

CALTAG

GEOTECHNICAL SOLUTIONS

SOL *∫* **SOLUTION**
Solidly-based innovation

ENGINEERING • GEOTECHNICAL EQUIPMENT
RESEARCH AND DEVELOPMENT • TECHNICAL TRAINING

WWW.SOL-SOLUTION.COM

Introduction

SOL SOLUTION WAS FOUNDED IN 1992 AS A SPECIALIST GEOTECHNICAL ENGINEERING DESIGN OFFICE BASED IN THE TOWN OF RIOM IN FRANCE. THE COMPANY HAS SIGNIFICANT EXPERTISE IN SOIL MECHANICAL CHARACTERISATION AND STRUCTURAL INTERACTION (BUILDINGS, TRANSPORT INFRASTRUCTURE ...).



Sol Solution's engineering services are divided into **3 main areas**: studies prior to construction (recommendations for foundations, retaining dimensioning ...), control of newly constructed structures (sanitation networks, piling, micro-piling ...) and finally performance analysis of existing structures in service (transportation infrastructures, dykes, earth structures ...).

Sol Solution undertake **Research and Development** work on behalf of both public and private sector clients and contractors. The company provides technical courses with a training agreement organization.

The company designs, develops and sells **innovative solutions**, particularly in the specialist fields of earthworks compaction control, geotechnical investigation, soil reinforcement and high-performance diagnostics.

Sol Solution has developed and offers a comprehensive range of dynamic cone penetrometers DCP (**PANDA®**, **PANDITO®**, **KODIAK®**, **GRIZZLY®**), bearing capacity equipment (lightweight deflectometer ...), all supported by **associated software** (processing and interpretation), with complete after-sales service, spare parts, equipment calibration, technical assistance and training in equipment application and use.

PANDA[®] DCP

*Lightweight dynamic cone penetrometer
with variable energy*

Applications

- **COMPACTION CONTROL (NF P 94-105)**
- **SOIL INVESTIGATION**
- **DIAGNOSIS**

Characteristics

- Suitcase dimensions:
L 55 x W 43 x H 21 cm
- Weight complete suitcase:
18,5 kg
- Fixed 2 cm² cones and
sacrificial 4 cm² cones
- Color touch screen display



Multilingual



Portable
equipment



Advantages

- Conceived and developed by Sol Solution
- Variable strike energy input from operator adapted to relative ground resistance
- Measurement of variable strike energy and depth for each blow provides instantaneous calculation of ground resistance
- Transport and implementation by a single operator
- Inclined and horizontal soundings
- Automatic data acquisition and integrated GPS
- Penetrograms viewable on site
- Reference curves and automatic inbuilt calculation of encountered anomalies viewable on site
- Correlations with other geotechnical tools (CBR, CPT, SPT...)
- GEOSPRINT[®] data processing software
- Several languages available



Options

- Mechanical rod extractor
- Various associated automatic striking systems

PANDA® MECHANICAL ROD EXTRACTOR

Applications

- TO REMOVE PANDA® RODS DRIVEN INTO THE GROUND MANUALLY OR BY AUTOMATIC HAMMER

Characteristics

- Dimensions in cm:
L 119 x W 19 x H 27
- Total weight: 7.5 kg
- Tripod with ballbearings
jaw
- Removable 1 m elbow
lever arm



Portable
equipment

Advantages

- Conceived and developed by Sol Solution
- Simple and efficient rod extraction system
- Lightweight, practical, and easily transportable package
- The angled lever arm increases the extraction force
- Lever arm and tripod are separable for storage and transport
- The ballbearings are interchangeable in case of wear
- Useable with PANDA®, KODIAK® and PANDITO® DCP



LIGHTWEIGHT ELECTRIC HAMMER FOR PANDA®

Applications

- TO FACILITATE AUTOMATIC HAMMERING FOR PANDA® TESTS

Characteristics

- Dimensions (in cm):
H 100 x W 24 x D 17
- Total weight: 21.5 kg
- Hammering column with
10 kg ram
- Transformer 230 V / 24 V
- Constant energy input



