

Suitable for ASTM D6528

Test Types:

Dynamic Simple Shear

Dynamic Triaxial

Available Load ranges:

Axial Load: 5kN

Axial Load: 10kN

Shear Load: 5kN

Shear Load: 10kN

Software

Fully automated

Control Parameters:

Axial Load/Displacement
Shear Load/Displacement

Active Height Control

GDS Combined Advanced Dynamic Cyclic Simple Shear (ADVDCSS)



What is it?

The GDS Combined Advanced Dynamic Cyclic Simple Shear (ADVDCSS) testing system is a new innovation by GDS in that it combines Simple shear and Triaxial testing without the use of a separate loadframe. The ADVDCSS uses our established technology of Electro-Mechanical actuators which are designed for long life and highly accurate position control. Unlike pneumatic actuators this type of actuator is even suitable for carrying out small strain testing, long term creep tests and dynamic tests up to 5Hz. The system converts from a simple shear test to triaxial test in about 15 minutes by replacing the cell wall with a shorter one and raising the position of the lower platen using the built in lift system to allow for the shorter sample length of simple shear tests

Features

Axial and shear loads or displacements are provided by proven GDS electro-mechanical force actuators. Axial and

shear load readings are controlled under closed-loop feedback. During shearing the constant axial strain for the specimen is maintained using active height control via the axial force actuator. Topcap fixity is assured through a system of linear guides to minimise topcap rocking during shearing.

During simple shear tests constant volume conditions are ensured in the sample by use of PTFE coated low friction slip rings around the sample. These rings are finely machined for smoothness and flatness to ensure minimum friction. Optionally wire reinforced membranes can be used in the GDS system. Height control of the specimen is active and readings are taken from a very small range LVDT to ensure accurate control of the topcap position.

Triaxial tests such as stress paths, K-zero and permeability can all be carried out in the ADVDCSS subject to the correct test modules being present.

Technical Specifications

- Accurate electro-mechanical actuators
- Available sample sizes (one size supplied with system):
 - $\Phi 50\text{mm} \times 100\text{mm}$
 - $\Phi 70 \times 140\text{mm}$
 - $\Phi 100 \times 200\text{mm}$
 - Other sizes available on request
- 8 Channel Dynamic 16 Bit data logger
- Low friction sample slip rings
- High quality, low friction linear guides used to ensure strength and alignment in normal and shear directions.
- Available control parameters:
 - Axial Load / Stress
 - Axial Strain / Displacement
 - Shear Load / Stress
 - Shear Strain
- Available control modes for each control parameter:
 - Ramp (monotonic), Cycle (slow speed) and hold.



Developed in association with Delft University of Technology.

Advantages of the GDS ADVDCSS

- The system can carry out Simple Shear and Triaxial testing (a cell shown in Fig. 2)
- The ADVDCSS can saturate Simple shear samples in a similar way to normal triaxial testing, using cell pressure and back pressure. This cannot be achieved in a normal simple shear system
- The ADVDCSS has been designed to be extremely stiff in the axial and shear directions, this leads to very low system compliance.
- Upgrades can be added to allow:
 - Bender element testing
 - Unsaturated Testing
 - Local strain measurement

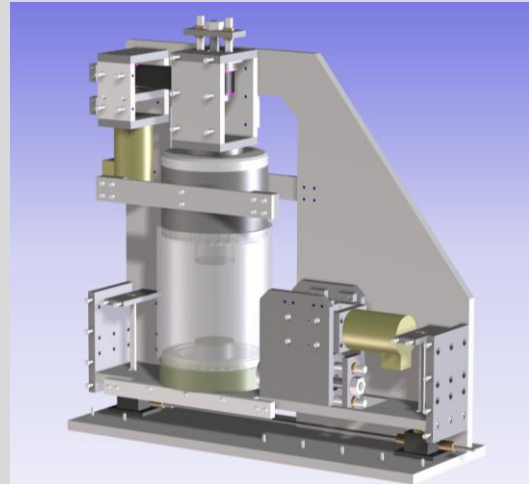


Fig. 2 Both tests are interchangeable on one carriage

Upgrade to bender element testing

The ADVDCSS system may be upgraded to perform P and S wave bender element testing with the addition of the following items (see Fig. 3):

- Bender element pedestal with *new* inserted element
- Bender element top cap with *new* inserted element
- High-speed data acquisition card

Signal conditioning unit, amplification of source and received signals (P and S wave) with user-controlled gain levels (via software).

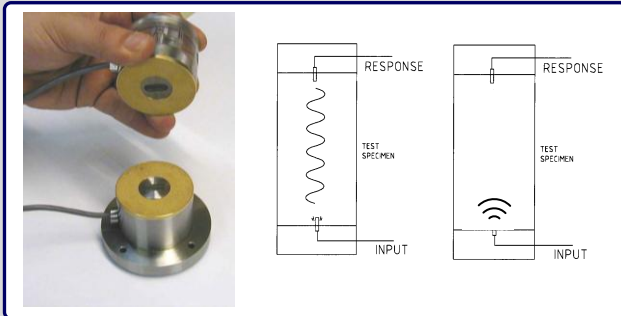


Fig. 3 P and S wave elements

For further information on bender element testing, please refer to the dedicated Bender Element Testing datasheet.

GDSLAB control software

The GDSLAB control and acquisition software from GDS is a highly developed, yet extremely flexible software platform. Starting with the Kernel module and the ability to perform data acquisition only, additional modules may be chosen for your testing requirements. Some currently available modules available are as follows:

- Simple Shear
- Dynamic Triaxial
- SATCON (saturation and consolidation)
- Standard triaxial
- Stress path testing (p, q and s, t)
- Advanced loading tests
- Unsaturated testing
- K0 consolidation
- Permeability

GDSLAB has the ability to be configured to your hardware choice, no matter how unique the arrangement. The hardware layout is available in graphical format via the GDSLAB 'object display'. This makes setting up the devices and checking the connectivity extremely simple, as in Fig. 4.

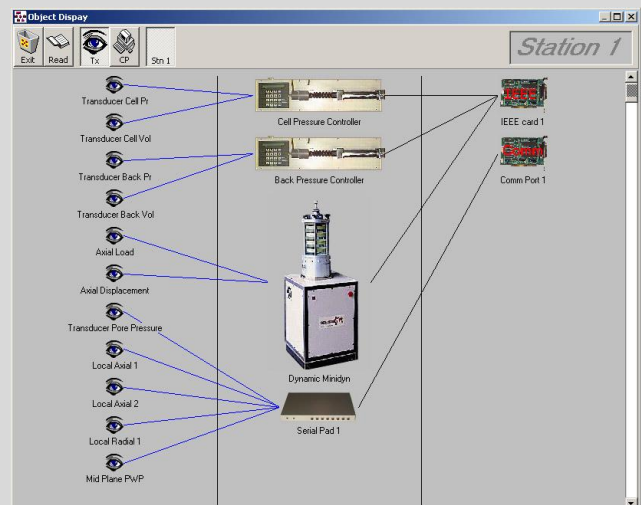


Fig. 4 GDSLAB object display showing a DYNNTTS setup

For further information on GDSLAB, please refer to the dedicated GDSLAB datasheet. Note: Due to continued development, specifications may change without notice.