Variable Direction Dynamic Cyclic Simple Shear (VDDCSS)

Overview: The Variable Direction Cyclic Simple Shear (VDDCSS) allows simple shear to be performed in two directions, rather than the standard single direction. This is achieved by having a secondary shear actuator that acts at 90 degrees to the primary shear actuator.

When used as a variable direction machine, the secondary shear axis can be used independently of the other shear axis or in conjunction with it, therefore simple shear may be performed in any horizontal direction. Tests can be carried out with constantly rotating shear vectors.

Key Features:	Benefits to the User:
Test control:	Test control allows specification of amplitude of horizontal load / displacement as well as direction.
Direction of shear and pattern of shear rotation from zero degrees can be defined:	• Constant at zero degrees. • Rotate from zero degrees at a constant rate. • Cycles from zero degrees plus or minus x degrees with period in seconds.
Teflon coated rings:	K-zero conditions ensured by use of 1mm high, low-friction, teflon coated rings.
Control & Acquisition software can also define test stages at different shear stress:	Angles relative to zero e.g. 0, 10, 20, 30 etc. Definition of waveform by datum/ common point, amplitude, controlling parameter and frequency.
Independent axis control:	Each axis can be load or displacement controlled.
Local strain LVDT's for both shear directions:	Highly accurate strain measurement.

Tests that can be Performed:

Dynamic simple shear and dynamic variable direct simple shear.

Upgrade Options:

Bender Elements.

Technical Specification:

Actuators:	3 x electro-mechanical, high accuracy, encoder controlled actuators
Axial Force Accuracy:	Typically <0.1%
Axial Load (kN):	5
Displacement Range:	Shear axis +/- 10mm (+/-30% shear strain) Normal axis +/- 25mm (+80% consolidation strain)
Displacement Resolution:	0.3µm
Load Range (kN):	5 normal force, 2 on each shear measurement (y and z)
Operating Frequency (Hz):	1
Sample Size (mm):	50 diameter specimen, height 20 to 30 (other sizes on request)

System Uses:

The VDDCSS provides a system for testing soils which ,may undergo loadings that change direction over time. This includes a variety of offshore foundations for structures such as wind farms and oil rigs.

The VDDCSS can also model situations which, bias in one direction and load in the other. An example of this is near-field seismic motions.

Fig. 1 Shows a Typical System Set-up:

PC Running GDS Software:

The PC connects via USB directly in to the VDDCSS. Control & data acquisition software allows the user to set-up and run tests.

A VDDCSS:

The VDDCSS does not require any additional pressure controllers, hydraulic power packs or control boxes. The desktop apparatus just links to a PC running GDS Software.

Upgrade Option:

The VDDCSS can be upgraded with bender elements.

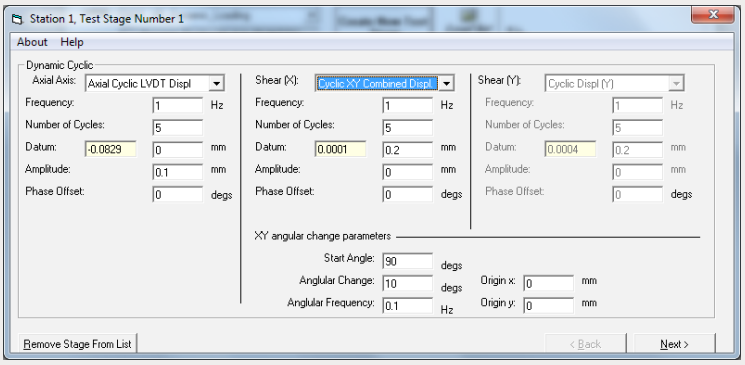
Tests that can be Performed:

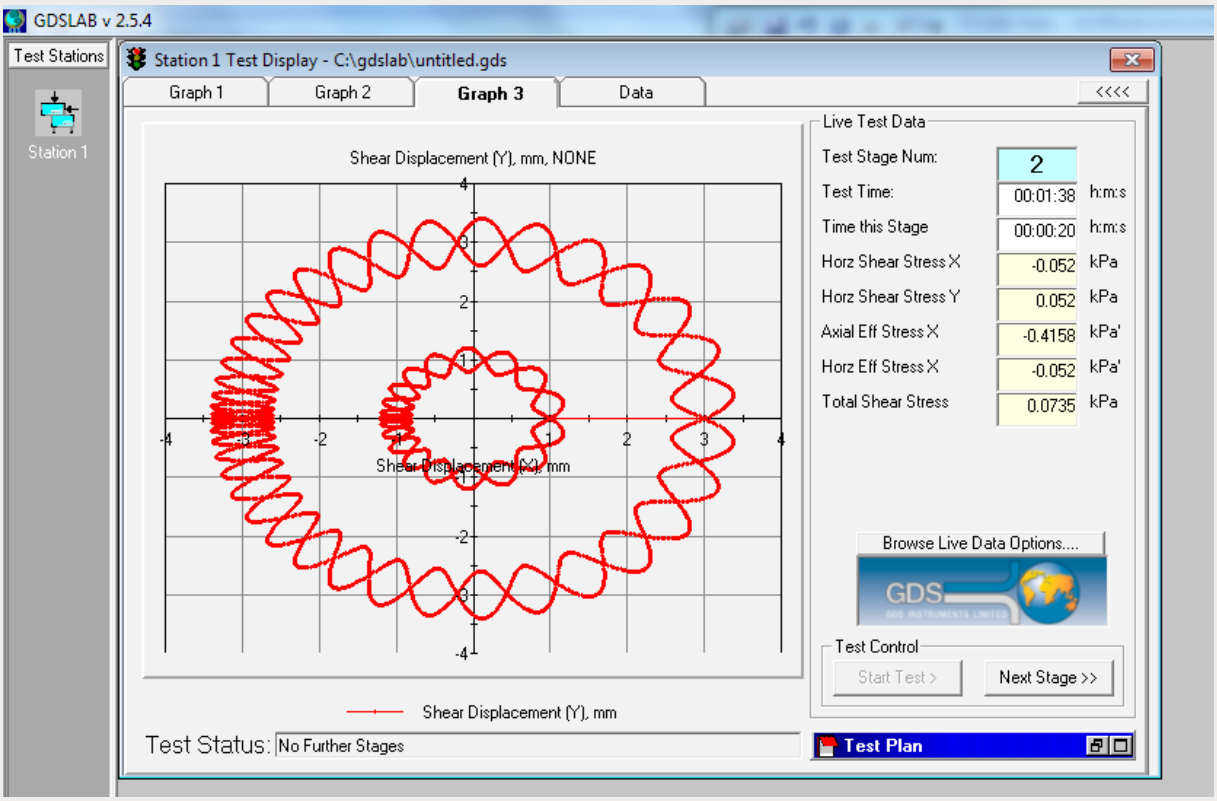
Dynamic simple shear and dynamic variable direct simple shear.

