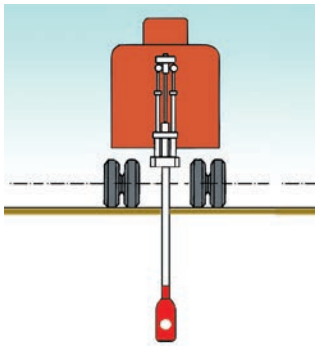
Flat Dilatometer | Seismic Dilatometer | Medusa DMT | Offshore Testing

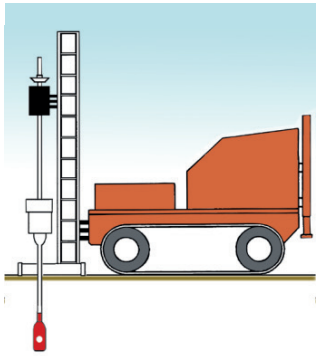
# In Situ Direct Push Technology

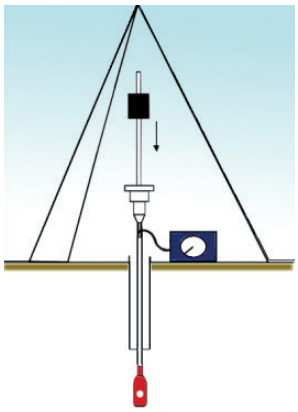
MARCHETTI DILATOMETER

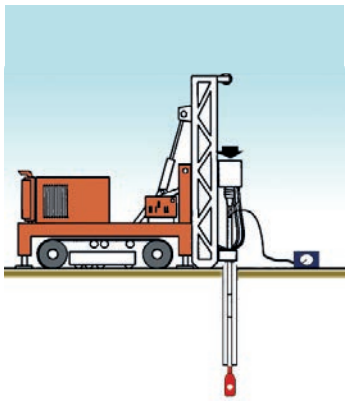
# Penetration Methods

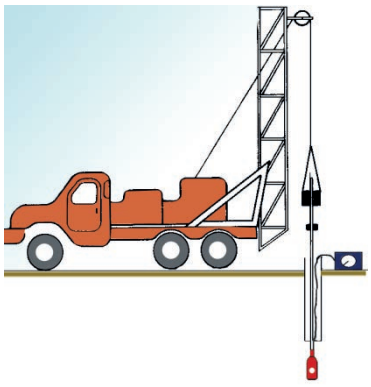
## The DMT and SDMT equipment may be advanced with any field machine