Portable
equipment



Electrical
energy
driven

Advantages

- Conceived and developed by Sol Solution
- The light weight automatic hammer enhances and replaces PANDA® manual method
- Portable for single operator use
- Electrical power source
- Optimized productivity



Options

- Wheeled suitcase for easy transport
- Mechanical rod extractor
- 24 V lithium battery for power supply

PANDITO® DCP

*Ultra-lightweight dynamic
cone penetrometer with
constant energy*

Applications

- **TO UNDERTAKE A SELF-CONTROL LAYER BY LAYER COMPACTION TEST**
- **IDENTIFY THE RISKS OF ACCESSIBILITY FOR CONSTRUCTION MACHINERY**

Characteristics

- Total weight: 8.5 kg
(5 kg hammering weight)
- 50 cm rod graduated every 10 cm with 2 cm² fixed cone
- Strike number for every 10 cm of depth is compared to a reference value, depending on the nature of the soil, its moisture content, and the required compaction quality



Multilingual



Fully portable



Mobile application

Advantages

- Conceived and developed by Sol Solution
- Simplified database of reference values displayed on the PANDITO® hammering mass for instantaneous on-site reading
- Efficient and simplistic for operator to gain test result
- Data processing spreadsheet: N10, qd (MPa), compaction compliance
- CBR Index Measurement
- Multilingual

Options

- Airfield model for opening/closing grass runways
- Established and developed using laboratory reference values (density in calibrated chambers) for new materials



GRIZZLY® DCP

*Heavy dynamic cone
penetrometer with constant
energy*

Applications

- **COMPACTION CONTROL (NF P 94-063)**
- **SOIL INVESTIGATION (NF P 94-115 AND EN ISO 22476-2)**
- **DIAGNOSIS**

Characteristics

- Dimensions: L 2.03 x W 0.89 x H folded 1.22 m
- Weight: 950 kg
- Weight and falling height of the normalized ram (type DPSH-B: 64 kg and 75 cm)
- 1 m rods, Ø 32 mm - 20 cm² fixed or sacrificial cones
- Fully hydraulic controls
- Emergency stop, flashing beacon, projector



Multilingual

Advantages

- Conceived and developed by Sol Solution
- Automatic measurement of depth for each blow
- Easily transported using mid-range vehicle (Trafic, Vivaro, Jumpy, Primastar ...)
- Stable platform track machine
- Integrated powerful extraction system (11 t)
- Single operator implementation
- Pre-programmable target depth along with intermediate halts for rod or rod additions and automatic stop where refusal achieved
- Detachable continuous depth sensor gauge
- Acquisition system with built-in GPS
- GEOSPRINT© data processing software
- Several languages available

Options

- Wired remote control with progressive joysticks
- Core sampler with plastic sheath
- SPT set (NF P 94-116 and EN ISO 22476-3)
- Torque wrench
- Automated variable energy input
- Available without acquisition system or specific software
- Drilling head (non-European market)



GRIZZLY® COMBINATION DEVICE

*Heavy dynamic cone penetrometer
with constant energy with drilling head*

Applications

- **COMPACTION CONTROL (NF P 94-063)**
- **SOIL INVESTIGATION (NF P 94-115 AND EN ISO 22476-2)**
- **DRILLING AND SOUNDING**

Characteristics

- Dimensions: L 1.98 x W 1.00 x H folded 1.31 m (without rod rack)
- Weight: around 1000 kg
- Use of helical augers (L 1 m - Ø 63 mm)
- Compliance with safety requirements: safety cage, sensitive devices, normal/reduced operating mode with flashing beacon, audible warning, remote control...
- Weight and falling height of the normalized ram (type DPSH-B: 64 kg and 75 cm)
- 1 m rods, Ø 32 mm - 20 cm² fixed or sacrificial cones



