

Dynamic Simple Shear with Confining Pressure Testing System

Related Standards

American ASTM D6528, D8296

The VJ Tech Dynamic Simple Shear Apparatus with Confining Pressure (DSS-C) utilises 2 electro mechanical dynamic actuators for applying the vertical and horizontal loads to the sample which is held under Pressure in an adapted Triaxial type Cell or a sample contained within Confining Rings and no Confining Pressure

The 2 electro mechanical dynamic actuators are controlled by the Dual Axis Dynamic Servo Controller (DSC3000MM) which is connected via Ethernet or USB to a PC. The vertical and horizontal displacements can be measured with either LSCT Transducers or Encoders which are part of the servo motors. The maximum range of travel in each axis is protected by limit switches and strain rate is easily set from the PC.

Back Pressure and Cell Pressure are controlled and measured using Pro Hydraulic APCs. Vertical and Horizontal Loads are measured by internal Load Cells. The Loads and Pore Water Pressure are measured via the DSC3000MM.

The controlling software (Clisp Studio csDYNSS-C) enables all stages of the test (Saturation, Consolidation (Isotropic, Anisotropic or K0), Static Loading, Cyclic Shear (Stress or Strain) or Liquefaction) to easily be set up and run.

Ordering Information

Main System Components

VJT2831-110 Dynamic Simple Shear with Confining Pressure Apparatus

VJT-DSC3000MM Dynamic Servo Controller (Dual Axis - up to 8 Input Channels per Axis)

VJT2266-P Pro Hydraulic APC (1000 kPa) (x2)

Transducers

MET0097 2 Internal Load Cells (5 kN)

VJT0271/DYN LSCT Transducer (Dynamic 25 mm)

VJT0272/DYN LSCT Transducer (Dynamic 50 mm)

VJT0250/DYN PWP Transducer (Dynamic 1 MPa)

VJT0250-G Remote Cell Pressure sensor (1 Mpa)

Accessories

VJT2831-100-70S 70 mm Skirted Sample Kit

VJT2831-100-100S 100 mm Skirted Sample Kit

VJT2831-100-70R 70 mm Confining Ring Sample Kit

VJT0280 De-airing block (x2)

MIS0166D Single Channel Signal Conditioning Card

VJT-PC-RACK Rack Mounted PC (Optional)

VJT-PSU0015 Isolation Transformer 230VAC with Cables

VJT-PSU0015-110 Isolation Transformer 110VAC with Cables

Software Ordering Information

VJT-csDYNSS-C Clisp Studio Dynamic Simple Shear with Confining Pressure Software



Dynamic Simple Shear with Confining Pressure Testing System

Features

- Static or dynamic testing via servo controlled high speed motors
- Axial and shear stress-strain control
- Stainless Steel Simple shear apparatus/assembly
- Supplied with all transducer and load cell brackets
- Confining Cell on runners for ease of sample assembly
- Cell accommodates sample sizes of 70 or 100 mm
- Full control from a PC (running Clisp Studio) over an Ethernet or USB connection
- Dual Axis Digital Servo Controller (2 DSCs in a cabinet (with optional rack mounted PC))
- DSCs with cyclic waveform peak control
- Waveforms available: Sinusoidal, Triangular, Square, Haversine, Saw Tooth, User Defined
- Sample assembly kits available:
 - Skirted Base Pedestal and Top Cap 70 or 100 mm dia.
 - Confining Ring Base Pedestal and Top Cap 70 mm dia

Specifications

Frequency Range	0.0001 - 10.0000 Hz (upgradeable to 10.0000 Hz)
Max. Dynamic Load	+/- 10 kN
Max. Horizontal Travel	+/- 20 mm
Max. Vertical Travel	+/- 15 mm
Max. Confining Pressure	Up to 2000 kPa
Max. Back Pressure	Up to 2000 kPa
Sample Diameter	70 mm (or 100 mm on request)
Nominal Sample Height	26 mm (or 38 mm for 100 mm)
PC Interface	USB or Ethernet

Clisp Studio (csDYNSS-C) Dynamic Simple Shear with Confining Pressure Testing System Software

The VJ Tech Clisp Studio csDYNSS-C Software module enables you to perform dynamic simple shear tests on a sample contained within a Cell with a Confining Pressure.

Alternatively, dynamic simple shear tests can be carried out on a sample within Confining Rings but without Confining Pressure.

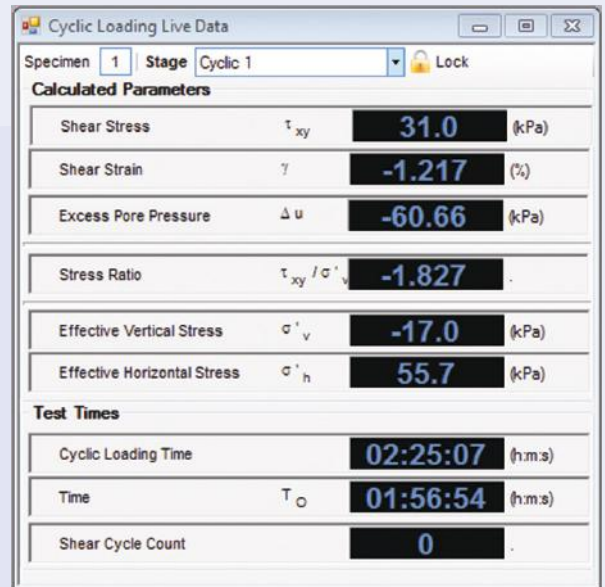
The software can be used with the VJ Tech Dynamic Simple Shear with Confining Pressure apparatus which enables the sample to be Saturated and Consolidated, and then Statically Loaded, Cyclically Sheared and tested for Liquefaction.

