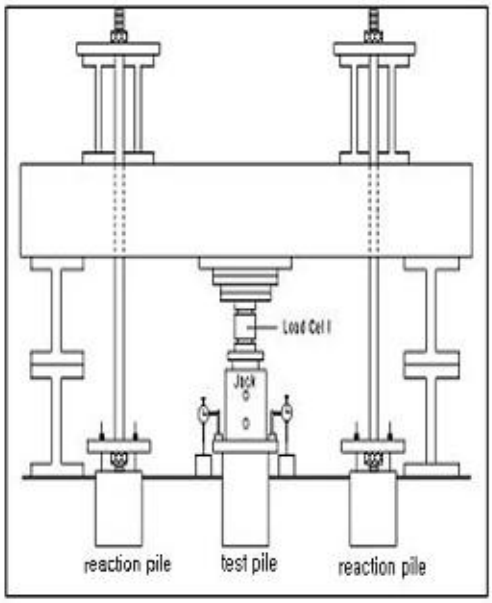
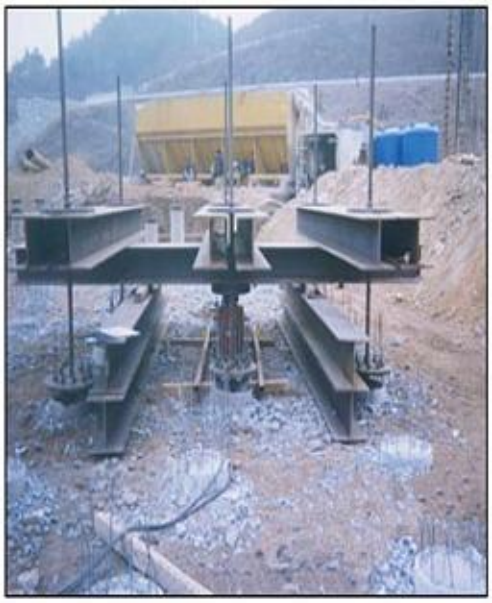
Lecture 22 보충자료 #1

Pile Load Tests

*** Static load test**



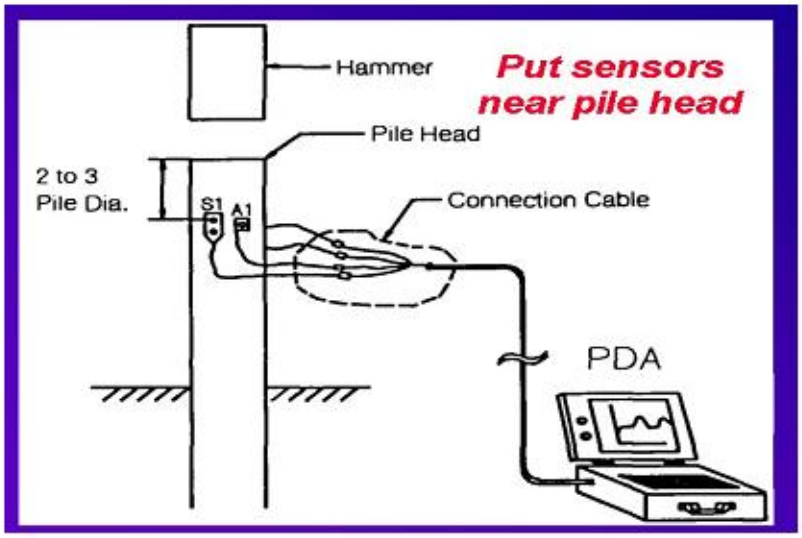


- To determine the allowing capacity of the pile, downward pressure is applied to the top of the pile and its load-displacement curve is measured

- Generally, from the available numerous load test methods the following four methods can be identified as the basic load test methods.
  1. Slow Maintained Load Test Method (SM Test)
  2. Quick Maintained Load Test Method (QM Test)
  3. Constant Rate of Penetration Test Method (CRP Test)
  4. Swedish Cyclic Test Method (SC Test)