Multilingual

Advantages

- Conceived and developed by Sol Solution
- Drilling for soil sampling, geological sections and pressure measurement tests
- Automatic depth recording and geological section entry (library available) in situ
- Drilling to several meters' depth
- Conversion from penetrometer to drilling machine is very simple and fast
- Printing of the penetrogram and geological section using GEOSPRINT© software
- Multilingual

Options

- Core sampler with plastic sheath
- SPT set (NF P 94-116 and EN ISO 22476-3)
- Torque wrench
- Automated variable energy
- Available without acquisition system or specific software

KODIAK® DCP

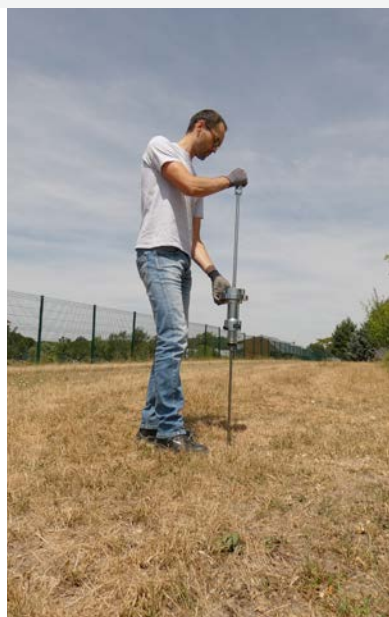
*Lightweight dynamic cone penetrometer
with constant and variable energy*

Applications

- **SOIL INVESTIGATION (EN ISO 22476-2- DPL)**
- **DIAGNOSIS**

Characteristics

- Weight of the penetrometer (with the 3 masses): 13.7 kg
- Dimensions: L 89 x Ø 15 cm
- Waterproof and robust wheeled transport case
- Simple locking of the hammer heads for transport for practicality and safeness
- 3 hammer heads available: 5, 8 and 10 kg
- Drop height: 50 cm
- 50 cm rods - Ø 14 mm, graduated every 10 cm
- 2, 4 and 10 cm² fixed and sacrificial cones



Multilingual



Portable
equipment



Mobile
application

Advantages

- Conceived and developed by Sol Solution
- Variable strike energy input from operator adaptable to relative ground resistance or condition
- Ultra-fast mass (hammer head) change by simple screwing
- Transport and implementation by a single operator
- Spreadsheet for soil investigation interpretation
- CBR Index measurement
- Smartphone application under Android for data input during the test and emailing
- Several languages available

Options

- Mechanical rod extractor
- Automatic acquisition system (penetration per blow and GPS)



LIGHTWEIGHT DEFLECTOMETER

Applications

- BEARING CAPACITY CONTROLS
- MODULE MEASUREMENT

Characteristics

- Plate weight (Ø 30 cm): 15 kg
- Hammering column weight: 15 kg (including 10 kg drop weight)
- Electronic acquisition box for recording, instantaneous display and data reading



Multilingual



Portable
equipment



Mobile
application

Advantages

- Instantaneous determination and visualization of the dynamic Evd modulus
- Data processing spreadsheet: EV2 modulus (MPa)
- Efficient and easily transportable
- No need for static loading (truck)
- Implementation by a single operator
- Results are independent of the operator
- Several languages available

Options

- Waterproof reinforced plastic transport case
- Transport trolley
- SD Wi-Fi card for smartphone's transfer

GEOSPRINT[©]

Software dedicated to the use and interpretation of dynamic cone penetrometers (PANDA[®], GRIZZLY[®]...)

