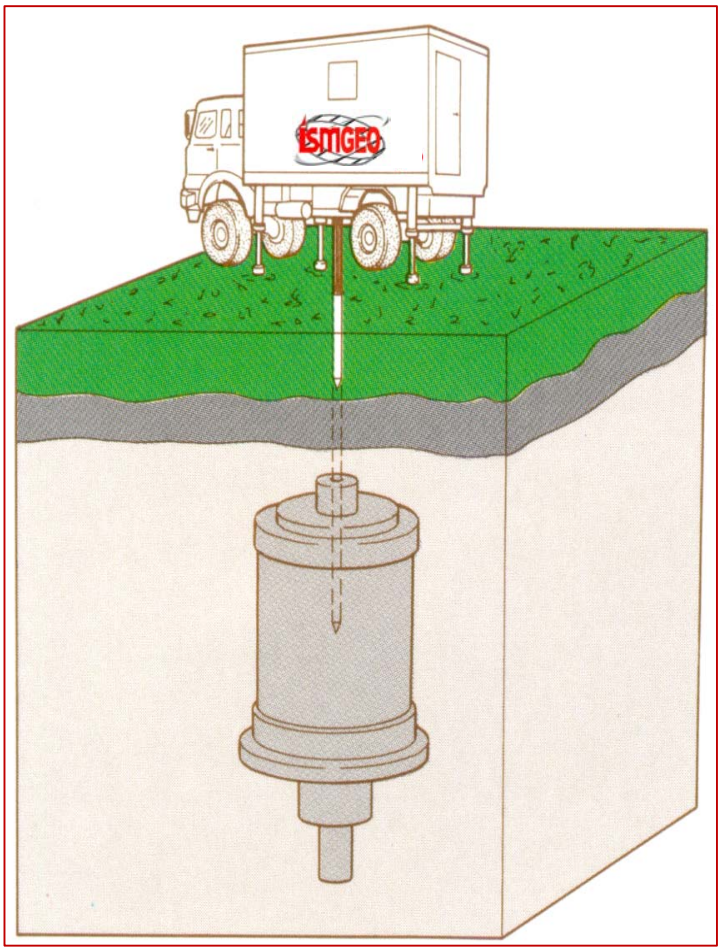
CALIBRATION CHAMBER PURPOSE

The geotechnical calibration chamber is a test system capable of providing the environmental necessary to simulate full scale in situ geotechnical tests in the laboratory. The dimensions of the soil specimen and the boundary conditions are such that experimental data can be readily interpreted and applied to in situ conditions. The purposes for which the calibration chamber apparatus was developed include the following:



a) The establishment of a wide range of correlations between test result and geotechnical parameters of the soil, to better understand the typically empirical in situ geotechnical tests; further, given the controlled conditions in the chamber, it is possible to check the correlations currently suggested for the interpretation of in situ test results;

b) The verification of the mechanical operation of in situ geotechnical instrumentation;

c) The development of new in situ geotechnical instrumentation;

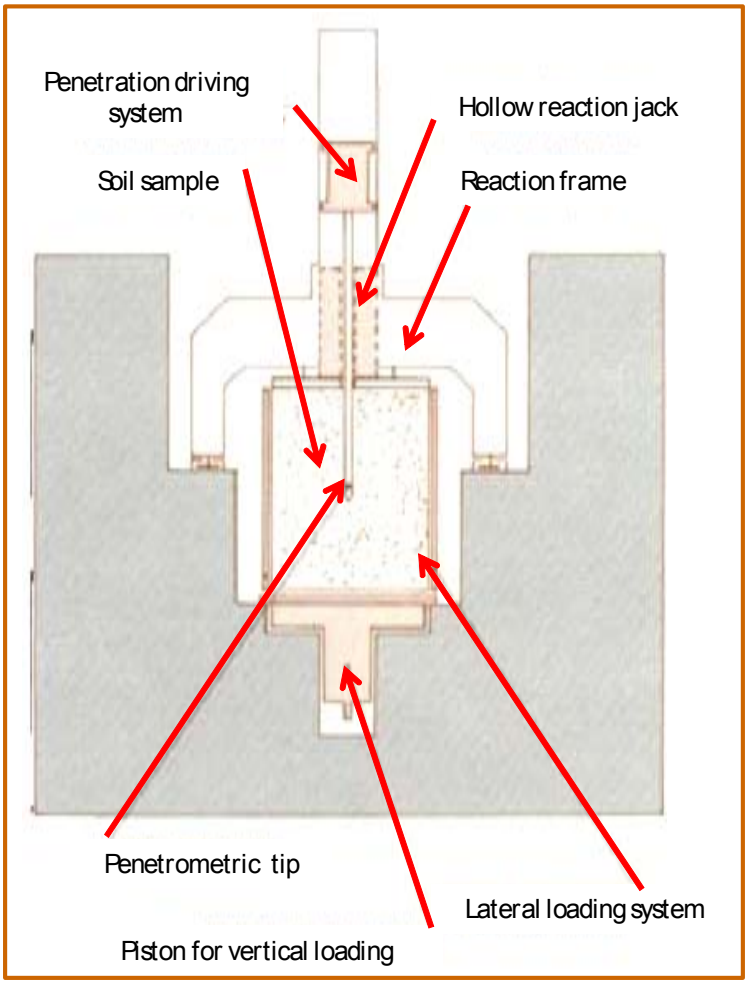
d) The testing of model piles, tie rods, etc.