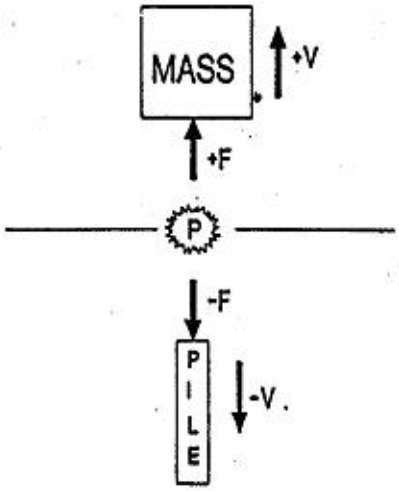
1. **SM Test** : This test method is commonly considered as the ASTM Standard Test method and The main disadvantage of this test is that it is time consuming(a test period may last 40 to 70h or more)
2. **QM Test** : This test method is fast and economical. Typical time of test by this method is 3 to 5h. This test method represents more nearly undrained conditions. This method cannot be used for settlement estimation because it is a quick method.
3. **CRP Test** : The main advantages of this method are that it is fast (2 to 3h) and is economical. This method is of particular value for friction piles but may not be practical for end-bearing piles because of the high force requirements to cause penetration through hard-bearing stratum.
4. **SC Test** : This test method is time consuming, and cycling changes the pile behavior. It is only recommended on special projects where cyclic loading may be of main importance.

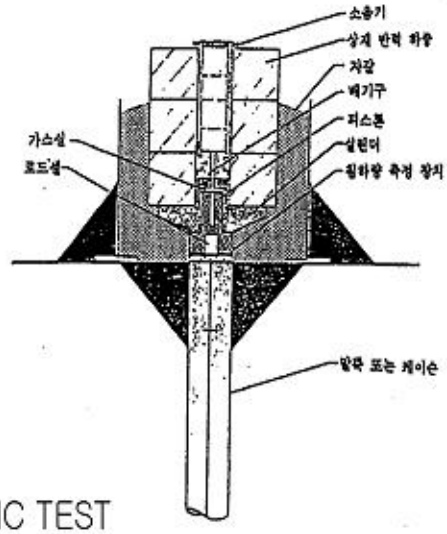
*** Dynamic load test**



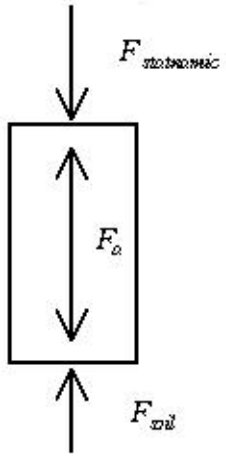
- In dynamic load test during pile driving, force and acceleration are measured by telltale and accelerometer which have been installed on the head of the pile and bearing capacity is obtained by using PDA (Pile Driving Analyzer).

*** Statnamic test**





STATNAMIC TEST



< Force of pile >

$$F_{statnamic}(t) = F_{soil}(t) + F_a(t)$$

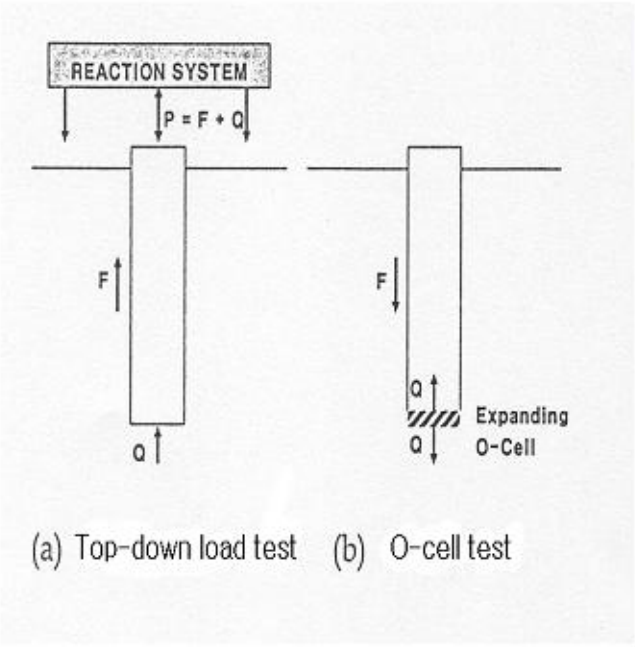
$$F_{soil}(t) = F_u(t) + F_v(t) + F_p(t)$$