Control Software:

Fig. 2 Screen shots of the VDDCSS control data acquisition software.

Operating System: Windows XP SP3 or higher (We recommend that whichever version of Windows you are running, that it is up to date with the latest Service Pack). PC Spec Hardware: 1GHz (minimum) / 1GB Ram (minimum): CD Rom.





Upgrade to Bender Element Testing:

The VDDCSS can be upgraded to perform P and S wave bender element testing with the addition of the following items:

- Bender element pedestal with bender element insert.
- Bender element top-cap with bender element insert.
- High-speed data acquisition card.
- Signal conditioning unit which includes amplification of source and received signals (P and S wave) with user controlled gain levels (via software).
- GDS Bender Element Analysis Tool GDSBEAT (optional).

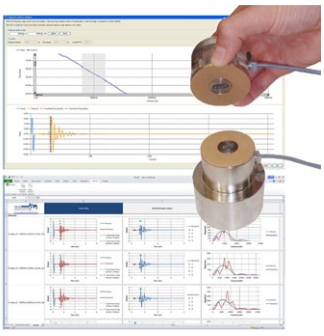


Fig. 3 Screenshots of GDSBEAT software.

Why Buy GDS?

Technical Support:

GDS provide comprehensive on-site product training and installation. GDS understand the need for ongoing after sales support, so much so that they have their own dedicated customer support centre. The support centre allows the user to log queries, download helpsheets and get the latest information on product updates. The site is fully searchable and provides a great resource to customers.

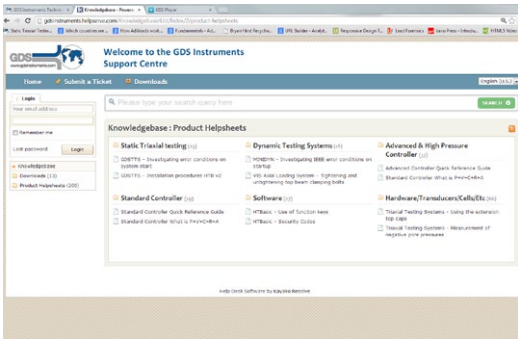


Fig. 4 GDS online customer support centre.

Alongside their support centre GDS use a variety of additional support methods including...

- **Remote PC Support**: Remote PC support works by GDS providing a secure link to a customers PC, thereby allowing GDS to take control. Once in control of the PC, GDS can help with any problems associated to software, installation, testing etc.
- **Product Helpsheets:** The helpsheets are the GDS FAQ documents. They cover a multitude of hardware and software questions and are free to download from our online support centre.
- **YouTube Channel:** GDS YouTube channel holds both software and hardware video's aimed to give you better understanding of how the products work.
- **Email & Telephone Support:** If you prefer you can email requests to support@gdsinstruments.com where they will be automatically added to the support system and then allocated to a support engineer.

GDS Awarded Queens Award for Enterprise in International Trade:

GDS have been presented with the most prestigious corporate award made in the UK – The Queen's Award for Enterprise in the International Trade category. GDS are delighted to have won the award which has been given to GDS for increasing overseas trade by 190% over six years of continuous sustained growth, and for selling over 85% of their production overseas. GDS have achieved this through a combination of continuous product development, understanding customer's requirements and a company wide dedication to customer support.

THE QUEEN'S AWARDS
FOR ENTERPRISE:
INTERNATIONAL TRADE

Made in the UK:

All GDS products are designed, manufactured and assembled in the UK at our offices in Hook. Quality assurance is taken of all products before they are dispatched.

ISO 9001 REGISTERED FIRM | INTERNATIONAL ACCREDITATION BOARD

GDS are an ISO9001:2000 accredited company. The scope of this certificate applies to the approved quality administration systems relating to the "Manufacture of Laboratory and Field Testing Equipment".

Due to continued development, specifications may change without notice. See the GDS website for the full product range & to visit our Geotechnical Learning Zone.