



Features

- ◆ Instant Hammer energy measurement and transfer coefficient calculation.
- ◆ Rugged handheld acquisition unit, weighs less than 2Kg
- ◆ Storage for over 700 results
- ◆ Backlight LCD screen for working in dark environments
- ◆ Reporting software to display and print out results
- ◆ Complies with the relevant parts of both BS EN ISO 22476-3 and ASTM D 4633-05
- ◆ Battery powered system
- ◆ Includes instrumented section of SPT rod to measure Acceleration and Strain

SPT Hammer Energy Measurement

The measurement of SPT Hammer energy is now recommended for all Standard Penetrometer Test systems.

BS EN ISO 22476-3 states that the hammer energy ratio has to be known and a certificate of calibration available "if N values are going to be used for the quantitative evaluation of foundations or for the comparison of results". This standard also recommends that checks should be carried out on a 6 monthly basis, and also after damage, overloading or repair. It is also good practice to carry out a calibration at the start of any large contracts.

The SPTMAN system is able to measure the energy actually transferred from the drive hammer to the drive rods, and to calculate the Hammer Energy coefficient, by comparison with the theoretical potential energy.

The SPTMAN system is an easy to use portable system, which includes all the neces-

sary hardware and software to carry out the test. The system is supplied with a standard 54mm diameter instrumented SPT rod, however others types of rod can be instrumented if required. Spare calibrated instrumented rods can also be purchased if required.

The heart of the system is a rugged, portable battery powered analyser with solid state memory and is designed for use on construction sites. It is supplied in a waterproof carry case for ease of transport. Tests are carried out using an easy to follow menu, which enables Hammer Energy and the Energy ratio to be displayed in real time .

SPTMAN Software

The SPTMAN analysis software is supplied as standard. It is Windows based and user friendly and enables the operator to download and store test data, and also to print out SPT rig calibration certificates.



SPTMAN Specifications



Acquisition Unit

Acquisition: 4 channel, 16 bit acquisition at 100Khz sample rate. Pre-trigger, auto gain and auto balancing of strain gauges.

Storage: 700+ results, including 3 data sets per pile with full header information—site, pile no, diameter, operator, transducers and date/time stamp.

Keypad: Sealed colour coded and full alphanumeric keypad, tactile and audio feedback

Operating Temperature: 0 to 50 Deg C

Size: L 218 x W 187 x D 55mm

Weight: 1.35Kg

Display: Monochrome LCD Transflective with backlight. Contrast keypad adjustable. Display area 122x70mm. Protective anti-reflective glass.

Backlight: Backlit display with auto-off

Connectors: Waterproof Lemo type, each with unique configuration.

Battery: 1.2V NiMH rechargeable “AA” cells

Battery Life: 8hrs+ operation on full charge

Battery Charge Time: Approx 6Hrs

Charger: External wall plug-in charger for 100/110/250VAC inputs. External cigar plug -in charger for 12VDC inputs

Battery Indicator: Displays the level of charge in the unit.

Instrumented Rod



The standard instrumented rod supplied is a 54mm OD, 1m long section with male/female 1.5” Whitworth threads. However customers own rods can be instrumented if required. Sensors are located within a protective housing.

Connectors: Rugged Jaeger type with quick release , to enable easy set up on site. 3m leads enable the test technician to operate the analyser at a safe distance from the hammer.

Accelerometers: 2No 5000g ‘shock’ type with ICP power supply.

Strain Gauges: 2No Foil type for accurate measurements.

Calibration: both accelerometers supplied are calibrated, using reference equipment traceable to UK national standards. Recommended re-calibration interval is 1 year.

Standard Inclusions

SPT Hammer Energy Acquisition Unit, Instrumented 54mm o/d 1m long SPT rod fitted with 2No PCB Accelerometers and 2No strain gauges, 3m connection cables, Data transfer cable, AC Adapter charger for unit, waterproof carry cases for SPTMAN and Instrumented Rod, Protective pouch with neck strap, Instruction Manual, SPTMAN Software CD, Calibration certificates, 1 Year Limited Warranty

Spares and Extras

Site calibrator: Provides a test signal that can be used to verify the correct working of the acquisition unit. This can be useful if damage is suspected to unit or instrumented rods on site.

Instrumented Rod: Spare instrumented rods of any diameter can be supplied to order, complete with calibration certificates for sensors.

SPTMAN Software

The SPTMAN software is an easy to use Windows based platform for downloading data, analysing results and producing calibration certificates. The certificate includes plots of Force, velocity, acceleration and displacement and also displays Measured Energy, Theoretical Energy and the Energy ratio. Full details of the rig and site can also be shown, together with your companies logo.

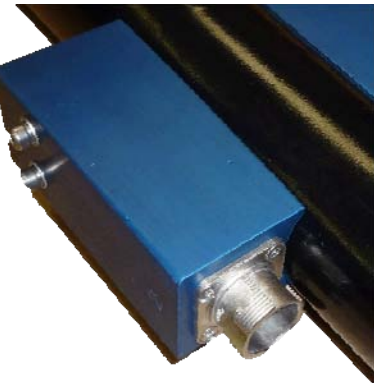
Methodology

The method is based on the propagation of waves in long elastic cylinders. When the SPT rod is struck with the falling weight the rod section is deformed (enlarged) and this enlargement travels down the pile to the base of the rod, where it is reflected back.

The force transmitted to the rods is calculated by measuring the axial strain in the rod over a period of time and taking the modulus and cross section of the rod into account by:

$$F(t) = A_a \times E_a \times \epsilon_m(t)$$

The particle velocity of the measurement section is determined by integrating data from the accelerometers over a period of time. The energy which passes into the drive rods can be determined from the



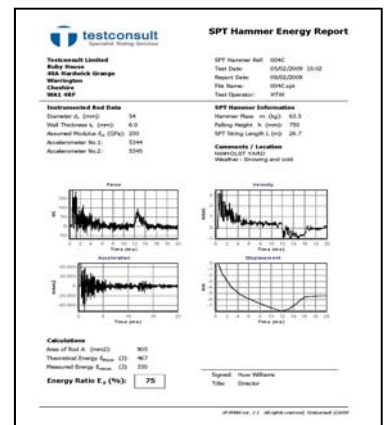
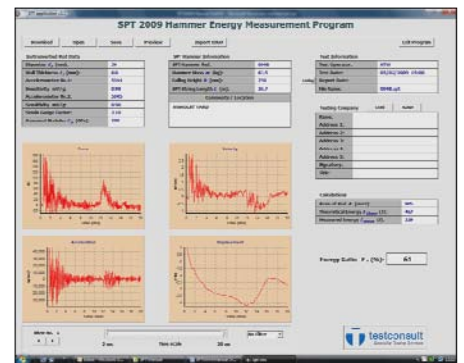
Force and velocity data using:

$$E(t') = \int_0^{t'} F(t) v(t) dt$$

The hammer energy ratio is then given by :

$$E_{meas} = \frac{E_{meas}}{E_{theor}} \leq 1$$

Where E_{theor} is calculated from the mass of the hammer and the falling height.



SPTMAN Software & Report Format



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