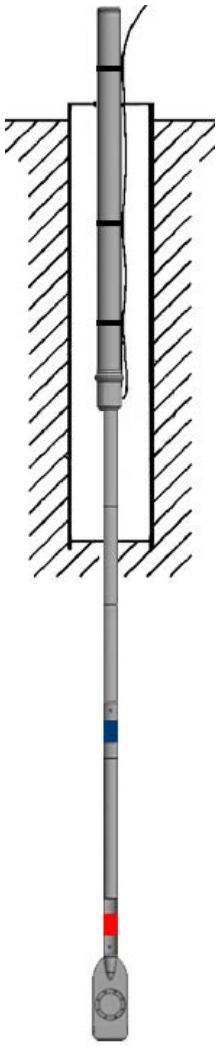








## Torpedo and Drill Rig downhole



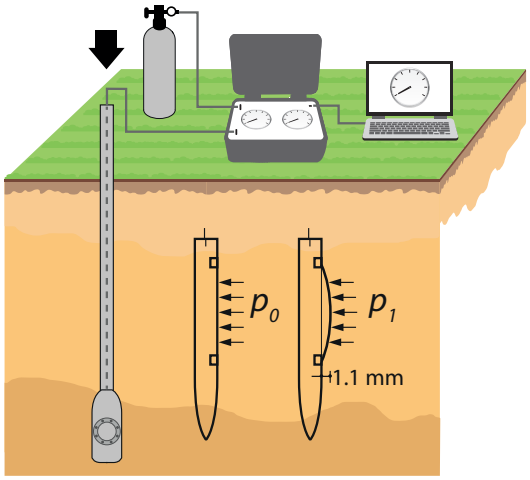
# Flat Dilatometer

The **Flat Dilatometer (DMT)** is an **in situ test** for the determination of various key soil parameters used for geotechnical design. The test is rapid, accurate, simple and cost-effective. The results are highly repeatable and **independent from the operator**. The blade may be advanced with any field machine, including penetrometers and drill rigs. **DMT** measurements are performed in situ, directly on the soil in its original position and state. This eliminates the disturbance caused by drilling, sampling and transport to laboratory. The profiles of the **results are available real time during test execution**. The direct measurement of soil deformation enables accurate estimations of the elastic modulus. The $K_D$ parameter provides stress history information of the soil, a very difficult property to assess with other testing methods.

## Main Applications

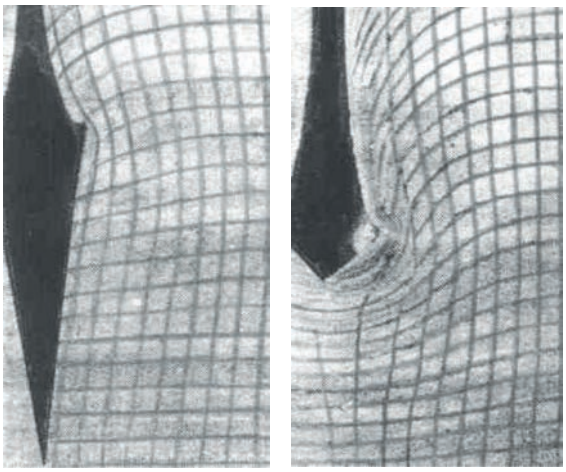
- Soil stratigraphy
- Stress history (OCR, $K_0$)
- Settlement prediction
- Soil Improvement quantification
- Slip surface detection in clayey slopes
- P-y curves for laterally loaded piles
- Liquefaction potential
- Permeability in clay
- FEM input parameters (ex. Plaxis)
- Subgrade modulus for pavements
- Subgrade modulus for diaphragm walls

## Direct deformation measurement



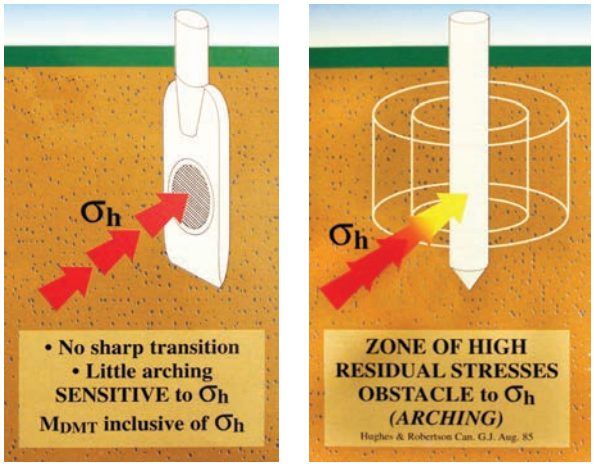

## Minimum soil disturbance

(Baligh and Scott ASCE GJ Nov. 1975)



**Wedge** Cone

## Sensitive to horizontal stress




**Flat** Circular

# Seismic Dilatometer

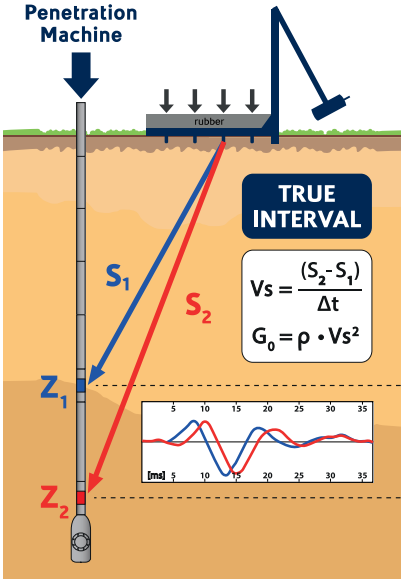
The Seismic Dilatometer (**SDMT**) is a probe for measuring the **shear wave velocity Vs**. The test provides **accurate and repeatable results** with a rapid, reliable and simple technology which does not require any geophysical background. The True Interval configuration is implemented with two sensors spaced 0.5 m. The electronic board provides very accurate AD signal conversion and uses digital data transmission. The high quality of the acquired seismograms enables **real time** shear wave velocity evaluation.

