

# DATA



*World Leaders in Software Based Geotechnical Testing Systems for Laboratory and Field*



**Fig 1. GDS Standard triaxial testing system, STDTTS showing optional Rowe and Barden consolidation cell (inset)**

## Overview

Using our existing advanced technology, we have developed our PC-Controlled Standard Stress Path Triaxial Testing System (Fig. 1 and Fig. 2). The system uses our proven GDSLAB Windows software, the classic Bishop & Wesley-type stress path triaxial cell, and is based on our Standard 3MPa/200cc pressure/volume controller. Three of these pressure controllers link the computer to the test cell as follows:

- one for axial stress and axial displacement control.
- one for cell pressure control.
- one for setting back pressure and measuring volume change.

All control and data logging is built into the system via GDSLAB software.

## System elements

This system comprises the following elements:

- the classic Bishop & Wesley-type 7kN/1700kPa/38mm/50mm Stress Path triaxial cell with both 38mm and 50mm diameter pedestals and top caps (including extension top caps), one internal submersible load cell (you can choose from 1kN, 2kN, 4kN or 8kN ranges when placing your order), 2000kPa range pore pressure transducer and  $\pm 20$ mm range displacement transducer.
- three standard 3MPa/200cc pressure/volume controllers configured with volume change measurement and a 16bit data acquisition device for accurate measurement of all transducers, RS232 computer interface and Windows controlling software.

## Test Menu

The standard test menu is as follows:

- B CHECK
- SATURATION RAMPS
- ISOTROPIC AND AN ISOTROPIC CONSOLIDATION
- UNCONSOLIDATED-UNDRAINED

# STDTTS

## THE GDS STANDARD TRIAXIAL TESTING SYSTEM

### GDS Instruments Ltd

Unit 32 Murrell Green Business Park  
London Road, Hook, Hampshire  
RG27 9GR, U.K.

Telephone +44 1256 382450

Facsimile +44 1256 382451

e-mail: [info@gdsinst.demon.co.uk](mailto:info@gdsinst.demon.co.uk)

web: <http://www.gdsinstruments.com>

- CONSOLIDATED-UNDRAINED WITH PORE PRESSURE MEASUREMENT
- CONSOLIDATED-DRAINED WITH VOLUME CHANGE MEASUREMENT
- LOW FREQUENCY CYCLIC LOADING
- STRESS PATH

## System features

- Automatic area correction. The system automatically uses volume change and axial displacement to compute the current average area of the test specimen. This is used in all control calculations. The average area is defined as the cross-sectional area of the volumetrically equivalent right cylinder of the same height as the deformed test specimen.
- Pore pressure is measured at the base pedestal using a rigid pore pressure sensor.
- Volume change measurement is resolved to one cubic millimetre.
- Friction effects are eliminated by measuring axial force with a submersible load cell inside the triaxial chamber. Deviator stress is cross-checked by the computer using Bishop & Wesley's equations.
- Axial displacement is measured by two independent means - directly by transducer and indirectly by volume change into the lower chamber.
- All tests can be either strain or stress controlled in either compression or extension.
- The system allows linear stress paths to be programmed in stress space. Any number of continuous linear paths can be made with/without user-intervention at the end of each path.
- The system can also perform constant rate of strain consolidation testing using the Rowe & Barden-type hydraulic oedometer. This extra-cost option is available by changing the software and test cell.

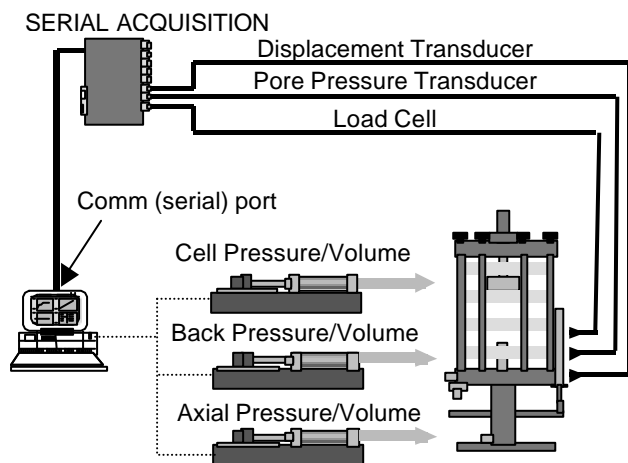


Fig 2. STDTTS schematic

## System advantages

The new GDS PC-controlled Standard Stress Path Triaxial Testing System has many advantages including,

- futureproof as the software is expandable to include additional transducers, hardware, or even complete systems
- very simple to set up and use
- no compressed air - direct screw pump control of water pressure

- the whole system including PC can be laid out on a lab bench area 1.4m by 0.9m
- the electrical and hydraulic inter-connections of the system are easy to see and understand and are not hidden behind wall panels
- tests can be carried out manually to give "hands-on" experience, or under direct PC control for automated testing e.g. testing overnight
- ideal for teaching modern triaxial testing in colleges and universities
- designed for effective stress and stress path testing for commercial and public works laboratories.

## System Specification

The system is designed to be bench-mounted on a lab bench and occupies a plan area including the PC of about 1.4m long by 0.9m deep. The total net weight of the system (cell and three pressure controllers) is about 80kg.

### Triaxial Cell

Bishop & Wesley-type stress path extension/ compression triaxial cell.

Maximum cell pressure/axial load 1700kPa/7kN.

Maximum axial displacement 25mm.

Standard sizes of test specimens: 38mm dia x 76mm, 50mm dia x 100mm (alternative sizes available on request).

Cell dimensions: 300mm dia x 800mm high.

Weight: 34kg.

### Pressure Controller

Microprocessor-controlled stepping motor-driven screw pump with closed loop servo regulation of pressure.

Maximum pressure 3000kPa.

Accuracy of pressure measurement 0.1 % range.

Resolution of pressure control and measurement 1 kPa.

Maximum volume 200cc.

Accuracy of volume change measurement and control 0.1 % range.

Resolution of volume change measurement 1 cu. mm.

Size: 600mm long x 230mm wide x 200mm high

Weight: 14kg.

### Load Cell

Internal submersible oil-filled load cell with semiconductor strain gauged shear webs. Response to cell pressure changes less than 0.2%/MPa.

Ranges: 1kN, 2kN, 4kN or 8kN (alternative ranges available on request. Note: load cells are interchangeable).

Accuracy: Combined non linearity and hysteresis 0.1% range.

### Pore Pressure Transducer

Range: 2000kPa.

Accuracy: Combined non linearity and hysteresis 0.1% range.

### Displacement Transducer

Hybrid rectilinear potentiometer type. Combines the best features of precision conductive plastic and wire-wound potentiometers. The conductive plastic film ensures infinite resolution and a very long life. The wire-wound element guarantees excellent linearity and a low temperature coefficient.

Range: 50mm.

Accuracy/Linearity:  $\pm 0.25\%$  range.