Features

- Test automation available
- Easy instrument and equipment setup and calibration
- Easy test setup using wizard style Assistant
- User configurable high speed data logging
- Saturation stage (Ramp or Step)
- Isotropic, Anisotropic or K0 Consolidation Stage
- Static Loading stage
- Simple Cyclic Shear stage (Stress or Strain)
- Liquefaction cyclic shear stage
- Live view of sensor readings and status
- Live Data View (Measured and calculated data)
- Live graphical displays of logged and calculated data
- Live tabular displays of logged and calculated data
- User configurable views, graphs and tables
- Cycle Analysis of Cyclic and Liquefaction stages
- Optional customised presentation reports on request
- Data export to Excel for further manipulation
- Test script export and import



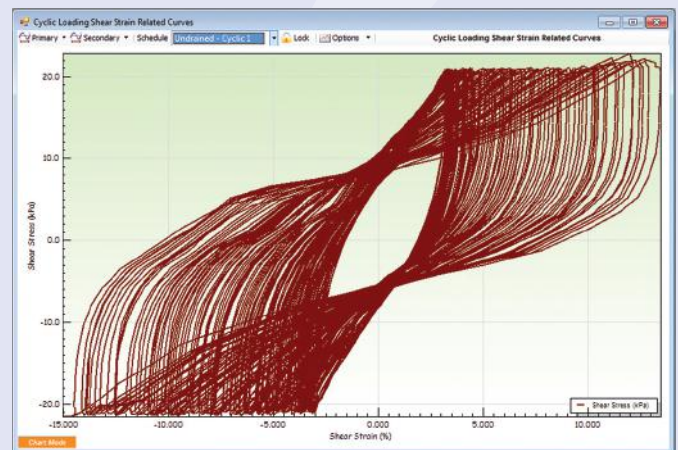
Cyclic Loading Monotonic Shearing Graph



Cyclic Loading Live Data

Specimen	Stage	Time (s)	Dynamic Excess Pore Pressure (kPa)		Total Horizontal Stress (kPa)		Effective Shear Stress (kPa)		Effective Vertical Stress (kPa)		Horizontal Stress (kPa)		Vertical Stress (kPa)		Shear Strain (%)		Volume Change (%)		Axial Strain (%)	
			Δu	σ	σ'_h	σ'_v	τ_{xy}	σ'_v	σ'_h	σ'_v	σ'_h	τ_{xy}	σ'_v	σ'_h	τ_{xy}	σ'_v	σ'_h	τ_{xy}	σ'_v	σ'_h
7255	1460	68.49	90.5	82.0	22.0	13.5	-4.5	-0.207	0.154	6.582	1.087	-0.036	28.371							
7256	1460	68.68	90.9	82.0	22.2	13.3	-7.0	-0.315	-0.167	6.582	-1.179	-0.036	28.371							
7257	1461	68.63	90.8	81.0	22.2	12.4	-10.0	-0.450	-0.520	6.582	-3.660	-0.036	28.371							
7258	1461	69.06	91.8	81.0	22.8	11.5	-13.9	-0.610	-0.812	6.582	-5.717	-0.036	28.371							
7259	1461	70.01	93.7	82.0	23.7	12.0	-16.5	-0.695	-1.001	6.582	-7.049	-0.036	28.371							
7260	1461	69.75	95.2	83.0	25.5	13.3	-18.1	-0.709	-1.111	6.582	-7.826	-0.036	28.371							
7261	1461	69.99	95.6	83.0	25.6	13.0	-19.0	-0.745	-1.173	6.582	-8.263	-0.036	28.371							
7262	1462	72.74	98.0	86.0	25.3	13.3	-19.8	-0.783	-1.217	6.582	-8.573	-0.036	28.371							
7263	1462	70.78	97.6	85.0	26.8	14.2	-20.4	-0.761	-1.255	6.582	-8.839	-0.036	28.371							
7264	1462	71.08	97.7	85.0	26.6	13.9	-21.0	-0.790	-1.292	6.582	-9.101	-0.036	28.371							
7265	1462	72.16	98.9	86.0	26.8	13.8	-21.2	-0.792	-1.318	6.582	-9.284	-0.036	28.371							
7266	1462	70.84	98.1	85.0	27.2	14.2	-21.1	-0.775	-1.334	6.582	-9.398	-0.036	28.371							
7267	1463	71.74	99.0	86.0	27.2	14.3	-20.8	-0.764	-1.342	6.582	-9.450	-0.036	28.371							

Cyclic Loading Calculated Results



Cyclic Loading Shear Strain Related Curves Graph