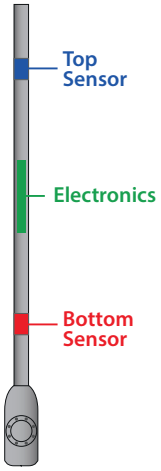
The Vs profiles are available up to the current test depth. Accelerometers monitor the inclination of the SDMT probe during penetration.The SPDMT is an enhanced version of the Seismic Dilatometer containing two additional sensors for recording **compression P waves**.

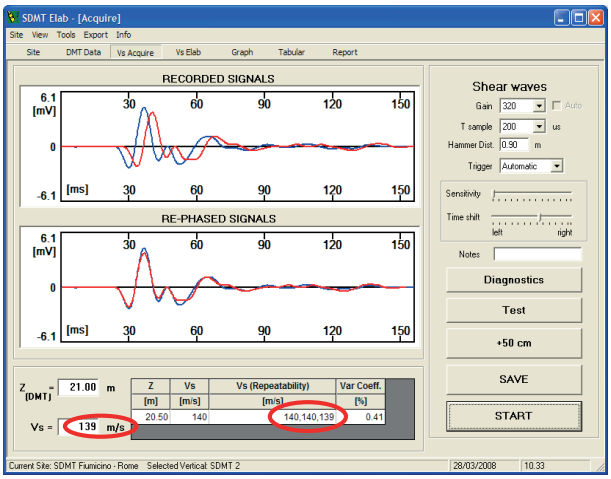
## Main Applications

- Max Shear Modulus $G_0$
- In situ G-gamma decay curve
- Sample Quality Assessment
- Local Seismic Response
- Soil category ($Vs_{30}$)