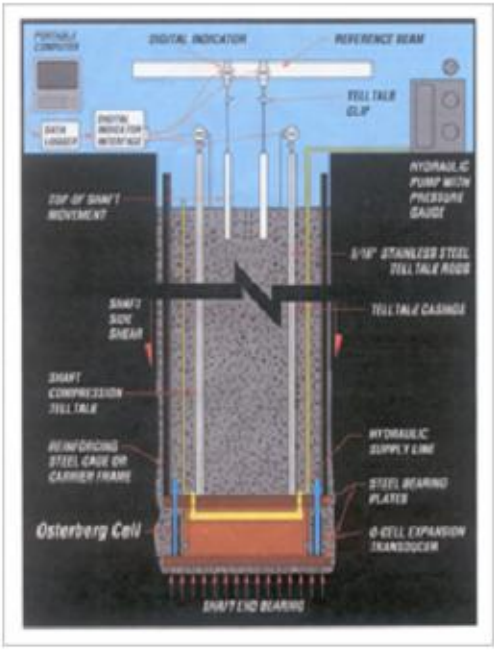
here, $F_u(t)$ =static bearing capacity
$F_p(t)$ =pore pressure
$F_v(t)$ =damping force

- Statnamic is the compound word of a static and dynamic, this load test method is developed to complement the problem of static and dynamic method

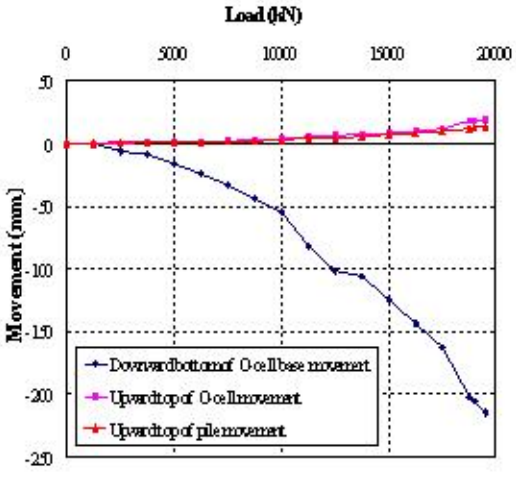
- Statnamic load test machine will be installed directly to the head of the pile and then solid fuel is burned to create a pressure in the vault of the piston

* **Osterberg cell test**

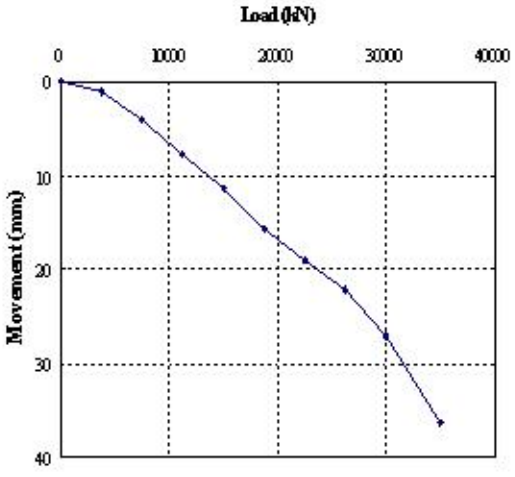




- When oil pressure is applied to the surface of the o-cells, the bottom part will create a base resistance which is of equal force to the side friction created on the other end. and when pressure is applied to the initial position, sleeve friction (F) and base resistance (Q) react each other



Bi-directional load test results



Conventional top-down test results