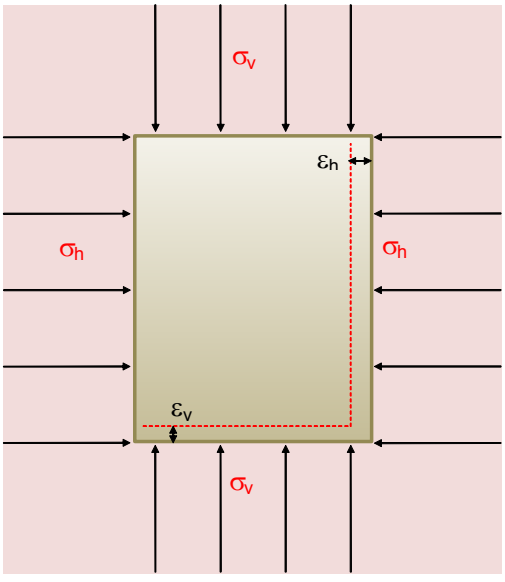
WORKING PRINCIPLE

Vertical and horizontal stresses can be independently applied in a controlled manner to the boundaries of the sample within the calibration chamber (Ø = 120 cm; h= 150 cm).

A mechanical gear-driven system is used to penetrate the full scale probe to be calibrated.

During this phase, different boundary conditions on the sample may be established, through a servo-controlled system.





Possible boundary conditions during testing in calibration chamber

BC1 → σ_v=cost; σ_h =cost

BC2 → $\Delta\varepsilon_v$= $\Delta\varepsilon_h$ =0

BC3 → σ_v=cost; $\Delta\varepsilon_h$ =0

BC4 → $\Delta\varepsilon_v$ = 0; σ_h =cost

TEST PROCEDURE

Test procedures comprise:

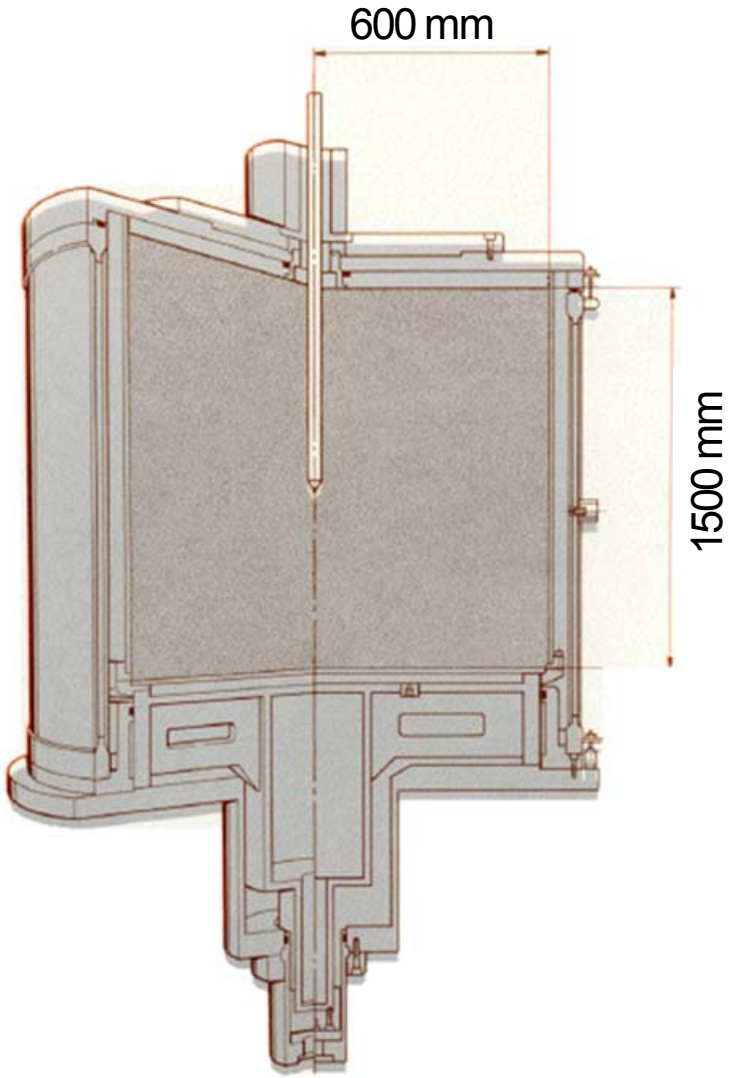
a) Sample preparation;
b) Consolidation of the specimen to desired stress levels, imposing the stress history requested;
c) Penetration of the instrument, acquiring the appropriate data, depending on the instrument;
d) Performance of additional tests with the installed instrument, executed in a manner similar to that employed in situ.

Sample preparation

Testing within calibration chamber

Control instrumentations

The geotechnical calibration chamber is used both for characterization and calibration of in situ geotechnical testing apparatuses, and for calibration of measuring instrumentation. An additional application of this apparatus is research carried out by ISMGEO itself and/or on behalf of third parties, seeking to understand in deeper sense the currently empirical correlations. For characterization of apparatuses and instrumentation for in situ testing, the following tests are currently performed in the calibration chamber:



CONE PENETRATION

PIEZOCONE TESTS

SCREW PLATE TESTS

CROSS HOLE TESTS

MODEL PILE TESTS

CALIBRATION OF LOAD CELLS, PIEZOMETERS, ETC.