Applications

- **COMPACTION CONTROL (NF P 94-063 AND NF P 94-105)**
- **SOIL INVESTIGATION (NF P 94-115 AND EN ISO 22476-2)**
- **DIAGNOSIS**

Characteristics

- Penetrometric data processing and interpretation
- Data recovery
- Insertion of maps, pictures, drawings ...
- Automatic report generation
- Soundings geolocation
- Conceived and developed by Sol Solution
- Multilingual

GeoSprint[©]

BY
SOL SOLUTION
À l'innovation sur le solifère appliqué



Multilingual

3 modules available

- **Compaction control module advantages :**
 - database (GTR soil classification and compaction qualities)
 - various automatic calculations of compaction anomalies
 - other available soil classifications (USCS, AASHTO, DIN 1896, PG3 ...)
- **Soil investigation module advantages :**
 - estimation of soil's bearing capacity
 - geological library for lithological cross section
- **Correlations module advantages :**
 - in situ tests (CPT, SPT, PMT, DCP, DPSH ...)
 - geotechnical parameters, bearing capacity
 - creation of your own correlations



AFTER-SALES SERVICE RENTAL

Objective

- **VERIFY AND ENSURE EQUIPMENT MAINTENANCE AND METROLOGY**
- **ASSIST OPERATORS IN THE EQUIPMENT USE**
- **PROPOSE RENTAL EQUIPMENT FOR OCCASIONAL NEEDS**

Missions

- Repair, diagnosis, maintenance
- Spare parts and consumables sale
- Calibration and verification
- Technical assistance for hardware and software use
- Interpretation of findings assistance
- Equipment rental (daily, weekly, monthly)



Advantages

- Flexibility and efficiency of the after-sales team
- Shipping by traditional or express transport
- France and international

TECHNICAL TRAININGS

Objective

- TRAIN CONSTRUCTION COMPANIES IN SOIL TECHNIQUES AND METHODOLOGIES
- ENSURE ACQUISITION OR MAINTENANCE OF EMPLOYEES' SKILLS

Missions

- Technical training in geotechnical engineering (road, building, earthworks, sanitation, backfill, trenches)
- Training in the use and interpretation of the materials distributed by Sol Solution
- Existing or specific training programs adapted to your needs
- Several hundred operators and employees trained each year



Advantages

- Training provided at Sol Solution or on your premises (France and international)
- Pedagogical approach combining theory and practice
- Sol Solution possess an activity declaration of activity as a training provider (n° 83.63.02143.63)
- Agreement and internship certificates issued



Certifications

- Training organization registered
- Organization referenced on the Datadock platform

GEOTECHNICAL STUDIES AND RETAINING

Objective

- DESIGN FOUNDATIONS
- DESIGN RETAINING STRUCTURES IN REINFORCED SOIL

Missions

- Standard geotechnical missions (NF P 94-500) from G1 to G5 (G1 ES/PGC, G2 AVP/PRO, G3, G4 and G5)
- Design shallow and deep foundations, roads ...
- Carry out geological and geotechnical investigations (drought, landslides, ...)
- Operate from design to achievement (Cradle to Grave)
- Geotechnical project management missions
- Buildings, individual houses, engineering structures, earthworks, roads, dykes, platforms, rock slope stability, retaining, environment, soil pollution diagnosis ...
- Sounding, drilling (vertical or inclined), coring, piezometers, pumping tests, pressuremeter, penetrometers, permeability, bearing capacity tests, geophysical tests, Cross-Hole, Down-Hole ...
- Soil reinforcement process using three-dimensional cellular geotextiles M3S® (Sol Solution patent): design, supply process, site assistance, monitoring and execution controls of the structure



Advantages

- Sol Solution has its own soil analysis laboratory (odometer, shear, triaxial, internal erosion, soil identification, PROCTOR, IPI, CBR ...)
- Several thousand studies undertaken
- Geotechnical skills for modelling calculation software: TALREN®, PLAXIS®, GEOSTAB®, K-REA®, FOXTA®...