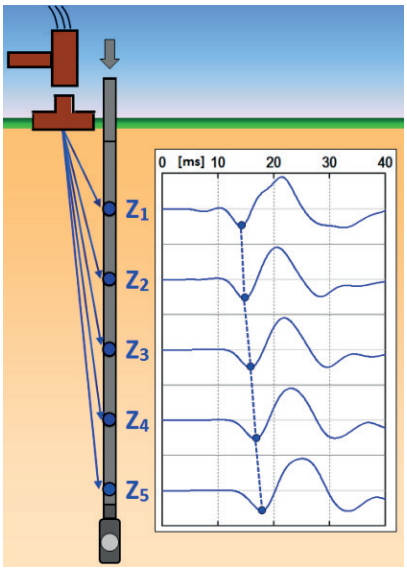
## SDMT - Vs

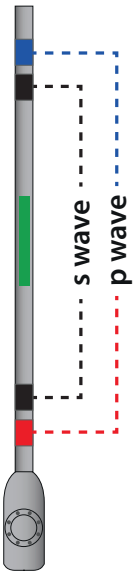


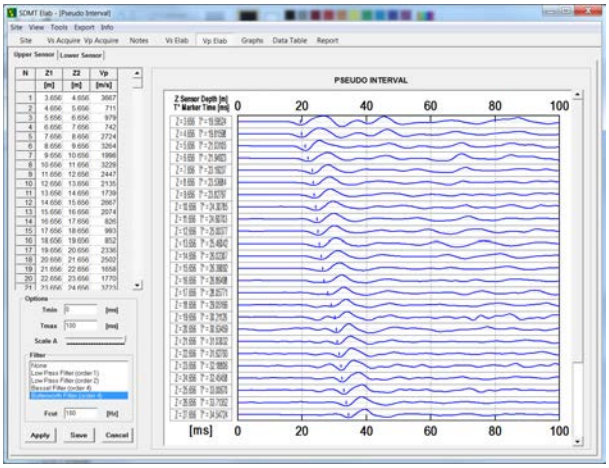




## SPDMT - Vs & Vp

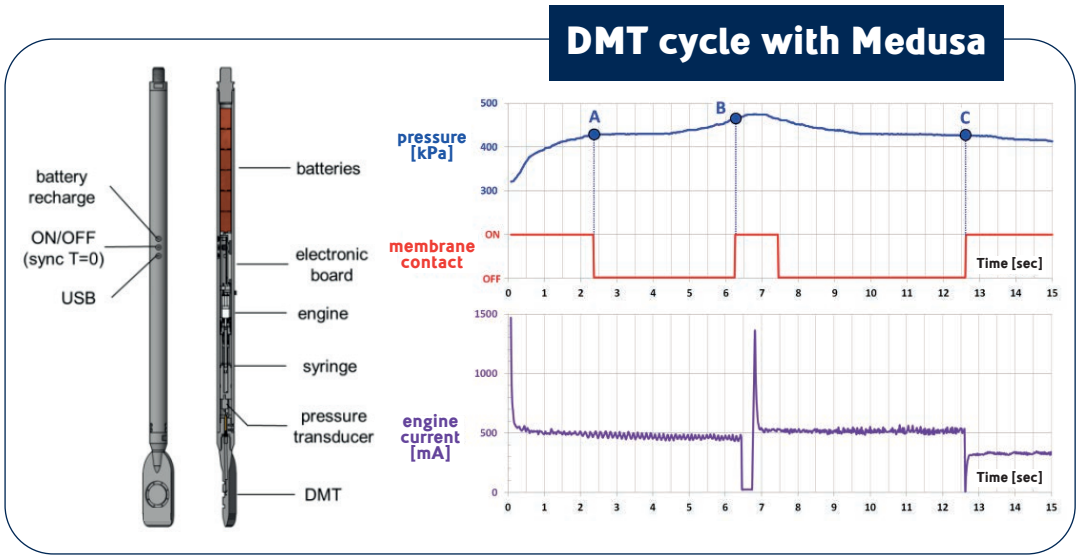


# Medusa DMT

The Medusa DMT is an **automated dilatometer** probe able to autonomously perform the test. An electronic board, powered with rechargeable batteries, activates a **motorized syringe** for **expanding hydraulically** the DMT membrane. The blade has the same dimensions of the original standard flat plate dilatometer. The device may operate **without any cable** (MEMO mode) or with an electric cable for **real time results**.



# Offshore Testing

**Studio Prof. Marchetti** has directed several world-wide offshore projects for performing DMT and SDMT measurements from the floors of **rivers**, **lakes** and **seas**. The know-how based on many **years of experience** has made the execution of such tests reliable, robust and efficient. A key step consists in determining the most cost-effective setup ensuring correct test execution. **Shear wave velocity** measurements are performed with a custom designed **seafloor hammer**.

# About us

Studio Prof. Marchetti was founded by **Professor Silvano Marchetti**, inventor of the Flat Dilatometer (**DMT**) and Engineer **Diego Marchetti**, developer of the Seismic Dilatometer (**SDMT**) and **Medusa DMT**. The instruments are protected with international patents. The production, testing and service of the equipment occurs in the offices of Rome. The equipment is distributed world-wide in over **70 countries.** The tests are coded in **international standards** such as ASTM, Eurocode and ISO. The company invests considerable energies in **technological innovation**, for enhancing existing products and exploring new solutions in soil testing. It cooperates with Universities and Institutes world-wide for **research** in site characterization and geotechnical engineering.

MARCHETTI DILATOMETER

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EUROCODE 7 Part 2 (2007) | ASTM - Standard D6635 - 15 (2016) | ISO - ISO/TS 22476-11 (2017) | ISSMGE - TC16 Report (2001)