Certifications

- Decennial insurance
- OPOiBi qualification (qualified engineering)

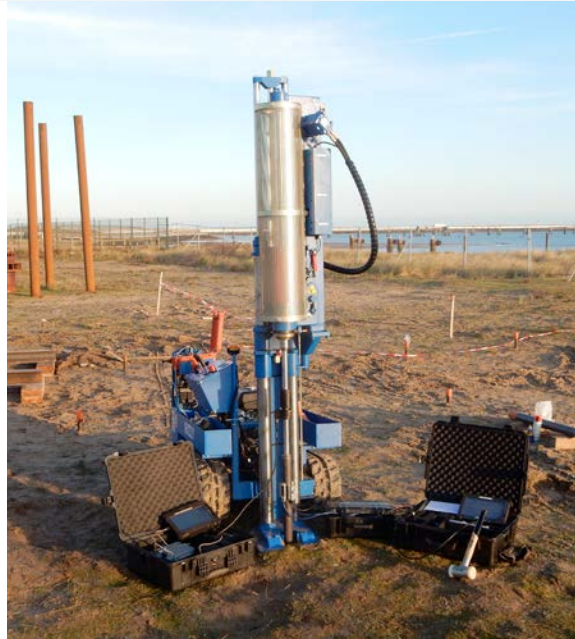
CONTROLS

Objective

- ENSURE THE INSTALLATION QUALITY AND THE WORKS IMPLEMENTATION
- VALIDATE VARIOUS WORKS

Missions

- Compaction and bearing capacity controls (platforms, trenches, embankments, earthworks, dikes ...)
- Wet and dry underground networks controls (camera inspection, leak tests, compaction controls)
- Deep foundation controls (micropiles by low-stress dynamic loading, static axial tensile test, piles integrity test ...)
- Material quality controls in laboratory



Advantages

- Standard control equipment and procedures
- Technical couplings
- Soil laboratory analysis

Certifications

- OPQIBI qualification (qualified engineering)
- COFRAC accreditation (FRench ACcreditation COmmittee) in the field: "Water - Acceptance controls for new sanitation networks", type A (guaranteeing total independence)

GEOTECHNICAL AND GEOPHYSICAL DIAGNOSTICS

Objective

- CHARACTERIZE WORKS
- DIAGNOSE STRUCTURES CONDITION AND FUNCTIONING

Missions

- Sanitation networks expertise and leak detection
- Network detection and research (ground radar and radiodetection)
- Identification of all types of underground networks
- Hydraulic structures diagnosis (dikes and earth dams), vulnerability studies ...
- Definition of the soil sensitivity to internal erosion and determine its erosion speed
- Diagnosis of linear transport structures in service: sanitation networks, roads, railways, tunnels, underground structures ...
- Non-collective sanitation systems diagnosis



Advantages

- In situ diagnosis of soil characteristics
- Several thousand km of structures diagnosed
- Non-destructive high-performance geophysical tests and innovative and low-trauma geotechnical tests (mapping and spatialisation)
- Method couplings



Certifications

- OPQIBI qualification (qualified engineering)

RESEARCH AND DEVELOPMENT

Objective

- FIND THE BEST SOLUTION TO YOUR NEEDS
- DEVELOP PROCESSES FOR OUR CUSTOMERS AND OUR USES

Missions

- Design, development, evolution of products, software and technologies widely used (PANDA®, PANDITO®, KODIAK®, GRIZZLY®, geoendoscopy, M3S®...)
- Study of client specific geotechnical projects
- Numerical modelling of structures
- Soils geomechanical characterization
- Data coupling
- R&D developed for external organizations (EDF, SNCF, NATO, RATP, VEOLIA, ADP...)
- Numerous patents, trademarks, and models



Advantages

- Cost service eligible for the Research Tax Credit
- Multidisciplinary R&D team (geotechnical, mechanical, electronic, IT...)
- More than 10% of the turnover devoted to R&D (regular funding of thesis ...)
- Collaborative projects participation

Certifications

- R&D organization approved by the Ministry of Higher Education and Research





agree studio

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